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LOCAL HAZARD MITIGATION PLAN

September 30, 2021 (update per FEMA Comments)
(5-year update 2021-2026)

CITY OF PALMDALE LOCAL HAZARD MITIGATION PLAN 2021 – 2026 UPDATE

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Note: Full size scalable maps are available for viewing by appointment at the City of Palmdale Public Works Department.

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MAPPING

We extend our acknowledgement and special thanks to Jim Deyo, City of Palmdale Traffic/GIS Department, for his collaboration and GIS Mapping contributions to this LHMP.

We would also like to thank the Governor's Office of Emergency Services ("OES") for providing some of the maps included in this LHMP and for providing the Earthquake HAZUS Report and associated maps utilized in this LHMP.

Note: Care was taken in the creation of the maps utilized in this LHMP, which are provided "as is." The City cannot accept any responsibility for any errors, omissions, or positional accuracy, and therefore, there are no warranties that accompany these maps. In no way do these maps represent or constitute a land survey. Users are cautioned to field verify information before making any decisions.

EXECUTIVE SUMMARY

The City of Palmdale's Local Hazard Mitigation Plan (LHMP) recognizes that natural and man-made disasters can result in the loss of life and property, economic and social societal setbacks, and the degradation of the environment. It also recognizes that local governments are charged with the responsibility of protecting their residents from danger and harm. In keeping with this responsibility, the City of Palmdale (City) has established a number of plans, policies, programs, and ordinances. They are intended to provide protection to its citizens by reducing the levels of risks people, property and the environment are subject to from natural and technological/man-made hazards within the City (and its neighboring communities).

As recognized in the Palmdale General Plan,

"Some degree of risk is inevitable since natural disasters cannot be predicted with certainty and because the knowledge and technology to control man-made risks is constantly evolving. Since the total elimination of risk is not possible, public safety is relative to the degree of risk that people find tolerable. The value of life and property and the environment becomes a yardstick for tolerance and the need for governmental action." (Source: City of Palmdale, 1993 General Plan, Safety Element, p.S-1)

The protection of these community values is reflected in the goals and objectives contained in this LHMP.

This LHMP serves several different needs:

- Provides the platform for the integration of hazard mitigation strategies into the day-to-day policies, practices, and programs of the City of Palmdale.
- Includes a local and regional appraisal of the risk and vulnerability from natural hazards to the city's assets, critical facilities, infrastructure, economy, and population.
- Evaluates local capabilities to respond to and recover from major disasters.
- Ensures Palmdale's Mitigation Plan goals and objectives are compatible with existing hazard mitigation elements within Palmdale's General Plan and Emergency Operations Plan.
- Will result in the identification of prioritized, cost effective mitigation actions and projects to address identified vulnerabilities.
- Will conform to all guidance from the Federal government's Office of Homeland Security – Federal Emergency Management Agency (FEMA) and the State of California's Governor's Office of Emergency Services (OES), thereby qualifying the City of Palmdale for all manner of federal mitigation grant programs.

The "Local Hazard Mitigation Planning Process" ensures that once the LHMP is developed, it will become a living document that is consistent with the goals and objectives expressed in the City of Palmdale's General Plan and Emergency Operations Plan.

The City of Palmdale has also reached out to neighboring jurisdictions, inviting their participation in the planning process. The City has established a Hazard Mitigation Steering Committee and Local Hazard Mitigation Planning Task Force whose members understand that their role is ongoing and not limited to preparing this LHMP. These groups are the City's insurance that the annual and 5-year reviews of this LHMP will capture any new initiatives, accomplishments or significant mitigation actions taken by the City.

SECTION ONE

BACKGROUND

&

COMMUNITY PROFILE

SECTION ONE – BACKGROUND & COMMUNITY PROFILE

1.1 Definition of Hazard Mitigation

FEMA defines hazard mitigation as:

“...any sustainable action that reduces or eliminates the long-term risk to people and property from future disasters.” (Source: <https://www.fema.gov/grants/mitigation>, 2021)

Section 323 of Disaster Mitigation Act 2000 amended the Stafford Act (Public Law 93-288) to give more responsibility to local government for pre-disaster mitigation actions that will reduce or eliminate damage to lives and property in future disasters. The law reiterates its emphasis on minimum standards, and requires, as a condition of receiving federal disaster assistance:

“... that any repair and reconstruction shall be done in accordance with the minimum standards of safety, decency and sanitation, and in accordance with applicable codes, specifications, and standards”. (Source: https://www.fema.gov/sites/default/files/2020-03/stafford-act_2019.pdf, 2019)

Federal law requires that local jurisdictions have an approved LHMP as a condition for receiving both pre-disaster and post-disaster hazard mitigation grants. It also requires that the state or local government recipients of federal assistance evaluate the natural hazards of the area in which the assistance is to be used and take action to mitigate them, including safe land use and construction practices.

To be effective, hazard mitigation actions must be taken in advance of a disaster. After disaster strikes, mitigation opportunities exist only during recovery and even those opportunities can be limited by the absence of advance planning. Nevertheless, the immediate post-disaster period does present special opportunities for mitigation.

Hazard mitigation includes such activities as:

- Hardening structures and facilities at risk using structural and non-structural means;
- Identifying hazard-prone areas and developing standards for prohibited or restricted use and development;
- Adoption of disaster resistant ordinances and regulations;
- Fuel reduction in forests and high fire hazard areas;
- Habitat restoration in streams; and,
- Storage of excess runoff.

Hazard Mitigation may occur during any phase of a threat, emergency, or disaster. Mitigation can and may take place during the *preparedness* (before), *response* (during), and *recovery* (after) phases.

For example, in locations with active earthquake faults, it is known that older “soft story” apartment buildings do not meet the current code requirements intended to provide life safety for all concerned. By pre-identifying the locations of these buildings (Preparedness) it provides opportunity for local first responders (Response) to familiarize themselves with these high-risk facilities. It also provides the opportunity to retrofit the building (Mitigation) to comply with minimum standards for life safety. Improved building performance at the time of disaster will improve the ability of the residents, owners, and the community to address other immediate needs (Response) and facilitate an orderly recovery (Recovery).

1.2 Why Develop a Local Hazard Mitigation Plan?

The Disaster Mitigation Act – 2000 (DMA 2000) regulations establish a process for producing a community based LHMP that considers all-natural hazards. The Palmdale LHMP emphasizes natural hazards and also includes man-made and technological hazards to the extent that these are deemed critical. The LHMP will demonstrate that proposed mitigation actions are based on a sound planning process that accounts for the inherent risks to, and capabilities of, the community. Per DMA 2000 requirements, this LHMP will at a minimum address or include the following general items:

- Initial Coordination and Capability Assessment
- Public Involvement
- Planning, Research, and Documentation
- Agency Coordination
- Hazard Identification
- Risk Assessment
- Goals and Objectives
- Mitigation Strategy
- Plan Adoption
- Submittal to State OES and FEMA
- Plan Implementation and Maintenance

The City of Palmdale adopted a Local Hazard Mitigation Plan in 2004, followed by updates in 2009 and 2016. This LHMP will be evaluated annually to determine progress and/or effectiveness of mitigation projects and programs. Updates will document the success of mitigation actions in reducing damage to lives, property, and the environment. Model projects that can be replicated by other jurisdictions will be encouraged. Documentation of losses avoided is critical if policy decision makers are expected to understand the cost effectiveness of mitigation actions.

The progress of the City’s mitigation strategy will be monitored, and goals and objectives reviewed to address current conditions and anticipate future changes. The City will hold annual meetings, establish protocols, make recommendations, review and approve draft plans, coordinate with department heads and monitor progress on grants.

The overall effectiveness of the locally based hazard mitigation programs can be seen in the results of disasters over the years. California is arguably the most disaster-prone state in the nation with a combination of significant hazards and the nation's largest population. Contrasting the results of like events nationwide and worldwide demonstrates the state's effectiveness in minimizing losses.

This LHMP recognizes the risk from natural hazards on people, property, and the environment and prescribes prioritized mitigation actions that can reduce or eliminate the threat to lives and property in the future. Mitigation of the impacts from disasters will yield savings to individuals and both the public and private sectors in the form of avoided losses in the future. Implementation of the City of Palmdale's hazard mitigation actions will break the repetition of the Preparedness – Response – Recovery disaster cycle.

This LHMP provides a set of action items to reduce risk from natural hazards through education and outreach programs and to foster the development of partnerships, and implementation of preventative activities such as post disaster repair and reconstruction standards, pre-established post disaster sheltering facilities, commercial business post-disaster start-up locations and land use programs that restrict and control development in areas subject to damage from natural hazards.

NATURAL HAZARD LAND USE POLICY IN CALIFORNIA

Planning for impacts from natural hazards has historically been a requirement to survive in California. Fires, floods, earthquakes, landslides, volcanoes, freezes, severe storms, and tsunamis ravage parts of the California landscape on a regular basis, and always have. In addition, cultural and environmental resources abound and are directly linked to the economic wellbeing of California. Planning to protect these assets should be an integral element of any governmental agency's land use planning program. All California cities and counties have General Plans and the implementing ordinances that are required to comply with the statewide planning regulations.

The continuing challenge faced by local officials and state government is to keep the network of local plans effective in responding to the changing conditions and needs of California's diverse communities, particularly in light of the very active seismic region.

This is particularly true in the case of planning for natural hazards where communities must balance development pressures with the nature and extent of hazards.

Planning for natural hazards means that local plans must include inventories, policies, and ordinances to guide development in hazard areas. These inventories should include the compendium of hazards facing the community, the built environment at risk, the personal property that may be damaged by hazard events and most of all, the people who live in the shadow of these hazards.

SUPPORT FOR NATURAL HAZARD MITIGATION

The primary responsibility for development and implementation of risk reduction strategies and policies lies with local jurisdictions. Local jurisdictions, however, are not alone. Partners and

resources also exist at the regional, state, and federal levels of government. Numerous California state agencies have a role in natural hazards and natural hazard mitigation, as outlined below.

FEDERAL LAW

Federal legislation has historically provided funding for disaster relief, recovery, and some hazard mitigation planning. DMA 2000 (Public Law 106-390) reinforces the importance of mitigation planning and emphasizes planning for disasters before they occur and establishes a pre-disaster hazard mitigation program and includes new requirements for the national post-disaster Hazard Mitigation Grant Program (HMGP).

Section 322 of DMA 2000 specifically addresses mitigation planning at the state and local levels and identifies requirements that allow HMGP funds to be used for planning activities and increases the amount of HMGP funds available to states that have developed a comprehensive, enhanced mitigation plan prior to a disaster. State, tribal, and local jurisdictions must have an approved mitigation plan in place that demonstrates proposed mitigation measures that are based on a sound planning process accounting for the risk to and the capabilities of the individual communities, prior to receiving post-disaster HMGP funds or permanent repair monies under Public Assistance.

STATE LAW

Several statutes and executive orders are relevant to disaster mitigation planning in California. Among the most important are:

- California Earthquake Hazards Reduction Act of 1986 – established coordinated program to implement new and expanded activities to significantly reduce earthquake threats.
- Health & Safety Code Sec. 19211 – requires bracing of water heaters.
- Health & Safety Code Sec. 19181 – requires the installation of earthquake sensitive gas shutoff devices in buildings open to the public.
- Public Resources Code Sec. 2621, et seq. (Alquist-Priolo Earthquake Fault Zoning Act) – requires jurisdictions to establish rules and regulations prohibiting the development of structures intended for human habitation across the trace of active faults.

In addition, the state has instituted a number of programs related to disaster mitigation. These include:

- Caltrans Seismic Retrofit Program – requires critical structures, such as bridges, to meet the latest seismic safety standards.
- California Earthquake Authority: California Residential Mitigation Program – provides grants for homeowners to brace the house to its foundation.
- National Flood Insurance Program (administered by the Department of Water Resources) – intended to share risk through flood insurance and reduce development in floodplains.
- Office of Planning and Research general plan guidelines documents – intended to provide guidance and basic requirements for jurisdictions to implement goals and policies related to safety.

STATE AGENCIES

There are several state agencies with responsibility for hazard mitigation activities, all participate as core agencies on the State Hazard Mitigation Team (SHMT).

The SHMT assisted in the promulgation of the first State of California Multi-Hazard Mitigation Plan (CMHMP), approves updates to the current plan, and recommends mitigation actions for implementation by state and local government. The core membership of the SHMT includes state agencies that deal with fire, water resources, forestry, emergency services, transportation, conservation, and more, including:

- The *Governor's Office of Emergency Services (OES)* is responsible for disaster mitigation, preparedness, response, recovery, and the administration of federal funds after a major disaster declaration; is the caretaker for the State Multi-hazard Mitigation Plan; and Chairs the State Hazard Mitigation Team.
- The *Southern California Earthquake Center (SCEC)* gathers information about earthquakes, integrates this information on earthquake phenomena, and communicates it to end-users and the general public to increase earthquake awareness, reduce economic losses, and save lives.
- The *California Division of Forestry (CDF)* is responsible for all aspects of wildland fire protection on private, and state lands, and administers forest practices regulations, including landslide mitigation, on non-federal lands.
- The *California Geologic Society (CGS)* is responsible for geologic hazard characterization, public education, the development of partnerships aimed at reducing risk, and exceptions (based on science-based refinement of tsunami inundation zone delineation) to state mandated tsunami zone restrictions.
- The *California Division of Water Resources (DWR)* plans, designs, constructs, operates, and maintains the State Water Project; regulates dams, provides flood protection, and assists in emergency management. It also educates the public, and serves local water needs by providing technical assistance.

RELATIONSHIP OF THIS LHMP TO STATE AND COUNTY HAZARD MITIGATION PLANS

The State of California has a solid record of legislation, commissions, executive orders, regulations, codes and standards, task forces, programs, policies, and planning requirements that provide the underpinning for the CMHMP and local hazard mitigation plans.

Those state agencies responsible for managing the response to and recovery from the impacts of fires, floods, landslides, and earthquakes, have participated for 15 years with OES in the development of single disaster hazard mitigation plans in response to federal requirements for disaster assistance. The hazard profiles established by these agencies and expressed in the 2018 State of California Hazard Mitigation Plan provide the underpinning for both the 2019 County of Los Angeles All Hazards Plan and the Palmdale LHMP.

The task force and steering committee will review all the goals and objectives adopted by the state, review priorities chosen, identify mitigation actions recommended by the state plan,

identify items addressed in the table of contents, and reference state sources of information as needed.

1.3 Purpose of this LHMP

The purpose of this LHMP is to integrate hazard mitigation strategies into the day-to-day activities and programs of the City of Palmdale.

As the costs of damage from natural disasters have continued to increase, the community and the local decision-making body realizes the importance of identifying effective ways to reduce vulnerability to, and losses from, disasters. An LHMP assists a community in reducing impacts from hazards by recognizing its vulnerability in relation to its risk, identifying resources, creating an orderly data collection process, and developing strategies for risk reduction, while helping to guide and coordinate mitigation activities throughout the community involved.

The resources and information within the LHMP are as follows:

- Establish a basis for coordination and collaboration among agencies and the public;
- Assist in the integration of mitigation goals and objectives with other City Plans;
- Identify existing, and prioritize future, mitigation projects;
- Assist in meeting the requirements of federal mitigation programs; and
- Create the foundation for future LHMP updates and maintenance.

In addition, this LHMP is designed to ensure that in the course of preparing for, responding to, or recovering from natural and man-made hazards, the long-term values of the community are not compromised.

If there is damage to lives and/or property, from any event that is catastrophic to the City or surrounding community, this LHMP provides the City with a framework by which the impacts of the event may be mitigated against in the most cost and resource-effective manner possible.

1.4 General Planning Requirements in California

All California cities and counties have General Plans and implementing ordinances that are required to comply with statewide planning regulations. State law requires each city and county to adopt a General Plan. The General Plan is the master document that governs land use and development within a community.

State law gives cities and counties wide latitude in formatting a General Plan. However, every General Plan must satisfy fundamental content requirements. These requirements or mandatory elements include land use, transportation, housing, open space, conservation, noise, safety, air quality, and environmental justice.

No one element of the General Plan has greater legal status or importance over any other. Rather, when complete, the General Plan should serve as an integrated, internally consistent, and compatible statement of local policies. In recognition of local differences, State law

empowers local governments to tailor the General Plan to locally relevant issues. Optional elements may also be adopted to reflect local conditions and interests more fully.

Planning for natural hazards calls for local plans to include inventories, policies, and ordinances to guide development in hazard areas. These inventories should include the compendium of hazards facing the community, the built environment at risk, the personal property that is vulnerable to damage, and most of all the people who live with these hazards.

California is a “home rule” state. That is, local government (Cities and Counties) have the authority to dictate public policy and must meet certain minimum codes and standards, or general planning laws, but they have options that include the adoption of standards that are more rigorous than those of the state or federal government.

SPECIFIC PLANS

A specific plan is a tool for the systematic implementation of the General Plan. It effectively establishes a link between implementing policies of the general plan including those related to public safety and hazard mitigation, and the individual development proposals in a defined area. A specific plan may be as general as setting forth broad policy concepts, or as detailed as providing direction to every facet of development from the type, location, and intensity of uses to the design and capacity of infrastructure; from the resources used to finance public improvements and the design guidelines of a subdivision.

A specific plan may encompass a large development (such as Ritter Ranch, at over 10,000 acres the largest Specific Plan in Palmdale) or much smaller areas that are connected by a physical or economic feature the jurisdiction wishes to preserve.

The adoption of a specific plan is a legislative act similar to adoption of a general plan or zoning ordinance. Therefore, specific plans may be subjected to voter initiative and referenda.

1.5 Community Profile

History

Over 100 years ago, when land in the Antelope Valley sold for fifty cents an acre, a group of Swiss and German families migrated from the Midwest and named their new community "Palmenthal."

Today Palmdale is one of the fastest growing cities in California. Affordable housing, excellent schools, and over 300 days a year of smog-free blue sky contribute to Palmdale's "A place to call home" lifestyle. Palmdale is an upper-middle class community, with a median household income of \$62,865 in 2019. Despite its growth, Palmdale continues to cherish the values of a family-oriented community while enjoying all of the conveniences provided by its rapidly expanding commercial sector.

Palmdale was the first city within the Antelope Valley, incorporated August 24, 1962. Palmdale is a general law City governed under the council/manager form of local government. The mayor is elected every two years for a two-year term. Also, every two years, two of the four council members are elected to serve four-year terms.

Recent Growth

Recent population growth has been spurred by the availability of affordable housing, Palmdale's proximity to major employment centers, and by annexation as well. Palmdale had 116,670 in the 2000 census. This number increased to 152,750 in the 2010 census, and to 155,079 in the 2019 census. The following Growth Chart outlines the growth rates for Los Angeles County. These exceptional growth rates, particularly for the Antelope Valley communities are tied economically to the ribbons of Highways 14 and 138 – portions of which are vulnerable to potential damage from earthquake induced ground shaking, flooding, and fires.

**Table 1.1 - Fastest Growing Cities in Los Angeles County
(Population of 50,000 or more)**

City	2019 Census estimate	2010 Census	2000 Census	Increase 2010-2019	Increase 2000-2010
Palmdale	155,079	152,750	116,670	1.52%	30.92%
Lancaster	157,601	156,633	118,718	0.62%	31.94%
Santa Clarita	212,979	173,320	151,088	22.88%	14.7%

Source: United States Census

Location/Economy

Palmdale is located in the southern region of the Antelope Valley, in the western portion of the Mojave Desert. It is approximately 60 miles northeast of downtown Los Angeles, off State Highway 14 (commonly known as the Antelope Valley Freeway).

Palmdale is north of Soledad Canyon and the San Gabriel Mountains, with sections of the Sierra Pelona Range bordering on the southwest. The city is bounded on the north by the City of Lancaster, and the Angeles National Forest to the west. Rural unincorporated county areas, characterized by a number of desert buttes, extend eastward from the Planning Area.

Palmdale city limits cover 105.10 square miles, with an additional 69.1 square miles of unincorporated lands falling under Palmdale's Sphere of Influence (SOI). The City of Los Angeles is 498.29 square miles and lies approximately 60 miles southwest of Palmdale, along with 88 other cities and 13+ million people in the San Fernando Valley and Los Angeles Basin. Its closest neighbor is the City of Lancaster, located to the north of Palmdale.

The largest local employers in the city are within the defense industry consisting of Lockheed-Martin, Northrop Grumman, Boeing, NASA, and U. S. Air Force Plant 42.

The Antelope Valley communities, principally Palmdale and Lancaster, are isolated geographically. A significantly large number of commuters leave the Antelope Valley for employment centers in Los Angeles and the San Fernando Valley, commuting 40-60 miles via automobile and (to a much lesser extent) rail to work in the San Fernando Valley and Los Angeles basin.

The risk of a significant disaster interrupting transportation, communication and utility assets and services makes it incumbent for these communities to prepare locally for the possibility of both local and regional impacts from disaster.

Topography/Climate/Hydrology

The city ranges in altitude from 2,450 feet to 2,700 feet with the surrounding mountains rising up to 4,000 feet above sea level. The topography varies from almost flat with occasional drainages and sand dunes on the valley floor to steep foothill and mountain areas on the south.

The San Andreas Fault traverses the Planning Area parallel to and just north of the mountains. Junipers, Western, Joshua trees, and desert chaparral are found in scattered areas throughout the city.

The climate is characteristic of this region of the Mojave Desert. The mountain ranges block cool, moist coastal air and create hot, dry summers, and cold winters. Seasonal rains (thunderstorms) are common, but creeks are dry during much of the year. Average temperatures range from 34 degrees (F) in January to 98 degrees (F) in July. Annual rainfall ranges from 0.05 to 1.84 inches, and occasional snow can be expected during winter.

Natural drainage channels, including Amargosa and Anaverde Creeks and Little Rock and Big Rock Washes run generally north and northeast across the Planning Area toward the Rosamond and Rogers dry lakes.

Potential for Disasters

If a significant regional earthquake occurs, Palmdale will be affected. The event would either inflict severe damage locally or inflict widespread damage to portions of the San Fernando Valley and Los Angeles Basin. Palmdale should be prepared to house and shelter significant portions of its own population or significant portions of those regional victims who may be trying to find a safe place to stay. These actions are consistent with the "Safe" community theme, being a good neighbor, and working toward a safe and resilient community that is prepared for disaster.

This becomes an important planning consideration in light of the potential disruption or damage to highways, metro-rail, and other infrastructure in the event of a serious earthquake, flood, fire, or terrorist attack. Palmdale has a robust disaster history and has participated in Major Federal Flood and Earthquake Disaster Declarations in 1992, 1993, 1994, 1995, 1998, 2005, and 2017. Historically, the 7.9 Fort Tejon Earthquake in 1857 and the Owens Valley Earthquake in 1872 established a benchmark for the Antelope Valley and are evidence of the tremendously damaging potential of earthquakes in this region.

1.6 Public Services and Infrastructure

In the following sections, existing public services in Palmdale are described and analyzed with respect to present conditions, mitigation actions taken in the past, and anticipated needs for future mitigation actions, based on vulnerabilities and potential losses. The City's infrastructure system includes the following components:

1. City Services
2. Water treatment and distribution
 - a. Water Supply
 - b. Water Quality
3. Sewer service
4. Storm drainage and flood control
5. Law Enforcement
6. Fire protection and prevention
7. Electric power
8. Natural gas
9. Solid waste disposal
10. Schools
11. Hospitals and medical facilities
12. The California State Water Project

CITY SERVICES

The City's Neighborhood Services Department provides services that help keep Palmdale's residents and businesses safe. The Neighborhood Services Department is responsible for coordinating the City's emergency operations planning, preparedness, and implementation. In addition, the office oversees the student drug education program, Neighborhood and Business Watch programs, crime prevention and community-based policing efforts, graffiti abatement, and parking enforcement programs. Law enforcement services are provided by contract with the Los Angeles County Sheriff's Department. Fire and emergency response are provided by the Los Angeles County Fire Department.

WATER TREATMENT AND DISTRIBUTION SERVICE

Water Supply. Residents who live within the boundaries of the Palmdale Water District receive their water from one of three sources or a combination of these three sources: the California Aqueduct (California State Water Project), Little Rock Dam, and water wells.

The California State Water Project conveys water from the Feather River and the Lake Oroville Reservoir in Northern California to areas in Southern California that do not have adequate local sources. The District is entitled to take 21,300 acre feet, or 5.6 billion gallons, of water each year from the aqueduct into Palmdale Lake where it is stored for eventual use. This water is then treated at the District's water treatment plant for distribution to the public.

Another source of surface water is supplied by the reservoir created by Littlerock Dam. Littlerock Dam was originally built in 1922 and was recently renovated to increase the storage capacity of the reservoir to 3,500 acre feet, or 1.1 billion gallons, of water. Littlerock Dam reservoir is fed by natural run-off from snowpacks in the local mountains and from rainfall. The water is then transferred from Littlerock reservoir to Palmdale Lake. After entering Palmdale Lake, this water is treated at the District's water treatment plant for distribution.

A third source of water for the District's customers is through the District's water wells pumping ground water. A well is drilled, a pump installed, and then the water is pumped from as deep as 550 feet from the earth's natural underground aquifer. This water is then treated with chlorine and placed into the District's distribution system. Well water makes up approximately 40% of the District's annual production. In drought conditions well water production may increase up to 50-60% to offset the lack of available surface water.

If long-term availability of imported water from the State is reduced, Palmdale will become more reliant on local groundwater sources. Continued over drafting of groundwater resources could escalate extraction costs for groundwater. Ensuring an adequate supply of water, given projected growth rates and the potential for drought conditions, may require the City to adopt and enforce water conservation measures.

Water Quality. Government regulations deal with the provision of safe drinking water, as well as adequate water supply. The Palmdale Water District Public Health Goal (PHG) Report compares the District's drinking water quality with Public Health Goal (PHGs) adopted by California's EPA's Office of Environmental Health Hazard Assessment (OEHHA) and with Maximum Contaminant Level Goals (MCLGs) adopted by the USEPA. Presently, groundwater generally meets federal and state standards. A few wells in the rural communities adjacent to Palmdale have been found to contain high amounts of nitrates due to septic tank leakage. The potential for local groundwater contamination has long been a concern of residents and may increase as more development utilizing septic systems occurs.

SEWER SERVICE

The Los Angeles County Sanitation District Nos. 14 and 20 provide sewer service in the City. District 20 serves the City's urban core and the northeastern portion of the Planning Area, while District 14 serves the northwestern portion of the Planning Area, Quartz Hill, Lancaster, and private sewage haulers. The USAF Plant 42 sewer system drains to District No. 14.

STORM DRAINAGE AND FLOOD CONTROL

The six major existing drainage courses in the City's Planning Area are Amargosa Creek, Anaverde Creek, Little Rock Wash, Big Rock Wash, Pearland Watershed, and Portal Ridge Watershed. Most drainage courses in Palmdale are unimproved, which allows storm water to overflow into adjacent flat areas, contributing to sheet flow. The Rosamond and Rogers dry lakes serve as final destinations of water runoff in the Antelope Valley.

Although widespread flooding has not occurred in Palmdale, localized flooding has occurred when rainfall is heavy and prolonged.

The City's 1996 Master Drainage Plan provides a long-term solution to localized flooding. Retention and detention basins, pipes, and channels are being, and have been constructed throughout the city to protect existing and future development from flooding. Approximately \$330 million worth of City improvements are proposed under the Master Drainage Plan.

Funding for construction of Master Drainage Plan facilities will come from a variety of sources as specified by the City's Capital Improvements Program, including special assessment districts and

drainage impact fees collected from new developments. Depending on the future rate of development, it could take an additional 10 to 15 years to fully implement the Master Drainage Plan. New development increases impervious surface area and decreases the rate at which runoff percolates into the ground, thus increasing storm runoff to low-lying areas. As an interim flood control measure, the City requires individual development projects to provide onsite flood detention facilities within their projects to capture storm runoff and prevent flows from exceeding the capacity of downstream facilities.

Culverts that carry surface runoff have been constructed at road crossings, and road shoulders have been graded to allow water to flow north toward the valley floor where it can percolate and aid groundwater recharge. In some areas, lined channels safely carry runoff down hillsides, preventing erosion by running water. Unlined channels allow runoff flow to percolate, decreasing the volume of storm water carried to the dry lakebeds north of the area.

Storm drainage facilities in the city consist of both natural and lined channels. In addition to allowing groundwater recharge, natural drainage channels can support significant biological communities. However, these unimproved channels can pose a threat to life and property due to the possibility of intermittent floods. A balance between resource protection and public safety must be achieved. Factors influencing decisions on drainage improvements include the cost of improvements and the availability of funding to implement them, land use regulations (low density zoning and lot coverage limits), and the potential of flood hazard areas for uses compatible with periodic flooding (recreation).

LAW ENFORCEMENT

The City of Palmdale receives police law enforcement services under contract with the Los Angeles County Sheriff's Department. The unincorporated areas surrounding the City receive law enforcement services from the Sheriff's Department and traffic enforcement services from the California Highway Patrol (CHP). Each agency provides backup for the other. An independent sheriff sub-station in Palmdale was established in early 1992. A new state-of-the-art sheriff's station, located in Palmdale on Sierra Highway and Avenue Q, opened to the public in July 2006.

FIRE PROTECTION AND PREVENTION

Fire protection services for Palmdale are provided by the Los Angeles County Fire Department. Fire protection services are financed through property tax assessments.

Stations 24, 37, 136, 114, 131, and station 93, the Battalion Headquarters at Massari Park are currently located within the Palmdale Planning Area. There are four additional stations (Station 84, 129, 92 and 117) that serve the outlying areas.

The Los Angeles County Fire Department also receives mutual aid from the U.S. Forest Service. As a part of the Los Angeles County Fire Department, all manpower and resources of the Department back up the fire stations in Palmdale. Fire protection needs in the Planning Area will be met by the entire department's resources, if needed, regardless of the number of firefighters and equipment stationed in the Palmdale area.

The fire prevention office located in Lancaster is responsible for reviewing new development applications and building permits to ensure that new construction projects adhere to fire code requirements. The State Responsibility Areas (SRA) land requirements for fire safety in construction include the use of fire-retardant materials, water storage tanks, fire hydrants, sprinkler systems, fire alarms, signage, defensible space, and fire escapes. Fire code requirements vary according to the type of use and construction materials employed. Additionally, fire protection requires a ready source of water for firefighting uses. Fire suppression water flow requirements are calculated together with domestic requirements, to ensure adequate availability of water to meet both domestic and emergency needs.

Staffs from individual fire stations within the area conduct onsite inspections of new construction, as well as annual inspections of existing structures, to ensure compliance with the fire code. Additionally, the fire protection office conducts information programs for the community on fire awareness and protection.

In order to adequately serve the growing population, additional fire stations will be required. New fire stations will be located in the areas with the greatest amount of development, as the need for additional fire service is determined by the Los Angeles County Fire Department. There is one fire station proposed for the Ritter Ranch area and a second station within the City Ranch area, along with fire suppression personnel and equipment. Future expansions of fire protection facilities will be coordinated with the Los Angeles County Fire Department.

ELECTRIC POWER

The Southern California Edison Company (SCE) provides electricity to the Antelope Valley, part of a service area that extends to Bishop on the north, Nevada on the east, Orange County on the south, and Santa Barbara on the west.

SCE provides electric service to 835 cities and communities. SCE serves 4.6 million customer accounts, including 285,000 commercial, industrial, and non-profit customers in these areas of central and Southern California.

NATURAL GAS

The Southern California Gas Company provides natural gas to most areas in Southern California, including the Antelope Valley. The City of Palmdale is within the boundaries of the Foothill distribution division and the North Basin transmission division; the company serves domestic and commercial uses in the Palmdale area.

SOLID WASTE DISPOSAL

Residential solid waste disposal in the City is provided through a franchise contract with Waste Management; the Antelope Valley Landfill is used (located at 1200 W. City Ranch Road in Palmdale). The franchise agreement sets residential pick-up rates and establishes standards for service.

SCHOOLS

The elementary school, high school, and college districts serving Palmdale are independent agencies, each governed by a Board of Trustees. The Palmdale School District, the East Side Union School District, the West Side Union School District, Lancaster School District, Keppel Union School District, Acton-Agua Dulce School District, the Antelope Valley Union High School District, and the Antelope Valley Community College District serve the Palmdale Planning Area.

The Palmdale School District serves the central developed core of the City. The district has more than 60 school sites, serving over 51,000 students.

HOSPITAL FACILITIES

The City of Palmdale is served by two large hospitals, Palmdale Regional Medical Center (PRMC) and the Antelope Valley Medical Center (AVMC).

Palmdale Regional Medical Center is located at 38600 Medical Center Drive in Palmdale and currently serves a 318 square mile area and has 184 beds with an additional 50 beds that will be added once the hospital's expansion project is completed. PRMC employs approximately 900 people, including 400 active medical staff.

Antelope Valley Medical Center is located at 1600 West Avenue J in Lancaster. It is a district facility serving a 1,586 square mile area and serves an average of 220,000 patients annually. AVMC has 383 beds with approximately 2,300 employees, 450 volunteers, and more than 650 physicians on staff.

THE CALIFORNIA STATE WATER PROJECT

An important factor affecting hazard mitigation planning in Palmdale is the location of the California Aqueduct which is immediately adjacent to the city.

The California State Water Project (SWP) is a water storage and delivery system of reservoirs, aqueducts, power plants, and pumping plants. Its main purpose is to store water and distribute it to twenty-nine (29) urban and agricultural water suppliers in Northern California, the San Francisco Bay Area, the San Joaquin Valley, the Central Coast, and Southern California. Of the contracted water supply, 70 percent goes to urban users and 30 percent goes to agricultural users.

Maintained and operated by the State Department of Water Resources (DWR), the SWP makes deliveries to two-thirds of California's population. Other purposes of the SWP are to improve water quality in the Sacramento-San Joaquin Delta, control Feather River floodwaters, provide recreation, and enhance fish and wildlife.

This significant State resource crosses the San Andreas Fault within the jurisdictional boundary of the City of Palmdale, just north of the DWR pumping station and reservoir and Highway 14. This choke point of critical resources is the poster child for vulnerability, and the assets at risk are significant to local and statewide interests.

SECTION TWO

PLANNING PROCESS

SECTION TWO – PLANNING PROCESS

Requirement §201.6(b): *In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process **shall** include:*

- (1) An opportunity for the public to comment on the plan during the drafting stage and prior to plan approval;*
- (2) An opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia and other private and non-profit interests to be involved in the planning process; and*
- (3) Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.*

Requirement §201.6(c) (1): *The plan **shall** document the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.*

2.1 Overview of Planning Process

The City of Palmdale’s Steering Committee reconvened to prepare the 2021 update for their LHMP. The Planning Process, outlined in the sections below, documents the changes to the planning process that have taken place since the 2004 inception of this LHMP and since the 2016 adoption of the updated LHMP. Significant updates to this LHMP include:

- New members and additional agencies/departments on the Mitigation Team;
- An online public survey (which replaced in-person meetings due to restrictions resulting from the COVID-19 pandemic);
- Modifications to identified hazards and hazard rankings, including pandemic as a new hazard and identifying how climate change may change the characteristics of existing hazards;
- Updated historical hazard information and GIS data included in hazard profiles;
- Updated asset inventory and replacement values included in the vulnerability assessment; and,
- Updated capabilities assessment, mitigation strategy and plan maintenance efforts.

The process of developing the City’s LHMP can be divided into the following steps:

Step 1: Get Organized – Building the Planning Team

Step 2: Plan for Public Involvement – Engaging the Public

Step 3: Coordinate with Other Departments and Agencies

Step 4: Hazard Identification

Step 5: Risk Assessment

- Step 6: Identifying Goals**
- Step 7: Review Possible Measures**
- Step 8: Draft the Mitigation Action Plan**
- Step 9: Adopt the Plan**
- Step 10: Implement the Plan**

2.2 Participation in the Planning Process

The City began the initial process in 2004 to prepare an LHMP. The first LHMP was adopted in 2009 and updated in 2016. The Public Works Department had the responsibility for coordinating the LHMP development along with an outside consultant. The Steering Committee was comprised to oversee the planning process. A Local Hazard Mitigation Planning Task Force was formed to provide broad-based input from neighboring jurisdictions, private sector organizations, and other stakeholders. The role of the Task Force was to provide input at all stages of plan development, to recommend goals and objectives, to recommend mitigation priorities, and to review the draft plan at critical junctures. In addition, the Task Force had an ongoing role in monitoring plan implementation and participated in the annual review of the plan and recommend plan updates, as necessary.

A Steering Committee composed of City staff representing key City departments oversaw the planning process, provided a mechanism for coordination among city departments, provided technical and informational input into the Plan, and developed recommendations for management and/or City Council approval. The following pages contain membership lists for the Local Hazard Mitigation Planning Steering Committee and Task Force. While the Departments and agencies still reside on the committees, the representatives from these departments have changed. Throughout the process the teams met to review the program and provide updates. The team also reviewed and provided input on the community survey, the list of identifying the hazards, asset inventory etc. The updated committee members for the 2021 update are as follows:

CITY OF PALMDALE LHMP STEERING COMMITTEE (AS OF 2021)

Finance:

Sharon Williams – Purchasing Agent
Angie Perez – Risk Management

Development Services: Planning/Engineering & Building & Safety:

Mark Berg – Acting Building Official
Bill Padilla – City Engineer
Megan Taggart – Planning Manager

Parks and Recreation:

Keri Smith –Director of Parks & Recreation

Neighborhood Services:

Mike Miller – Director of Neighborhood Services

Public Works:

Chuck Hefferman – Director of Public Works

Lynn Glidden – Deputy Director of Public Works

Nick Godin – Capital Improvement Program Manager

Jim Deyo – GIS Coordinator

Administrative Services:

J.J. Murphy – City Manager

John Mlynar – Public Information Officer

COMMUNITY PARTNER LHMP TASK FORCE (AS OF 2021)

Contact	Agency/Institution/Company	Email
Utilities		
Russell Saul	AT&T	rs3472@att.com
Caleb King	Level 3 Communications	caleb.king@level3.com
Robert Santos	Crown Castle Fiber	robert.santos@crowncastle.com
Sean Goodson	Crown Castle Fiber	sean.goodson@crowncastle.com
Lewis Odrozo	Frontier Communications	lewis.odrozo@ftr.com
Bob Rothgery	Charter Spectrum	bob.rothgery@charter.com
Tim Bruce	Southern California Gas	tbruce@semprautilities.com
Kevin Kuennen	Southern California Gas	kkuennen@semprautilities.com
Christopher Vidal	Palmdale Water District	cvidal@palmdalewater.org
Sean Douglass	Southern California Edison	sean.douglass@sce.com
Michael Bjorge	Southern California Edison	michael.bjorge@sce.com
Lindsay Gross	LA County Public Works (Water Works Division)	lgross@lapdw.org
Big Hua	LA County Public Works (Water Works Division)	bhua@lapdw.org
Fire/Police/Hospital		
Carmen Mackey	LA County Fire	cmackey@fire.lacounty.gov
Gerald Cosey	LA County Fire	gerald.cosey@fire.lacounty.gov
Tom Stuckey	LA County Fire	tom.stuckey@fire.lacounty.gov
Monique Mischeaux	California Highway Patrol	mmischeaux@chp.ca.gov
Kawika Feltman	Antelope Valley Hospital	david.feltman@avhospital.org
Barbara Mariscal	American Red Cross	Barbara.mariscal2@redcross.org
School Districts		
Jan Mederma	Antelope Valley Union High School District	jmedema@avhsd.org
Julie Ferebee	Palmdale School District	jlferebee@palmdalesd.org
Nikki Skelton	Westside Union School District	n.skelton@westside.k12.ca.us
Yolanda McCauley	Acton-Agua Dulce School District	ymccauley@aadusd.k12.ca.us
Shannon Robinson	East Side Union School District	srobinson@eastsideusd.org
Kathleen Sanchez	Keppel Union School District	kasanchez@keppel.k12.ca.us
Penny Baker	Lancaster School District	bakerp@lancsd.org

2.3 Review and Incorporation of Existing Plans, Studies, and Technical Information

The planning process began with a review of existing literature on risk assessment, hazard identification, and mitigation planning. This included, but was not limited to, material produced by FEMA and OES.

FEMA

Getting Started: Building Support for Mitigation Planning; Understanding Your Risks: Identifying Hazards and Estimating Losses; Developing the Mitigation Plan: Identifying Mitigation Actions and Implementation Strategies

OES

Disaster Recovery and Mitigation Handbook

FEMA guidebooks provided direction to the planning process, helped in assessing risks and vulnerabilities, and served as templates for developing the initial LHMP and updates to the LHMP. In addition, the requirements of the National Incident Management System (NIMS) and the California Standardized Emergency Management System (SEMS) were reviewed in the light of the mitigation planning process. Federal, county, and state agency produced fire, earthquake, and flood histories and projections were reviewed. Other pertinent literature on natural hazards and a diverse group of websites were reviewed for historical hazard data and vulnerability assessments.

The “Crosswalk” reference document developed by FEMA for the review and approval of local mitigation plans was used to ensure that the City of Palmdale LHMP included all of the required elements. Current hazard mitigation activities were identified and evaluated by the Planning Team. The evaluation of current activities allowed those activities to be reviewed in relation to the City’s hazard risk assessment, which in turn, identified those hazards that required additional or initial mitigation activities. Mitigation options for each hazard were then identified, analyzed, and prioritized. These options or alternatives became the core of the City’s action plan.

Ongoing Hazard Planning

Since its incorporation, the City of Palmdale has taken an aggressive approach to identify and mitigate natural and human caused hazards. There are several local ordinances which affect or promote disaster mitigation, preparedness, response, and recovery. Specifically, there are ordinances that govern development in hazard prone areas that specify mitigation measures to be taken during and after land development activities.

Palmdale is currently undertaking an update to the General Plan and the update efforts for both the General Plan and LHMP have been coordinated to ensure the inclusion of safety measures and hazard mitigation that are consistent across these guiding documents.

The City also adopted a detailed Emergency Operations Plan in 2012 for response to various emergency and disaster situations. The Emergency Operations Plan was developed in coordination with Los Angeles County Sheriff and Fire departments, which provide public safety services in Palmdale, under contract with the City and refers to the Palmdale LHMP that was adopted in 2009 for the purpose of identifying threats to the community. When the EOP is next updated, it will be revised to reference the most recently adopted LHMP.

These documents were a rich source of information, data, goals and policies, and were utilized extensively in the preparation of the LHMP. In addition, various other information sources were used for information during plan development. The following is a partial list of information sources used:

- City of Palmdale General Plan 1993 (Comprehensive General Plan 2045 Update in process with tentative adoption in spring of 2022)
- Emergency Operations Plan
- County of Los Angeles All Hazard Mitigation Plan (2019)
- City of Palmdale Hazardous Waste Plan
- 1996 Hazard Threat Analysis (1996)
- State of California Multi-hazard Mitigation Plan (2018)

Hazard mitigation plans for current or proposed land development activities are reflected in the City of Palmdale specific plans. A total of 12 approved specific plans are currently active, ranging from plans recently “built out” to those still in pre-development stages. By use of the specific plan process the City has been able to ensure that potential hazards are identified, and mitigation measures are in place prior to granting entitlements. **Table 3.5** lists the Specific Plans and the mitigation measures they incorporate.

In addition, hazard mitigation plans developed by other agencies including Southern California Edison, Los Angeles County Fire Department and Los Angeles County Sheriff’s Department are included by reference.

2.4 Public and Stakeholder Involvement

LHMP UPDATE AND PUBLIC SURVEY

- The City released a Request For Proposals from qualified firms to update the LHMP on December 16, 2020.
- LHMP steering committee kickoff meeting occurred on February 10, 2021. The attendees were able to review the departments that were involved in the original preparation and identified representatives from outside agencies that could be invited to be members.
- The committee agreed upon a planning process/public outreach method. A public outreach online survey would be used for the 2021 update. A review process of this survey was undertaken and comments and/or changes were subsequently made.

- The committee also reviewed the hazards listed in the 2016 document and added pandemic to the list of hazards. Weekly Steering Committee meetings were held for the first seven weeks of this LHMP update, then shifted to bi-weekly meetings in late March 2021.
- An article was posted in the Antelope Valley Times on March 26, 2021, highlighting the LHMP and providing information and a link to the LHMP survey, which was provided in English and Spanish.
- A public meeting to introduce the LHMP to the City Council was held on April 20, 2021. No members of the public attended the meeting. The presentation was given by City staff and Interwest Consulting Group staff, which resulted in a discussion about Palmdale's proximity to the San Andreas Fault Line, drought, fires, and evacuation planning. (See Appendix B).
- Email correspondence with Task Force agency members began in the last week of March with correspondence continuing through July of 2021.
- An article was published in the Antelope Valley Times on March 26, 2021, announcing the close of the public survey on May 31, 2021. In total, 554 surveys were completed in English and 16 surveys were completed in Spanish.

ONLINE PUBLIC SURVEY

To better understand the community's understanding and concerns regarding natural hazards and local response, the City solicited input from the community in the form of an online survey to determine:

- How the community prioritizes hazards facing the City of Palmdale.
- Actions the City and community can take to reduce future damage from natural hazards.
- How local government officials can better communicate natural hazard risks to the public.

The survey included 12 questions and a comment section created to identify the respondent's connection with City of Palmdale, familiarity with previous natural hazard events, preparedness for future natural hazards, and opportunities to create a community more resilient to natural hazards.

To ensure the community had ample opportunities to provide input, the City promoted the survey using the following methods:

- City website – The City placed a link to the survey in a prominent location on the City's website homepage, ensuring all website visitors were aware of the opportunity.
- Press Release – The City distributed a press release initiating participation in the survey and a public meeting. Social Media post including a brief video from the *Palmdale Minute* with information about the LHMP survey. Two additional press releases announced the

one month count down to the end of the survey, and the final winner of the gift card following the end of the survey.

- A City Council presentation introducing the Local Hazard Mitigation and the importance of maintaining an up-to-date version of this LHMP. The presentation included information about the survey.
- Email to all City employees – An email reminder was sent to all City employees encouraging them to participate in the survey and to share the survey with other interested parties.
- Hard Copy surveys – The City provided paper (hard) copies of the survey at counters of City department offices including City Hall.

Outreach materials used to promote the public survey can be found in Appendix B.

RESULTS

The following summary highlights the key responses and findings of the survey. These survey results help to inform staff of community concerns.

COMMUNITY INTEREST

The City received responses to the survey from 570 individuals (554 in English, and 16 in Spanish). The community outreach effort for this LHMP update was much more successful than the previous efforts to engage the community. The previous update only received 37 responses, most of which were employees of the City and other local government agencies.

More than 80% of survey respondents indicated they lived and/or worked in the city, compared to only 16.7% of local respondents from the previous update, providing a much better representation of the concerns of Palmdale residents.

LEVEL OF CONCERN

Respondents were asked to review the city's likely natural hazards and rate their level of concern on a scale from not concerned, not very concerned, neutral, somewhat concerned, to very concerned, for each local hazard. While there was not much difference between respondents, most indicated the highest levels of concern regarding earthquakes, wildland brushfires, power/utility failure, and pandemic which may have been temporarily inflated due to the fact that the worldwide COVID-19 pandemic was still ongoing at the time the survey was released. Lowest levels of concern include flood, dam failure and inundation hazards, and transportation accident/hazardous materials spills.

ACTIONS TO PREPARE

The results of the survey indicate that many respondents have taken actions to reduce damage from a local hazard.

Approximately 70% of respondents have prepared for local hazards by talking with family members about what to do in case of a disaster or emergency, purchasing homeowners/renters' insurance, preparing a "Disaster Supply Kit" (extra food, water, batteries, medications, first aid, etc.), or developing a "Household/Family Emergency Plan in order to decide what everyone would do in the event of a disaster.

Far fewer respondents had purchased flood insurance, floodproofed their place of residence, installed retrofits such as high impact windows or doors, or fire-resistant siding, roofing, or window screens, attended meetings or received written information on natural disaster or emergency preparedness.

LOCAL GOVERNMENT EFFORTS TO REDUCE HAZARDS

Respondents were asked to provide input as to the most important things the local government can do to help the community be more prepared for a disaster by ranking them as very important somewhat important, neutral, not very important or not important. Those efforts include:

- Protecting private property
- Protecting critical facilities (hospitals, fire stations, etc.)
- Preventing development in hazard areas
- Protecting the natural environment
- Protecting historical/cultural landmarks, museums, etc.
- Promoting cooperation among public and private organizations and citizens
- Protecting and reducing damage to utilities
- Strengthening emergency services (police, fire, ambulance)
- Protecting major employers
- Protecting small businesses
- Protecting K-12 schools
- Protecting Colleges/Universities

Very few participants found any of these efforts to be not important or not very important. Respondents ranked protecting critical facilities as the most important priority for local government, followed by protecting private property, strengthening emergency services, protecting K-12 schools, protecting small business, protecting and reducing damage to utilities, protecting the natural environment, protecting colleges and universities, promoting cooperation among public and private organizations and citizens, protecting historical/cultural land marks, preventing development in hazard areas, and lastly, protecting major employers.

COMMUNITY ASSETS

Respondents were asked to determine the importance of protecting the following community assets for planning for local hazards. Below depicts the community's priorities ranked from very important, somewhat important, neutral, not very important, or not important:

- Human: Loss of life and/or injuries
- Infrastructure: Damage or loss of bridges, utilities, schools, etc.
- Governance: Ability to maintain order and/or provide public amenities and services
- Economic: Business closures and/or job losses
- Environmental: Damage or loss of forests, rangeland, waterways, etc.
- Cultural Historic: Damage or loss of libraries, museums, fairgrounds, etc.

Respondents prioritized human life as the most important community asset, followed by infrastructure, governance, economic interests, environment, and cultural-historic assets.

OVERVIEW

In reviewing the 570 survey responses from the community, several preliminary themes or opportunities have been identified below:

- **Actions to Prepare** – While many members of the community have taken small actions to prevent damage to their home in the event of a natural hazard, only a small portion have completed larger structural items to prevent damage. The City may consider developing and implementing programs to support risk reduction activities by property owners. Using the data available as a result of the risk assessment in this LHMP, the City is able to identify areas and structures with a higher risk or exposure to the identified hazards.
- **Awareness of Neighbor Needs** - Neighborhood events such as the annual community block parties are an opportunity for the City to support greater community interaction which can increase awareness of neighbors needs in the event of an emergency.
- **Community or Workplace Awareness** – In many cases, respondents were unaware or unsure of the hazards that may affect the community or their workplace and policies that may be in place to help respond to a natural disaster. The City can help to increase community awareness through wider promotion or participation in workshops or resources available to the community that have already been prepared by the City or volunteer organizations. The City may increase business owners' awareness of risk by providing emergency planning support, continuity of operations planning support, and potentially hosting seminars for the business community to learn about the hazard risks.

PUBLIC REVIEW PERIOD

The draft 2021 LHMP was released for public review in October 2021. The release of the public draft LHMP was promoted through a variety of means including:

- Press Release to local media

- City of Palmdale Website
- Facebook pages of the City of Palmdale
- Hard copy at City Facilities

The public review period of the draft LHMP concluded in October 2021. The public, and City staff provided comments and questions on the draft LHMP. All comments received by the public and staff were addressed and incorporated into the final LHMP as appropriate.

2.5 Local Capabilities and Resources

Various City departments, state and county agencies, local public and private utilities, and other service providers have designated technical staff to assist in plan development by providing information, reviewing technical drafts, and serving on the Local Hazard Mitigation Planning Task Force. In addition, the City obtained the services of an experienced technical consultant to provide support throughout the mitigation planning process.

The technical resources that can be used in Palmdale’s overall mitigation effort include several types of equipment, GIS and other software, and most importantly, personnel. Several staff have been trained and/or certified in mitigation concepts, firefighting, hazardous materials response and containment, first aid, CPR, and emergency management. Individual staff members have backgrounds in land development, land use planning, land management, environmental planning, risk management, security, facilities operations, and grant writing.

Table 2.1 shows the technical and administrative capacity that the City of Palmdale can bring to bear on the planning, development, implementation, and management of mitigation actions/projects. Many mitigation projects are listed in the City of Palmdale’s 10-year Capital Improvement Project which is updated annually.

Table 2.1 – Technical and Administrative Capabilities

Resource	Staff	Consultant/Contractor
Planner(s) or engineer(s) with knowledge of land development and land management practices	√	
Professionals trained in construction practices related to buildings and/or infrastructure	√	
Professionals trained in facilities management and operations	√	
Planner(s) or engineer(s) with an understanding of natural and/or manmade hazards	√	√
Planner(s) or engineer(s) with experience developing and managing mitigation projects and/or recovery projects	√	√
Environmental Planner		√

Professionals trained in assessing and/or mitigating against man-made hazards; professionals with risk assessment expertise	√	√
Construction project managers	√	As needed
Fiscal and Budget Management	√	
Personnel with GIS expertise	√	As needed
Grant Writer	√	√
Administrative & Operational Support	√	

Financial support for Palmdale’s mitigation activities is available from both FEMA and OES. There are several local financial resources that are also potentially available for implementation of proposed mitigation projects. Those sources include, but are not limited to:

- Gas Tax
- Propositions A & C Funds
- Traffic Impact Funds
- Amargosa Drainage Plan Fund
- Anaverde Drainage Plan Fund
- Portal Ridge Drainage Plan Fund
- Pearland Drainage Plan Fund
- City’s General Funds
- Public Facility Funds
- Federal Grants

For charts reflecting the City of Palmdale’s organizational structure, reference **Appendix A**.

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SECTION THREE

RISK ASSESSMENT

SECTION THREE – RISK ASSESSMENT

3.1 Risk Assessment Process

INTRODUCTION

As indicated previously, the LHMP process includes four broad tasks:

- **Organize Resources**
- **Assess Risks**
- **Develop LHMP**
- **Implement the LHMP and Monitor Progress**

A risk assessment requires the collection and analysis of hazard-related data, allowing local communities to identify and prioritize appropriate mitigation actions that will reduce losses from potential hazards. The information gathered during the process can serve as a basis for emergency management planning, as a justification for preparedness related expenditures, and as a foundation for mitigation actions and recovery policy decisions. The data from the risk assessment is the framework that the City of Palmdale will use to develop and prioritize mitigation strategies and actions, in the hope of reducing risk and vulnerability from future hazard events.

The risk assessment process followed the methodology described in the FEMA publication *“Understanding Your Risks – Identifying Hazards and Estimating Losses,”* and it was based on a five-step process:

- Identifying Hazards
- Profiling Hazards
- Inventorying Assets
- Assessing Vulnerability/Estimating Losses
- Analyzing Development Trends

3.2 Inventorying Assets

CITY-OWNED ASSETS

Developing a meaningful risk assessment requires developing an inventory of the number and value of city-owned assets. With this information, the City can establish priorities for hazard mitigation actions and determine the best courses of action to protect city-owned resources. It is also necessary to identify all city-owned resources in order to determine which facilities may be at risk from various hazards.

Arriving at appropriate asset values is not just simply determining value. Since many structures may have been built or acquired several years ago, it is important to determine the replacement values for structures that could be destroyed or damaged in the event of a natural or human-caused disaster. In addition to replacement values, the value of contents must also be estimated.

Lastly, should a facility require replacement or major repairs, the cost of temporary space and/or buildings must also be factored into the total cost.

As part of developing the LHMP, City staff conducted a complete inventory of city-owned facilities and developed estimates of replacement value, contents, and displacement costs. Estimated replacement values are based on appraisals, historic and current construction costs, current and estimated costs of new facilities, and insured values. The completed 2021 asset inventory appears as **Table 3.1** on the following page.

PRIVATELY-OWNED ASSETS

A complete inventory and detailed cost analysis of all privately-owned structures and facilities in the City of Palmdale area are beyond the scope of this LHMP. However, based on generally available data, “order of magnitude” estimates are possible. To estimate the potential losses to private property associated with earthquake events, a computer model called HAZUS, which was developed by the Federal Emergency Management Administration, was utilized. This model estimates losses to infrastructure and public and private structures, which are discussed later in this section. A detailed HAZUS report is included as Appendix C.

Table 3.1 City of Palmdale Facility Asset Values

Category & Asset	Total Value
Civic Center	
City Hall- Administration	\$2,298,429
Civic Center Park	\$62,068
Community Programs and Human Resources	\$1,620,709
Computer Equipment	\$7,811,035
Cultural Center	\$6,253,108
Development Services Building	\$10,903,201
Former Public Safety Office	\$1,778,785
Library	\$6,691,176
Parks & Rec Building	\$963,256
Rental Properties (Chambers of Commerce)	\$351,252
Senior Center - Legacy Commons	\$4,138,663
Traffic Operations Center	\$2,087,635
Public Works	
City Infrastructure	\$11,972,192
Maintenance Yard	\$4,538,602
Transit Infrastructure	\$1,987,570
Parks	
Anaverde	\$108,690
Arnie Quinonez	\$108,690
Courson	\$4,825,596
Desert Sands	\$2,368,028
Domenic Massari	\$644,214
Dry Town	\$17,160,820
Foothill	\$136,198
Joe Davies Heritage Airpark	\$5,874,687
Joshua Hills	\$108,690
Manzanita	\$136,198
Marie Kerr	\$13,275,336
McAdams	\$896,596
Pelona Vista	\$859,821
Yellen	\$103,447
Misc	
Airport Terminal Building	\$1,372,482
Boulders at the Lake	\$1,629,610
Boulders at the Ranch	\$2,308,707
Boulders at the Ranch II	\$1,065,109
Hammack Activity Center	\$6,101,376
Misc Resources	\$13,520,432
Palmdale Playhouse	\$3,169,455
Public Art	\$150,586
Records Center - Storage	\$139,487
SAVES Building	\$2,024,924
Storage	\$4,705,383
Work Source Consortium	\$3,692,296
Rentals	
Apartments	\$10,391,245
Single-Family Homes	\$1,702,123
Neighborhood Houses	
Gabriel's House	\$171,062
Manzanita House	\$171,062
Neighborhood House #2	\$192,596
Yucca	\$355,905
Total:	\$162,928,532

Working with City staff, the Task Force developed an inventory of critical infrastructure and facilities. Critical infrastructure and facilities fall into two categories: (1) facilities and infrastructure required to respond and recover from a natural or human-caused disaster, including fire and police stations, hospitals, evacuation centers, etc., and (2) infrastructure/facilities that deserve special attention. This category of infrastructure includes such things as the California Aqueduct, Palmdale Airport/Plant 42, gas pipelines, and high-voltage electrical transmission lines.

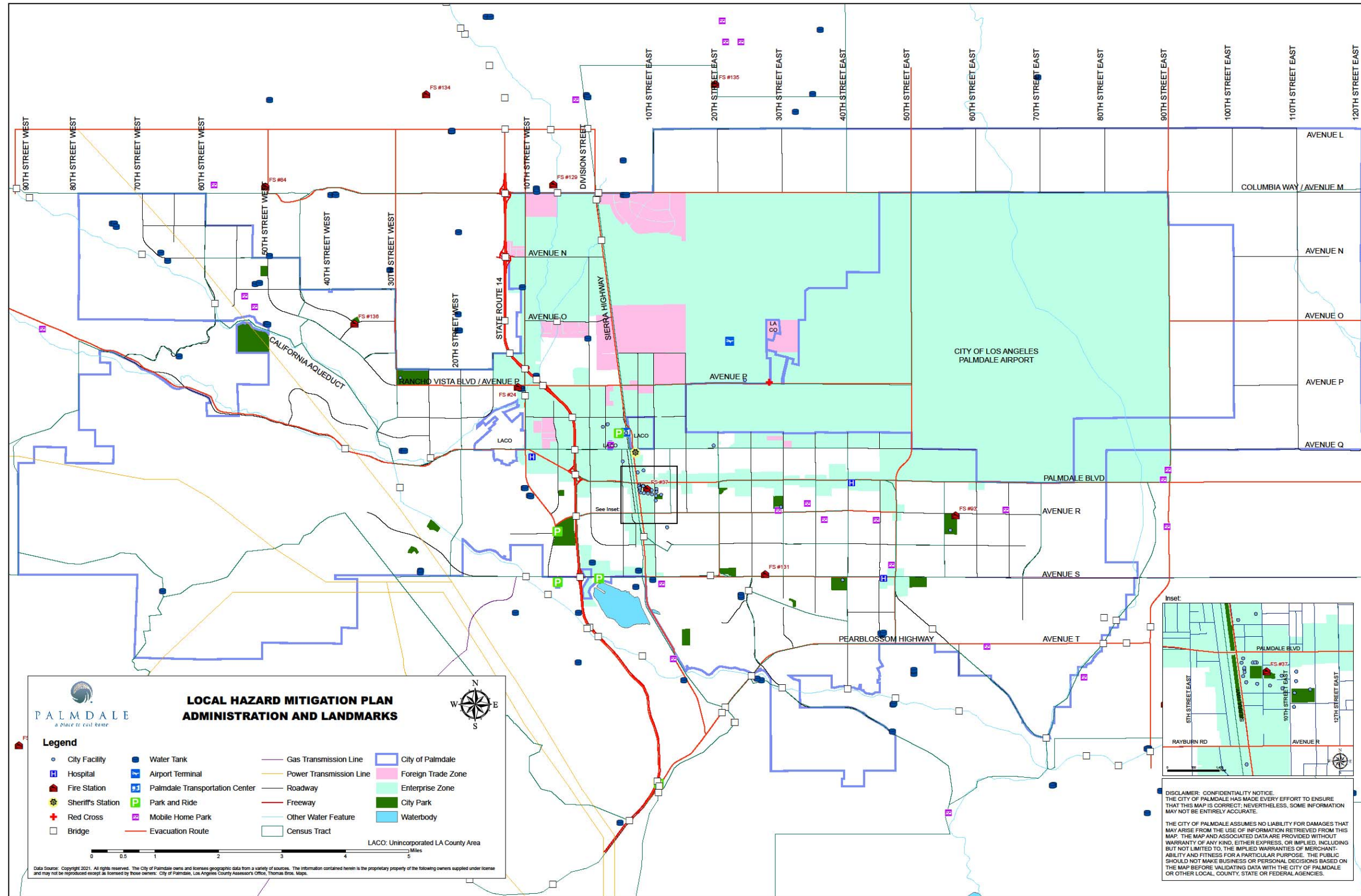
The purpose of identifying critical infrastructure and facilities is to note those community assets that are threatened by specific hazards and should receive priority in the implementation of mitigation measures. Critical infrastructure identified by the Task Force includes:

Table 3.2 City of Palmdale Critical Infrastructure

Category #1 (Facilities and infrastructure required to respond and recover from a natural or human-caused disaster)	Category #2 (Infrastructure/facilities that deserve special attention)
<ul style="list-style-type: none"> - City of Palmdale Sheriff Department & substations - City of Palmdale Fire Departments/Stations (5) - Kaiser Permanent Urgent Care Facility - Palmdale Regional Medical Center - City of Palmdale EOC (Administration, Development Services buildings, Marie Kerr Recreation Center) 	<ul style="list-style-type: none"> - California Aqueduct - Palmdale Plant 42 - Palmdale Airport - High Pressure Gas Line along Avenue S (From 14 Freeway to 47th Street East) - Edwards Air Force Base - Palmdale Water District- water storage tanks, water treatment plants

The locations of critical infrastructure are identified on the following **Map 3.1 – "Administration and Landmarks"**, created by the City of Palmdale's GIS Section.

Map 3.1 – City of Palmdale Administration and Landmarks



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3.3 Assessing Vulnerability & Estimating Potential Losses

Requirement §201.6(c)(2)(ii): *[The risk assessment shall include a] description of the jurisdiction’s vulnerability to the hazards described in paragraph (c)(2)(i) of this section. This description shall include an overall summary of each hazard and its impact on the community.*

Requirement §201.6(c)(2)(ii)(A): *The plan should describe vulnerability in terms of the types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard area*

Requirement §201.6(c)(2)(ii)(B): *[The plan should describe vulnerability in terms of an] estimate of the potential dollar losses to vulnerable structures identified in paragraph (c)(2)(i)(A) of this section and a description of the methodology used to prepare the estimate*

Requirement §201.6(c)(2)(ii)(C): *[The plan should describe vulnerability in terms of] providing a general description of land uses and development trends within the community so that mitigation options can be considered in future land decisions....*

OVERVIEW

This section includes: 1) a description of the City’s critical and essential facilities and infrastructure and 2) an estimate of the potential dollar losses to vulnerable structures. Hazard-specific vulnerability assessments and estimates of potential losses are provided in **Section 3.6**.

KEY ASSETS – CRITICAL AND ESSENTIAL FACILITIES AND INFRASTRUCTURE

The 2016 LHMP update included the addition of clearly identified critical and essential facilities. With the 2021 update, the Steering Committee reviewed, confirmed, or updated those key assets in consultation with the City’s Risk Manager. **Table 3.4** provides an updated list of Key Assets. The replacement value is the insured amount of the asset, including contents. These represent the total potential loss value for each facility. This list of assets and replacement values will be reviewed and updated as necessary during the next LHMP update.

Some assets are relied upon as part of critical response activities, while others are considered essential to the operations and viability of the City. Those which are part of critical response activities as identified by the City’s Emergency Operations Plan and GIS mapping of critical services are denoted as critical in the following table. The remaining assets are identified as essential. This designation prioritizes critical assets over essential assets for risk reduction and resiliency measures, while acknowledging that all of these assets are important to the City of Palmdale.

Table 3.3 – Critical and Essential Facilities

Critical and Essential Facilities			
Category	Facility	Address	Priority
Civic	City Hall	38300 Sierra Highway	
	Administration	Suite A	Critical
	City Clerk/CAO/Finance/Council Chamber	Suites B, C, D	Critical
	Computer Services	Suite D	Critical
	Human Resources and LACO Fire Inspection	823 Avenue Q-9 A&B	Essential
	Development Services Building	38250 Sierra Highway	Critical
	Legacy Commons (Senior Center)	930 E Avenue Q-9	Critical
	Public Works Maintenance Facility	39110 3rd St. East	Essential
	Work Source Center	38510 Sierra Highway	Essential
Main Library	700 East Palmdale Blvd	Essential	
Hospitals	Palmdale Regional	38600 Medical Way	Critical
Police/Fire	LA County Sheriff		Critical
	LA County Fire Stations (5 stations)		Critical
Infrastructure	Palmdale Transportation Center	39000 Clock Tower Plaza Drive	Critical
	Metrolink, UPRR Railroad		Essential
	Evacuation Route Roads		Critical
	State Highway 14 & 138		Critical
	Other Essential City-Owned Roads		Essential
	Fiber Optic Network		Essential
	High Pressure Gas Line along Avenue S (SR 14 to 47th East)		Critical
	Palmdale Plant 42		Essential
	Littlerock Dam		Essential
Lake Palmdale		Essential	
Community	Pelona Vista Park	37800 Tierra Subida Avenue	Essential
	Marie Kerr Park- Recreation Center	2723 Rancho Vista Boulevard	Critical
	Oasis Park Recreation Center	3850-A Avenue S	Essential
	Dry Town Park	3850-E Avenue S	Essential
	SAVES building	1002 Avenue Q-12	Essential
	Desert Sands Recreational Building	39117 3rd Street East	Essential
	Chimbole Cultural Center	38350 Sierra Highway	Essential
	Red Cross Facility	2715 E Avenue P	Essential
Potable Water / Waste Water	Pelona Vista Park Sewer Pump Station	37720 Tierra Subida Avenue	Essential
	Sewer System Infrastructure		Essential
	Storm Drain Systems		Essential
	Water System Infrastructure		Essential
	Palmdale Water District Storage Tank, Water Treatment Plants		Essential
	Palmdale High School	2137 E. Avenue R	Essential
	Palmtree Elementary	326 E Avenue R	Essential
	Tumbleweed Elementary	1100 East Avenue R-4	Essential
	Desert Rose Elementary	37730 27th Street East	Essential
	Mesquite Elementary	37622 33rd Street East	Essential
	Manzanita Elementary	38620 33rd Street East	Essential
	Highland High School	39055 25th Street West	Essential
	Summerwind	39360 Summerwind	Essential
	Ocotillo	38737 Ocotillo School Drive	Essential
	Joshua Hills	3030 Fairfield Avenue	Essential
	Barrel Springs	3636 Ponderosa Way	Essential
	Cimmaron	36940 45th Street East	Essential
Buena Vista	37005 Hillcrest Drive	Essential	

**Table 3.4 Risk Assessment Summary Table –
Summary of Key Assets Located in Known Hazard Areas**

Asset Name/Key Infrastructure	Priority	Earthquake	Liquefaction – very low probability	Wildland Fire	Flood/Dam Failure
SR 14	Critical	X			
City Park and Rides (3 - close proximity)	Essential	X		X	
Water Tanks (approx. 6)	Critical	X			
All City Facilities – Map 3.10	Critical	X			
Palmdale Transportation Ctr	Critical	X			X
Railroad – 2 miles	Critical	X			X
Civic Center Area	Critical/ Essential	X			X
5 Fire Stations	Critical	X		X	X
Red Cross Building	Essential	X			X
Palmdale Highschool	Essential	X			X
Desert Rose Elementary	Essential	X			X
Mesquite Elementary	Essential	X			X
Manzanita Elementary	Essential	X			X
Essential Roads (10 miles)	Essential	X			X
Highland Highschool	Essential	X		X	
Summerwind	Essential	X		X	
Ocotillo	Essential	X		X	
Anaverde	Essential	X		X	
Palmtree	Essential	X		X	
Joshua Hill	Essential	X		X	
Barrel Springs	Essential	X		X	
Buena Vista	Essential	X		X	

Cimarron	Essential	X		X	
Tumbleweed	Essential	X		X	
Marie Kerr Park – Recreation Facility (EOC)	Critical	X		X	
Pelona Vista Park	Essential	X		X	

VULNERABILITY ASSESSMENT METHODOLOGY

The City’s key assets were overlaid with the known hazard areas using GIS to determine which assets are located within each hazard area. Staff reviewed the overlay of key assets from a visual analysis and since it was a manual process these overlay maps were not created. GIS data used to compile and map the City’s key assets were collected from the City’s Geographic Information Services group. This department also provided hazard area data for wildfire and flood. Hazard area and key asset overlays were conducted for earthquake, liquefaction, wildfire, flood, and landslide. Key assets vulnerable to various hazards are presented in **Table 3.3**. Available replacement values for the key assets that fall within a hazard area are tallied in **Table 3.4** to provide the total estimated potential losses to each hazard. Please note that the actual losses will depend on the type and extent of the hazard event.

Adverse weather has the potential to affect the entire city. Drought, freeze, and fog do not inflict physical damage on the City’s key assets; however, windstorms, hail, tornadoes, and thunderstorms can pose a threat, and, therefore, all facilities listed in **Table 3.3** could potentially be susceptible to damage from these hazard events. The City maintains a map of facilities that store hazardous materials as well as hazardous substance facilities and is able to use GIS to evaluate the key assets located in close proximity to these facilities to determine their vulnerability. For security, the map and specific facilities at risk to hazardous material spills are not presented in this LHMP.

3.4 Analyzing Development Trends

*Requirement §201.6(c)(2)(ii)(C): [The plan **should** describe vulnerability in terms of] providing a general description of land uses and development trends within the community so that mitigation options can be considered in future land use decisions.*

The vulnerability analysis should include a general assessment of the development trends for a community. Prior development patterns should be assessed in the light of historic hazard events. This allows the identification of problematic zoning or land-use planning decisions. Current zoning or land-use plans can be overlain with the hazard profile maps developed earlier in the planning process, to identify future areas of hazard exposure. Possible changes or revisions to the zoning and land-use plans can then be recommended to mitigate against development of potentially dangerous or hazard prone areas. See **Maps 3.2** "Land Use" and **3.3** "Zoning" for current City of Palmdale information.

THE GENERAL PLAN

California Law requires each city to adopt a general plan for the physical development of the city and the surrounding planning area. The General Plan expresses the community's goals and embodies public policy relative to the distribution of future land uses. The general plan must contain nine mandatory elements -- land use, housing, circulation, conservation, open space, noise, safety, air quality, and environmental justice.

The City's General Plan has been periodically updated so that it is current with emerging trends and issues and was last comprehensively updated in 1993. Palmdale is in the process of updating the General Plan and expects to complete the update in 2022.

The goal of the General Plan Safety Element is to reduce the potential risk of death, injuries, property damage, and economic and social dislocation resulting from hazards such as fires, floods, earthquakes, and landslides. The Safety Element addresses fire safety standards, evacuation routes, water supplies, and clearance around structures. The Safety Element of the City of Palmdale General Plan includes specific policies designed to promote land use patterns and development in a manner that minimizes hazard threats. The General Plan policies address developed land, redevelopment areas, and new development.

Areas subject to inundation and/or flood hazards are shown in the City's General Plan. Prior to approval of any development application in these areas, a detailed hydrology report is required. It must detail the project specific flood hazard mitigation requirements. In most cases, drainage control facilities such as debris/detention basins, concrete, or earthen channels, bioswales and culverts, pipes and street gutters, are incorporated into projects. This infrastructure is meant to safely convey stormwater flows generated by a 25-year storm through developed areas and into natural drainages and creek channels. In some areas, natural channels are designated as open space and left undeveloped, or they are developed with uses, which are minimally affected by inundation such as sand and gravel quarries. These open areas allow storm flows to pass through Palmdale to dry lakebeds to the north without causing substantial damage to life or property.

In addition, the Land Use Element of the General Plan promotes infill developments. Implementation of this policy could foster a more continuous and cohesive pattern of urban development within the City core area.

The General Plan land use map, which includes Specific Plans, has taken into account flood hazard areas and development types and densities are specified as described above. The City is committed in providing continual updates to the flood control facilities to provide a high level of safety.

SPECIFIC PLANS

A significant portion of new development planned in the City of Palmdale will occur in areas within or adjacent to "Very High Threat" and "Extreme Threat" wildland fire hazard areas. The City has taken a number of steps to mitigate the hazards associated with development in these areas.

The primary tool utilized by the City to ensure that appropriate mitigation measures are identified and implemented is the Specific Plan Process. The City has utilized this process almost exclusively to guide and control the development of large tracts of land. Under this process, the developer is required to perform an in-depth analysis of potential hazards and to develop and implement mitigation measures to reduce the threats of property damage, injury, and loss of life. A review of the planning and environmental documents related to these specific plans indicates that the City and developers have taken care to identify hazard areas and to plan/implement appropriate mitigation measures. Among the mitigation measures adopted are:

- Community design, i.e., locating vulnerable development outside hazard areas
- Fire-resistant landscaping
- Building and density restrictions
- Building material specifications
- Buffer zones

Development within the City has dispersed residential neighborhoods over a wide area, leaving vacant areas surrounded by new development. This scattered development pattern makes efficient use of the regional infrastructure difficult and increases costs of serving each unit. The City's General Plan encourages infill development that utilizes existing infrastructure and discourages continued leapfrog development away from the City center into outlying rural areas. Development pressures to urbanize in rural areas are expected to continue, due to lower land costs in these areas. The City's view is that development should support itself, with no negative impact upon services being provided to existing City residents. The policies under this objective should apply to long-term maintenance and operation of public facilities, as well as to capital costs.

A total of 12 approved specific plans are currently active, ranging from plans recently “built out” to those still in pre-development stages. By use of the specific plan process the City has been able to ensure that potential hazards are identified and mitigation measures in place prior to granting entitlements. **Table 3.5** lists each of the approved specific plans and identifies the hazards applicable to that plan as well as required mitigation measures.

Table 3.5 - Hazard Mitigation for Future Development of Specific Plans

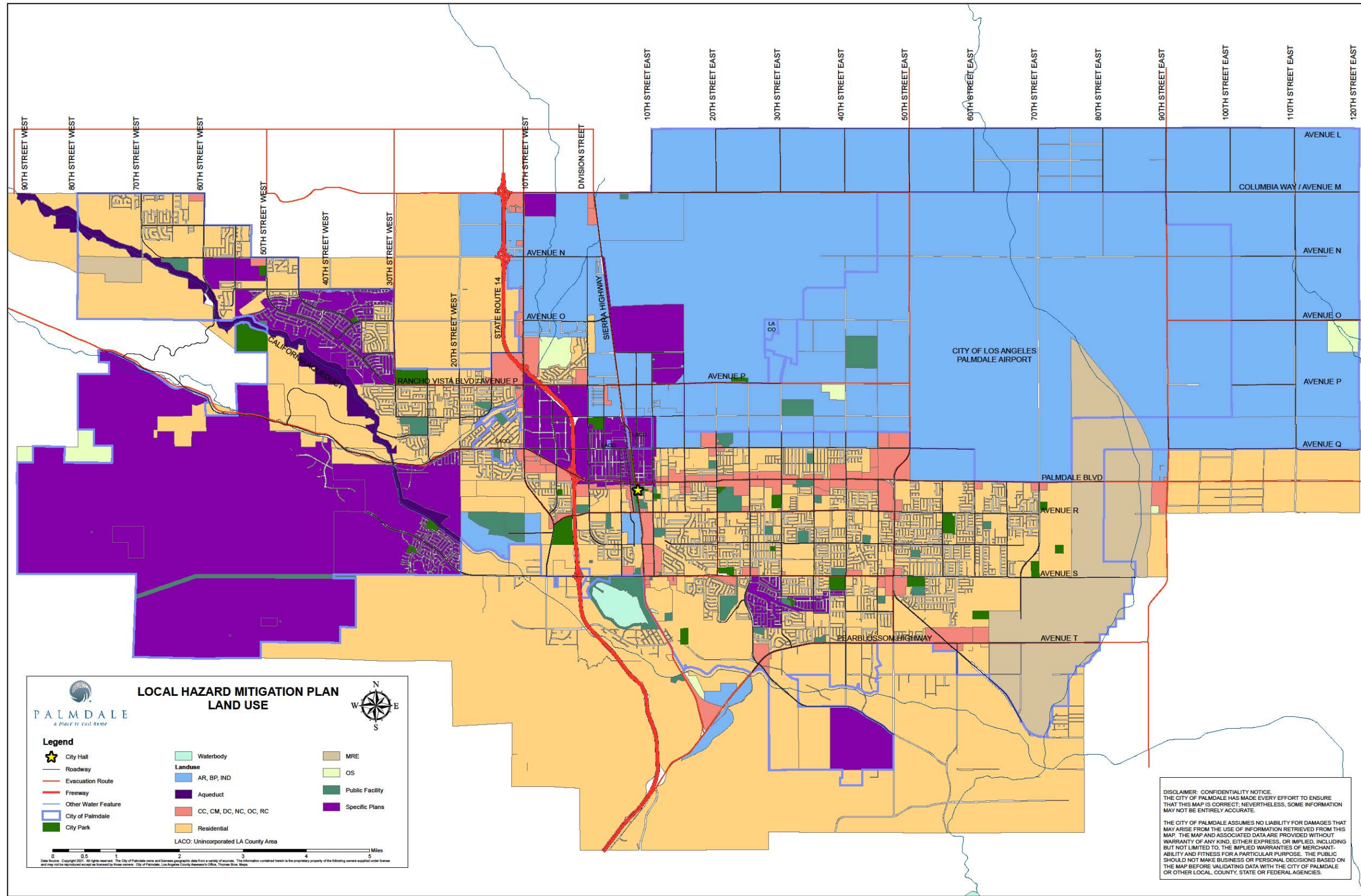
HAZARD MITIGATION FOR FUTURE DEVELOPMENT				
City of Palmdale Specific Plans				
Specific Plan	Location	Land Use	Hazard Areas	Mitigation Actions
Antelope Valley Business Park	120 Acres east of SR-14, so. of Ave. M, no. of Ave. N	Commercial, Industrial, Business Park	100 yr. Flood Zone	Amargosa Creek channel improvements
Antelope Valley Auto Center	78 Acres west of SR 14 and Ave. Q	Auto sales and service	None	N/A
City Ranch (Anaverde)	1,985 acres east of SR 14, south of Elizabeth Lake Rd	Residential, open space, recreation,	Alquist-Priolo High voltage power lines Calif. Aqueduct	1. Compliance with General Plan and municipal codes

		commercial, public uses	Rupture Brush fire 100 yr. Flood Zone	<ol style="list-style-type: none"> 2. Fuel modification zones 3. Elevated building pads 4. Building setbacks 5. Restricted building zones 6. Critical facility siting
Foothill Ranch (College Park) 1	540 Acres so. of Pearblossom Hwy, SE of Barrel Springs Rd., 47th St. East	Mixed use residential, open space, commercial, educational	Alquist-Priolo	<ol style="list-style-type: none"> 1. Foothill (College Park)
Hillside Residential 1	223 acres in northwest Palmdale	Residential	None	N/A
Joshua Hills 2	435 acres bounded by 25th St. on the west, Ave. S on the north, and 40th St. on the east	Residential, open space, commercial, public facilities	Alquist –Priolo Gas pipelines	<ol style="list-style-type: none"> 1. Construction prohibitions
Lockheed Plant 10	Approx. 674 acres bounded on north and east by USAF Plant 42, west by SPRR, and south by Ave. P and Lockheed Way	Office, Industrial	APZ Alquist-Priolo 100 yr. Flood Zone Haz. Mat. Storage	<ol style="list-style-type: none"> 1. Compliance with AICUZ 2. Land use restrictions 3. Height restrictions 4. Retention and flood control basins
Palmdale Business Park Center	632 acres bounded on east and south by USAF Plant 42, north by Ave. M, SPRR on west	Commercial, recreational	100 yr. Flood Zone (minimal)	<ol style="list-style-type: none"> 1. Drainage improvements
Palmdale Trade and Commerce Center 3	756 acres in central Palmdale	Mixed use, commercial, public, industrial	100 yr Flood Zone 500 yr Flood Zone AICUZ restricted AP Zone	<ol style="list-style-type: none"> 1. Compliance with General Plan, Flood, AICUZ, and AP requirements. 2. Compliance with Federal and State seismic requirements.
Palmdale Transit Area Specific Plan 3 & 4	746 acres, east of the Antelope Valley Freeway between Technology Drive and Palmdale Boulevard. 110 acres of the plan are located in unincorporated areas of the County.	Mixed use, commercial, residential, industrial, public, open space	100 yr Flood Zone, 500 yr Flood Zone, AICUZ restricted AP Zone	<ol style="list-style-type: none"> 1. Compliance with General Plan, California High Speed Rail Authority (SCRRA), Avenue Q Feasibility Land Use Framework Plan, Palmdale TOD Overlay Zone Land Use Framework Plan (TOD3), High Desert Corridor (HDC), Brightline High Speed Rail, Palmdale Downtown

				Revitalization Plan, Metrolink SCORE
Palmdale Transit Village 4	110 acres bounded between Tech Blvd to the north, SR-14 to the west, East Ave Q-9 to the south, and 10 th St East to the east	Residential, commercial	Accidental Potential Zone II – Air Force Plant 42	1. Compliance with General Plan, California High Speed Rail Authority (SCRRA), Business Plan, and Metrolink SCORE (Southern California Optimized Rail Expansion)
Rancho Vista	1,379 acres west of 30th Street, south of Ave. N-8	Residential, open space, commercial	None	N/A
Ritter Ranch	10,625 acres, approximately 4 miles west of SR 14, south of Elizabeth Lake Rd.	Residential, open space, schools, commercial, recreational	Alquist-Priolo 100 yr Flood Zone High voltage power lines Brush fires Liquefaction	1. Structural setback zones 2. Compliance with General Plan 3. Restricted use zones 4. Fuel modification plan 5. Special Foundation areas

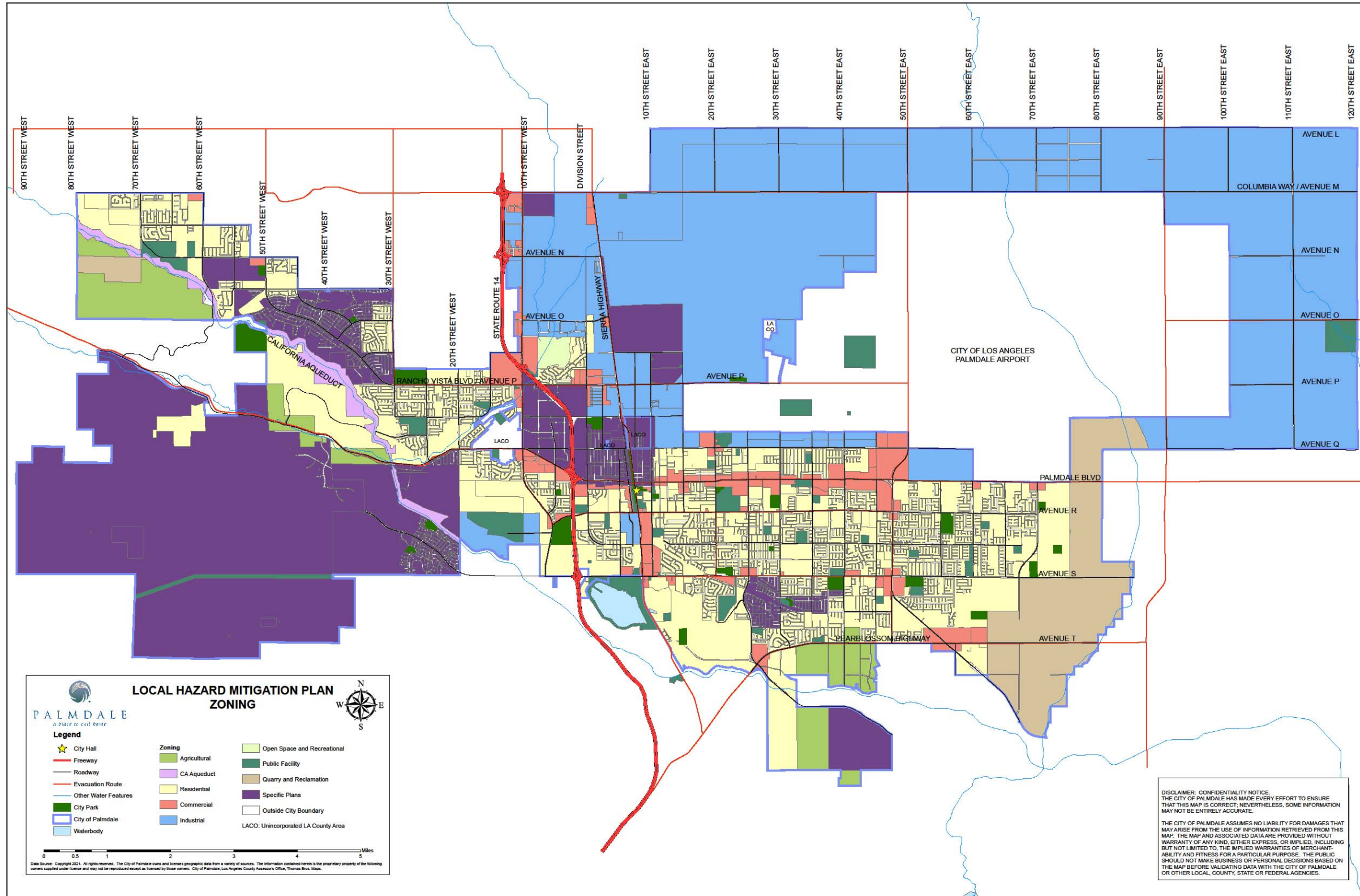
1. Planned for dissolution under the General Plan 2045 update.
2. Specific Plan largely built out and planned for dissolution under General Plan 2045 update.
3. Approximately 121.5 acres to be moved from Palmdale Trade and Commerce Center Specific Plan to the Palmdale Transit Area Specific Plan.
4. Palmdale Transit Village Plan replaced by Palmdale Transit Area Specific Plan.

Map 3.2 – City of Palmdale Land Use



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Map 3.3 – City of Palmdale Zoning



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3.5 Identifying Hazards

RISK ASSESSMENT RESEARCH, DOCUMENT REVIEW, AND PLANNING SURVEY

At the first meeting of the Steering Committee for the 5-year update, the team reviewed the hazards that were addressed in the 2016 LHMP. The team determined that these hazards were still applicable for the area and included a new hazard: infectious disease/pandemic. The team reviewed existing literature, technical data, and maps produced by the California Department of Forestry (CDF), the CDF Fire and Resource Assessment Program, OES, and FEMA, as well as City of Palmdale generated maps and documents, emergency operations plan, and the *Los Angeles County Multi-Jurisdictional Hazard Mitigation Plan*.

Newspaper articles, journals, climatic data, development trends, and watershed information were examined, as well as documents produced for the City by specialized engineering and environmental analysis firms. Documents included, but were not limited to, Environmental Impact Reports, Environmental Assessments, reports on soil stabilization, the 5-year CIP, the General Plan Update and specific development plans, and the reports relating to the environmental impacts of proposed projects.

The *State of California Multi-Hazard Mitigation Plan* was also reviewed. As appropriate, information from these sources has been incorporated into this LHMP. In particular, hazard and risk assessment information generated by Los Angeles County and information produced by federal, state, or local agencies, including graphics, have been used to support the risk assessment narrative. Specific sources of information include, but are not limited to:

- CALTRANS;
- California Geological Survey;
- FEMA Flood Insurance Rate Map;
- Southern California Earthquake Data Center;
- California Department of Fish and Game;
- California Department of Forestry (CDF);
- CDF Fire and Resource Assessment Program;
- FEMA Hazards Website;
- National Oceanic & Atmospheric Administration (NOAA);
- Other similar sources.

Technological hazards, such as those created by man-made conditions or originating within the human environment (bioterrorism, hazardous material spills, e.g.), were also considered. Technological hazards frequently have a significant impact on a localized area and are highly unpredictable.

In addition to research into existing materials, a community planning and perceived hazards survey instrument (Reference **Appendix B**) was distributed to City employees, the general community, and other agencies. The survey asked individuals about the types of disasters they

felt were the greatest threat to the City of Palmdale and what the City's mitigation planning priorities should be.

The consensus of City staff, the community, state and federal agencies, and all other interested stakeholders is that EARTHQUAKES, and the disaster events that are linked to them, pose the greatest threat to the City of Palmdale.

The community's perception of risk, which is sometimes not connected to empirical evidence, is discussed at length in the section detailing the results of the community planning survey.

LISTING OF HAZARDS

Natural and human-caused hazards that pose significant threats to the City have been identified through research and consultation of the Safety Element of the General Plan and the County's mitigation plan, and in collaboration with the public, the City of Palmdale, and the Hazard Mitigation Task Force and Mitigation Steering Committee. Those hazards that pose the highest risk and have the highest probability of occurring are profiled in this LHMP.

The list of hazards discussed within this LHMP includes:

- Earthquakes and Earthquake Related Hazards
- Floods, Dam Failure and Inundation
- Wildfires/Wildland Urban Interface Fires
- Transportation Accident/Hazmat Spill
- Drought
- Severe Weather
- Power/Utility Failure
- Pandemic/Infectious Disease

As an update from the previous LHMP, climate change impacts are now considered for each of the above-listed hazards.

Mitigation against the impacts of these identified hazards forms the basis of the City's mitigation strategy.

3.6 Profiling Hazards

Requirement §201.6(c)(2)(i): *[The risk assessment shall include a] description of the location and extent of all-natural hazards that can affect the jurisdiction. The plan shall include information on previous occurrences of hazard events and on the probability of future hazard events.*

The following hazard profiles are not presented in any particular order or rank of importance.

3.6.1 EARTHQUAKE

An earthquake is the ground shaking caused by the sudden movement of rock along a fracture in the Earth's brittle outer layer. This sudden slip, referred to as faulting, releases waves of energy that radiate outward in all directions from the area of initial movement. Most faulting and associated earthquakes occur in response to temperature-driven movements of rock that is deep inside the Earth. This slow movement pushes and pulls against the Earth's outer layer.

CAUSES OF EARTHQUAKES IN SOUTHERN CALIFORNIA

Earthquakes are caused by earth movement along a fault. Movement can be horizontal along the fault line ("strike slip") or vertically ("dip slip"). Typical fault movements are illustrated to the right:

A fault is a fracture along between blocks of the earth's crust where either side moves relative to the other along a parallel plane to the fracture.

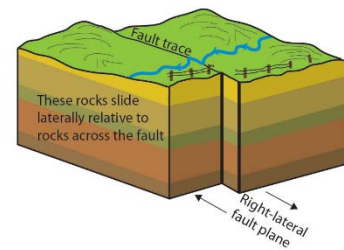
Strike-slip faults are vertical or almost vertical rifts where the earth's plates move mostly horizontally. From the observers' perspective, if the opposite block looking across the fault moves to the right, the slip style is called a right lateral fault; if the block moves left, the shift is called a left lateral fault.

Dip-slip faults are slanted fractures where the blocks mostly shift vertically. If the earth above an inclined fault moves down, the fault is called a normal fault, but when the rock above the fault moves up, the fault is called a reverse fault. Thrust faults have a reverse fault with a dip of 45° or less.

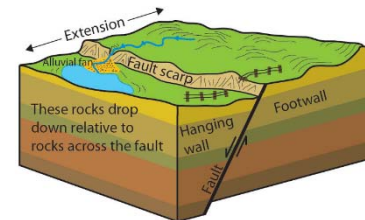
HOW IS EARTHQUAKE SIZE MEASURED?

Magnitude: Earthquake size or magnitude can be determined using an instrument called a seismograph. This instrument measures the movement of the Earth's surface by recording the radiating earthquake waves. Each whole number magnitude increase represents a ten-fold increase in the up and down motion recorded by the seismograph. An M = 6 earthquake causes 10 times the recorded motion of an M = 5 and 100 times the motion of an M = 4 earthquake. The magnitude may be used to calculate the amount of energy released by the earthquake. Each whole number increase in magnitude corresponds to an energy increase of about 32 times the lower magnitude value. An M = 6 earthquake releases about 30 times the energy of a M = 5 and nearly 1,000 times the energy of a M = 4 earthquake.

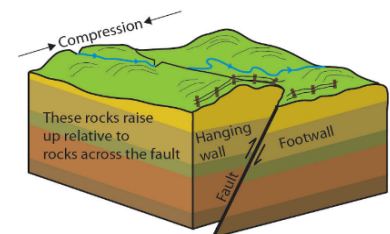
As earthquakes increase in size, the movement of the earth in response to the earthquake waves saturates. That is, the ground motion no longer increases in a way directly related to the



Strike-slip faulting



Normal faulting



Reverse and thrust faulting

Figure 3.1: Earthquake Fault Types

increased size of the earthquake. A different method of determining magnitude based on the number of factors, such as area of slip, is used to calculate the size of earthquakes generally greater than $M = 8$.

Intensity: Earthquake size may also be determined using a subjective scale of observed damage. This method was used before the installation of seismographs and before the development of the Richter Magnitude Scale. An example is the Modified Mercalli Intensity (MMI) Scale first published in 1931. Defining the intensity of an earthquake is similar to describing the brightness of a light bulb at a particular location in a room. What is observed depends not only on the light bulb's "magnitude" as measured by the number of watts, but also on the characteristics at any particular location that might affect the light's brightness.

Similarly, the intensity of damage observed at a specific building depends upon a number of factors, such as the earthquake's magnitude, distance from the fault generating the earthquake, type of geologic materials underneath the building, type of building construction, age of construction, and other attributes. Over time the MMI scale has been modified to address changes in building types. All these possible variations in damage result in a single earthquake being capable of producing intensities ranging from *not felt at a particular location* (MMI = I) to *causing catastrophic damage* (MMI = XII) at another place. Historical records generally list an earthquake's maximum observed intensity and the size of the area in which the earthquake was felt.

EARTHQUAKE DAMAGE

Earthquakes shake the ground in all directions. Because of this multi-directional shaking, the structural and nonstructural elements of a building must be specially designed to resist earthquake forces in a variety of directions. Structural and nonstructural elements of a building that are not secured to resist expected up and down and side-to-side earthquake shaking pose a hazard to building occupants.

Structural Damage: The structural elements of a building must be designed and constructed to support heavy weights under the force of gravity. Structural elements of newer Palmdale public buildings generally have sufficient strength to prevent collapse due to vertical earthquake motions. However, special earthquake-resistant design is often needed to strengthen structural elements to resist lateral or side-to-side earthquake motions.

Nonstructural Damage: Nonstructural elements can be vulnerable to damage from both vertical and lateral earthquake motions. When an earthquake shakes a building, the result can be:

- **Distortion and damage** to nonstructural elements, such as windows, partition walls, and elevators, caused as the shape of the building deforms in response to earthquake shaking.
- **Sliding and overturning** of bookshelves, file cabinets, mechanical equipment, and many other types of furnishings and equipment.
- **Falling of items** from counters, desks, and shelves.
- **Swaying and shaking** of suspended elements such as piping and light fixtures resulting in breaks, leaks, and falls.

Earthquake-resistant design of nonstructural elements was generally not a major concern in local or national building codes before 1980. Even in the most recent building codes, only a few nonstructural elements must be designed to resist earthquake damage. Therefore, the nonstructural elements in most buildings in the United States remain vulnerable to damage during earthquake shaking.

BENEFITS OF STRENGTHENING NONSTRUCTURAL ELEMENTS

Securing nonstructural elements improves the safety and security of the community during an earthquake emergency:

- Improves safety to individuals; reduces injuries and casualties;
- Helps maintain safe and clear exit ways for evacuation and building access;
- Reduces dangerous chemical spills, fires, and gas leaks;
- Improves the likelihood of using the facility following a damaging earthquake event; and
- Improves the likelihood of continuity of business operations following a significant earthquake.

Examples of securing nonstructural elements and their potential benefits:

- Bookshelves and file cabinets attached to walls reduce damage and improve the safety of exit routes;
- Locked storage rooms and secured equipment discourage theft;
- Safety film on glass provides increased safety in the event of a damaging earthquake, a bomb blast, accidents, and similar incidents. Glass safety films may also be tinted to improve energy conservation;
- Anchored vending machines prevent casualties caused by overturning during an earthquake or if shaken by users; and
- Earthquake strapping water heaters can reduce incidents of gas leaks, fire, explosion, and water damage.

Ancillary benefits:

- City staff and community members who inventory building areas for nonstructural earthquake hazards will also be learning skills that will enable them to make their homes and businesses safer.
- The inventory promotes teamwork among the community and helps team members become more familiar with building areas.

Securing nonstructural elements tends to foster recovery:

- Repair of earthquake induced damage to nonstructural elements can cost millions of dollars and keep facilities and businesses closed even when no structural damage has occurred.

Previous Occurrences

Earthquake events constitute the most likely serious hazard facing the City of Palmdale. Since 1769, the Southern California Region has experienced 40 recorded earthquakes of magnitude 5.0 or greater (see **Table 3.6** below). The region is crisscrossed by dozens of earthquake faults, the largest being the San Andreas. Among the other faults in the region are the Newport-Inglewood, Charnock (considered part of the Newport-Inglewood fault zone), Whittier, Chatsworth, Elsinore, Hollywood, Los Alamitos, and Palos Verdes. In addition to known faults, there are potentially dozens of faults below the surface that have not yet been charted. For example, the Whittier Narrows earthquake of 1987 occurred along a previously uncharted fault. More recently, the 1994 Northridge Earthquake was caused by an unknown thrust fault.

In 2019, two major earthquakes - a 6.4 on July 4 followed by a 7.1 on July 6 - occurred in Ridgecrest in neighboring Kern County, approximately 75 miles from the City of Palmdale. These were two of the largest earthquakes recorded in Southern California, with shaking felt into Northern California, Arizona, and Nevada. According to the USGS and CEA, estimated damages totaled over \$1 billion.

Table 3.6 – Earthquake Magnitude

Southern California Region Earthquakes with a Magnitude 5.0 or Greater			
1769	Los Angeles Basin – M6.0	1925	Santa Barbara – M6.8
1800	San Diego Region – M6.3	1933	Long Beach – M6.4
1812	Wrightwood – M7.5	1941	Carpinteria – M5.5
1812	Santa Barbara Channel – M7.2	1952	Kern County – M7.5
1827	Los Angeles Region – M5.5	1954	W. of Wheeler Ridge – M6.4
1855	Los Angeles Region – M6.0	1971	San Fernando – M6.6
1857	Fort Tejon – M7.9	1973	Point Mugu – M5.3
1858	San Bernardino Region – M6.0	1986	North Palm Springs – M5.6
1862	San Diego Region – M5.9	1987	Whittier Narrows – M5.9
1892	San Jacinto or Elsinore Fault – M6.3	1992	Landers – M7.3
1893	Pico Canyon – M5.7	1992	Big Bear – M6.5
1894	Lytle Creek Region – M6.0	1994	Northridge – M6.7
1894	E. of San Diego – M5.7	1999	Hector Mine – M7.1
1899	Lytle Creek Region – M5.7	2008	Chino Hills – M5.4
1899	San Jacinto and Hemet – M6.6	2014	La Habra – M5.1
1907	San Bernardino Region – M5.3	2014	South Napa – M6.0
1910	Glen Ivy Hot Springs – M5.5	2016	Borrego Springs – M5.2
1916	Tejon Pass Region – M6.1	2019	Ridgecrest (1 of 2) – M6.4
1918	San Jacinto – M6.8	2019	Ridgecrest (2 of 2) – M7.1
1923	San Bernardino Region – M6.3	2019- 2020	Ridgecrest aftershocks; At least six occurrences greater than M5.0, less than M6.0
		2020	Lone Pine – M5.8

Sources: Southern California Earthquake Data Center (SCEDC) Website, accessed June 2021.
Southern California Seismic Network Website, accessed June 2021

EARTHQUAKES IN CALIFORNIA

An earthquake large enough to cause moderate damage to structures – those of magnitude 5.5 or larger – occurs in California three or four times a year. The 1987 Whittier Narrows earthquake (M6), caused by a buried thrust fault, was responsible for hundreds of millions of dollars in property damage. More recently, the San Simeon earthquake (M6.5) hit an area six miles northeast of San Simeon on December 22, 2003.

Once every two to three years, a strong earthquake (M6 to M6.9), strikes somewhere in the state. An earthquake of this size, such as the 1994 Northridge Earthquake (M6.7) or the 1983 Coalinga Earthquake (M6.5) is capable of causing major damage if the epicenter is near a densely populated area.

Major earthquakes (M7 to M7.9) occur in California about once every ten years. The two largest earthquakes in California, the 1857 Fort Tejon Earthquake and the famous 1906 San Francisco Earthquake were similar in magnitude (M7.9 and M7.8) and resulted from movement along the San Andreas Fault. Earthquakes of this size (M7.7 to M7.9) can cause more extensive damage over a larger area than the M7.1 to M7.4 earthquakes that have struck California in recent decades.

Since seismologists started recording and measuring earthquakes, there have been tens of thousands of recorded earthquakes in Southern California, most with a magnitude below three. No community in Southern California is beyond the reach of a damaging earthquake.

While the well-known San Andreas Fault is capable of producing an earthquake over magnitude 8 on the Richter scale, there are many faults in the Southern California area that are capable of producing earthquakes in the 6 to 7 magnitude range. These faults have the potential to cause greater damage in the area due to their proximity to highly dense, built-up urban areas. A 6.0 magnitude quake along the Newport-Inglewood fault, for example, could cause more death, injury, and destruction in the urban area than an 8.0 quake on the San Andreas, due to the greater distance of the San Andreas from the urban core. While scores of quakes occur in the region in a typical year, most are measured 3.0 and under on the Richter scale, causing little or no damage. Many smaller quakes go virtually unnoticed except for detection by scientific instrumentation.

Map 3.4, on the following page, indicates the earthquake shaking potential for the state of California. All of Los Angeles County (highlighted) lies within areas that are near major active faults. These areas experience stronger shaking, more often.

Map 3.4 – Earthquake Shaking Potential

CALIFORNIA GEOLOGICAL SURVEY
JOHN G. FRANKISH, PH.D., STATE GEOLOGIST

STATE OF CALIFORNIA, EDMUND G. BROWN, JR., GOVERNOR
RESOURCE AGENCY, JOHN LAIRD, SECRETARY
DEPARTMENT OF CONSERVATION, DAVID BROWN, DIRECTOR

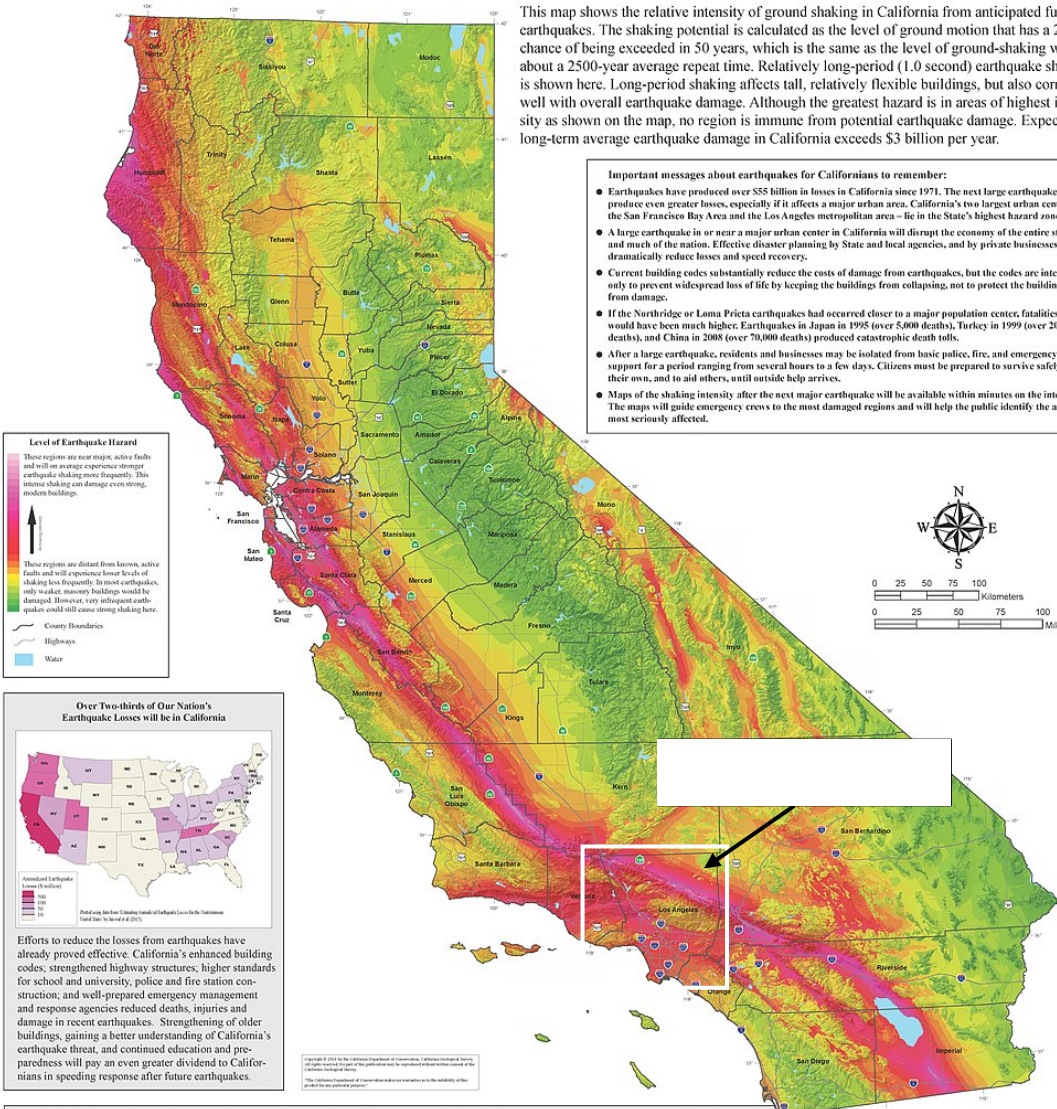
MAP SHEET 48 (REVISED 2016)
EARTHQUAKE SHAKING POTENTIAL FOR CALIFORNIA

Earthquake Shaking Potential for California 2016

D. Branum¹, R. Chen², M. Petersen³ and C. Wills⁴
¹California Geological Survey, ²United States Geological Survey

This map shows the relative intensity of ground shaking in California from anticipated future earthquakes. The shaking potential is calculated as the level of ground motion that has a 2% chance of being exceeded in 50 years, which is the same as the level of ground-shaking with about a 2500-year average repeat time. Relatively long-period (1.0 second) earthquake shaking is shown here. Long-period shaking affects tall, relatively flexible buildings, but also correlates well with overall earthquake damage. Although the greatest hazard is in areas of highest intensity as shown on the map, no region is immune from potential earthquake damage. Expected long-term average earthquake damage in California exceeds \$3 billion per year.

- Important messages about earthquakes for Californians to remember:**
- Earthquakes have produced over \$55 billion in losses in California since 1971. The next large earthquake may produce even greater losses, especially if it affects a major urban area. California's two largest urban centers – the San Francisco Bay Area and the Los Angeles metropolitan area – lie in the State's highest hazard zones.
 - A large earthquake in or near a major urban center in California will disrupt the economy of the entire state and much of the nation. Effective disaster planning by State and local agencies, and by private businesses, can dramatically reduce losses and speed recovery.
 - Current building codes substantially reduce the costs of damage from earthquakes, but the codes are intended only to prevent widespread loss of life by keeping the buildings from collapsing, not to protect the building from damage.
 - If the Northridge or Loma Prieta earthquakes had occurred closer to a major population center, fatalities would have been much higher. Earthquakes in Japan in 1995 (over 5,000 deaths), Turkey in 1999 (over 20,000 deaths), and China in 2008 (over 70,000 deaths) produced catastrophic death tolls.
 - After a large earthquake, residents and businesses may be isolated from basic police, fire, and emergency support for a period ranging from several hours to a few days. Citizens must be prepared to survive safely on their own, and to aid others, until outside help arrives.
 - Maps of the shaking intensity after the next major earthquake will be available within minutes on the internet. The maps will guide emergency crews to the most damaged regions and will help the public identify the areas most seriously affected.



Level of Earthquake Hazard

These regions are near major active faults and will on an average experience stronger earthquake shaking more frequently. This intense shaking can damage even strong, modern buildings.

These regions are distant from known, active faults and will experience lower levels of shaking less frequently. In most earthquakes, only weaker, masonry buildings would be damaged. However, very infrequent earthquakes could still cause strong shaking here.

County Boundaries
Highways
Water

Over Two-thirds of Our Nation's Earthquake Losses will be in California

Efforts to reduce the losses from earthquakes have already proved effective. California's enhanced building codes, strengthened highway structures, higher standards for school and university, police and fire station construction, and well-prepared emergency management and response agencies reduced deaths, injuries and damage in recent earthquakes. Strengthening of older buildings, gaining a better understanding of California's earthquake threat, and continued education and preparedness will pay an even greater dividend to Californians in speeding response after future earthquakes.

Earthquake shaking potential is calculated considering historic earthquakes, slip rates on major faults and deformation throughout the region, and the potential for amplification of seismic waves by near-surface geologic materials. The complete analysis is called a Probabilistic Seismic Hazard Analysis. The resulting earthquake shaking potential is used in developing building code design values, estimating future earthquake losses and prioritizing earthquake retrofit.

Historic earthquakes since 1769: The rate of historic earthquakes is used to estimate the rate of future earthquakes and to check the rate of future earthquakes calculated from other data.

Slip rates of major faults: The rate of earthquakes on faults is governed by the size of the fault and the rate that the two rock masses relative to each other. Larger faults can produce larger earthquakes, and faults with higher slip rates can generate more frequent earthquakes.

Surface geologic materials: Seismic waves may be amplified by near-surface materials. Soft soils – those with low shear wave velocity – amplify shaking compared with bedrock. A geologic map of California showing areas with different shear wave velocity can be used to estimate seismic amplification.

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Wells, C.J., Coppers, C.J., Jones, F.J., and Bruneau, D.M., 2011. A nonprobabilistic V100 Map for California: local peak ground acceleration. *Bulletin of the Seismological Society of America*, v. 101, p. 3083-3096. doi: 10.1785/001.2010-0165

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Probability of Future Events



Figure 3.2 San Andreas Fault

The probability that, sooner or later, the City of Palmdale will suffer a major seismic event is virtually 100%, as described in the Safety Element of the City's General Plan.

The City of Palmdale and the Planning Area are located in a seismically active region. The dominant seismic feature affecting the City is the San Andreas Fault which traverses the southernmost portion of the Planning Area. The San Andreas Fault is the boundary where the North American plate and the Pacific plate meet. Relative movement of the plates along this boundary causes earthquakes. This fault is considered one of the most dangerous in the state in terms of destructive potential. The San Andreas Fault extends over 600 miles from the Salton Sea, northwest toward the Pacific Ocean

at Point Arena. Two of the three largest (8.0+ Richter) earthquakes in the state have occurred along the San Andreas Fault: the 1906 San Francisco earthquake that caused 21-foot offsets and the 1857 Fort Tejon earthquake. **Table 3.7** lists earthquake activity on the resulting Modified Mercalli intensity from the San Andreas Fault. Intensity measures the amount of ground shaking caused by an earthquake. An intensity value is assigned by the amount of damage to structures, changes in the earth's surface, and personal accounts.

In addition, several fault traces branch off from the primary fault within the San Andreas Rift Zone. The major fault traces for the San Andreas system in the Palmdale area are the Cemetery Fault, the Nadeau Fault, and the Littlerock Fault. All three faults are active splays of the San Andreas Fault. Thus, movement on the San Andreas Fault may activate one or all of these subsidiary faults. The Nadeau, Cemetery, and Littlerock fault traces are located in Palmdale.

Other splays of the San Andreas Fault which are found in Palmdale are the Powerline Fault and the eastern end of the Clearwater Fault.

In addition to the San Andreas Fault system, other principal faults that could produce damaging earthquakes in the Palmdale area are the Sierra Madre-San Fernando, Garlock, Owens Valley, and White Wolf faults. Their maximum probable magnitudes are listed in **Table 3-8**. A maximum probable earthquake is the largest event expected to occur within 100 years. The Sierra Madre Fault is located at the base of the San Gabriel Mountains approximately 20 miles south of the Planning Area. The Garlock and White Wolf faults are northeast-trending faults located 30 to 60 miles, respectively, northwest of the Planning Area. The Owens Valley fault is 60 miles to the northeast and runs north south. A number of other faults located in the Southern California region could be responsible for earthquakes that would affect the city; although no major

damage is expected to occur. (Tables on the following page were excerpted from the Safety Element of the City's General Plan.)

TABLE 3.7 MAJOR SAN ANDREAS FAULT ACTIVITY

Date	Magnitude	Modified Mercalli Intensity	Location
1838	7.0	X - Comparable to 1906 earthquake	San Francisco
1857	7.9	IX+ - Buildings and large trees thrown down	Fort Tejon
1858	6.1	IX+ - Damage to building frames and foundations	San Francisco
1868	7.0	IX+ - Many buildings wrecked badly damaged. 30 killed	Hayward Fault
1890	6.8		So. Santa Cruz Mountains
1899	6.7	VIII - Brick buildings badly damaged. 6 killed.	San Jacinto Fault
1906	7.7	XI - Great earthquake and fire. 700 killed. Greatest damage on poorly filled land. 6.5-meter horizontal slip.	San Francisco
1916	6.0+		Tejon Pass
1922	6.5	IX - Damage to masonry buildings and reservoir. Ground cracking.	Cholame Valley
1934	6.0	VIII - \$41 million damage. 120 killed	Parkfield
1989*	7.1	VIII - Localized freeway and bridge collapse. 63 killed.	San Francisco/Bay Area
2004	6.0		Parkfield

*Southern Santa Cruz Mountain segment of the San Andreas Fault.

Source: California Department of Mines and Geology, Fault Map of California and Earthquake Hazards in the Los Angeles Region; Hill et al., 1979; Topazada et al 1981, 1982; Jennings 1975

TABLE 3.8 FAULT MAGNITUDES

Fault	Maximum Probable Magnitude (Moment)*	Recurrence Interval (Years)
San Andreas	8.0+	50-200
Sierra Madre-San Francisco	6.6	50-200
Garlock	7.5	500-700
Owens Valley	7.4	850-900
White Wolf	7.2	300

*The Moment Magnitude is preferred to the Richter Magnitude for earthquakes larger than 6M. As the magnitude surpasses 6.5M (Richter), all events begin to take on the same magnitude

values. The Moment Magnitude keeps its integrity and delineates the different values greater than 6.5M.

Source: California Department of Mines and Geology Preliminary Report #13, C. W. Jennings; Los Angeles County Seismic Safety Element.

1994 Northridge Earthquake

Perhaps the most destructive earthquake in the recorded history of Southern California was the Northridge earthquake, which occurred on January 17th, 1994. Striking at 4:31 in the morning, the quake measured 6.7 on the Richter Scale, and shook all of Southern California. Fifty-seven people lost their lives as a result of the quake, and more than 1,500 were seriously injured. More than 4,000 buildings were severely damaged and over 11,000 buildings suffered moderate damage. Severe damage occurred to structures as far away as Santa Monica, and several freeways suffered severe damage, including catastrophic failure of freeway bridges on the 10 and 14 freeways. The Santa Monica Mountains rose 15 inches in a matter of minutes.

EARTHQUAKE RELATED HAZARDS

The greatest damage caused by earthquakes results from ground shaking. Ground shaking results from seismic waves generated by the earthquake. Seismic waves travel under and on the earth's surface, causing ground motion, or *shaking*.

Ground Shaking: Ground shaking is the motion felt on the earth's surface caused by seismic waves generated by the earthquake. It is the primary cause of earthquake damage. The strength of the ground shaking depends on the magnitude of the earthquake, the type of fault, and the distance from the Earthquake epicenter. Buildings on poorly consolidated, compacted, or sandy soils will typically see more damage than buildings on consolidated soils and bedrock.

In addition to damage caused by ground shaking, earthquakes also cause, directly or indirectly, secondary hazards. These include.

Liquefaction: Liquefaction results when ground shaking causes wet, loose soils to become liquefied. As a result, buildings and other structures on these soils lose their support and may partially or entirely collapse.

Induced Landslides: The ground shaking associated with earthquakes may cause landslides in unstable hillside or mountainous areas. Landslides pose a hazard to persons and structures of all types in the impacted area.

Amplification: Soil and soft sedimentary rocks near the earth's surface can modify ground shaking caused by earthquakes. One of these modifications is amplification. Amplification increases the magnitude of the seismic waves generated by the earthquake. The amount of amplification is influenced by the thickness of geologic materials and their physical properties. Buildings and structures on soft and unconsolidated soils can face greater risk. Amplification can also occur in areas with deep sediment filled basins and on ridge tops.

Fires: Ground shaking may break gas lines, cause electrical lines to fall or short, and bring normally contained flames (such as furnaces and water heaters) into contact with combustible material, resulting in fires.

ALQUIST-PRIOLO EARTHQUAKE ZONE

As shown in **Map 3.5**, the Alquist Priolo Earthquake zone runs in an east/west direction across the southerly side of the City of Palmdale. This zone portrays the region in which a fault investigation must be conducted as a condition for a permit to construct certain buildings, pursuant to CA Public Resources Code Section 2621 et seq. While no critical or essential facilities fall within this zone, some key infrastructure does fall within this area. State Route 14, the City’s lifeline to southern California could be jeopardized during the event of an earthquake. **Table 3.9** identifies the infrastructure located within the Alquist Priolo Zone of Required Investigation.

Table 3.9 Key Infrastructure in Alquist Priolo Earthquake Zone

Key Infrastructure
SR 14
City Park and Rides (3 - close proximity)
Water Tanks (approx. 6)
Water Treatment Plant

No community in Southern California is immune from earthquake hazards. Even earthquakes that occur many miles away can cause local damage depending upon the characteristics of structures, soil types and conditions, and other factors. Regardless, the San Andreas Fault clearly poses the greatest natural threat to the City of Palmdale.

The following analysis evaluates the City’s vulnerability to a major seismic event from three perspectives: a general assessment of likely damage to structures, loss of life, and personal injuries; an analysis of potential losses to city facilities; and an analysis of potential losses to critical facilities and infrastructure.

The City of Palmdale would experience ground shaking as a result of a major seismic event on the San Andreas Fault. The extent and magnitude of ground shaking are shown on the following maps which were prepared by the City's GIS Section: **Map 3.5** "Seismic Activity" identifies the earthquake shaking probability of 10% in 50 years by shaking intensity expressed as spectral acceleration at one second frequency in units of gravity. **Map 3.6** "Soils, Liquefaction and Landslide Zones" identifies soil types and potential liquefaction and landslide zones in the Palmdale area.

It is seen on **Map 3.5** that about 85% of the entire City of Palmdale boundaries would show an 80-175% g seismic shaking. All City facilities would be affected along with major infrastructure. Refer to **Table 3.9** for facilities affected and cost involved. With regards to soils, liquefaction, and landslide zones, the majority of soils within Palmdale vary from rock to very dense soil/soft rock to stiff soil. There is a very low likelihood of liquefaction and landslides happening.

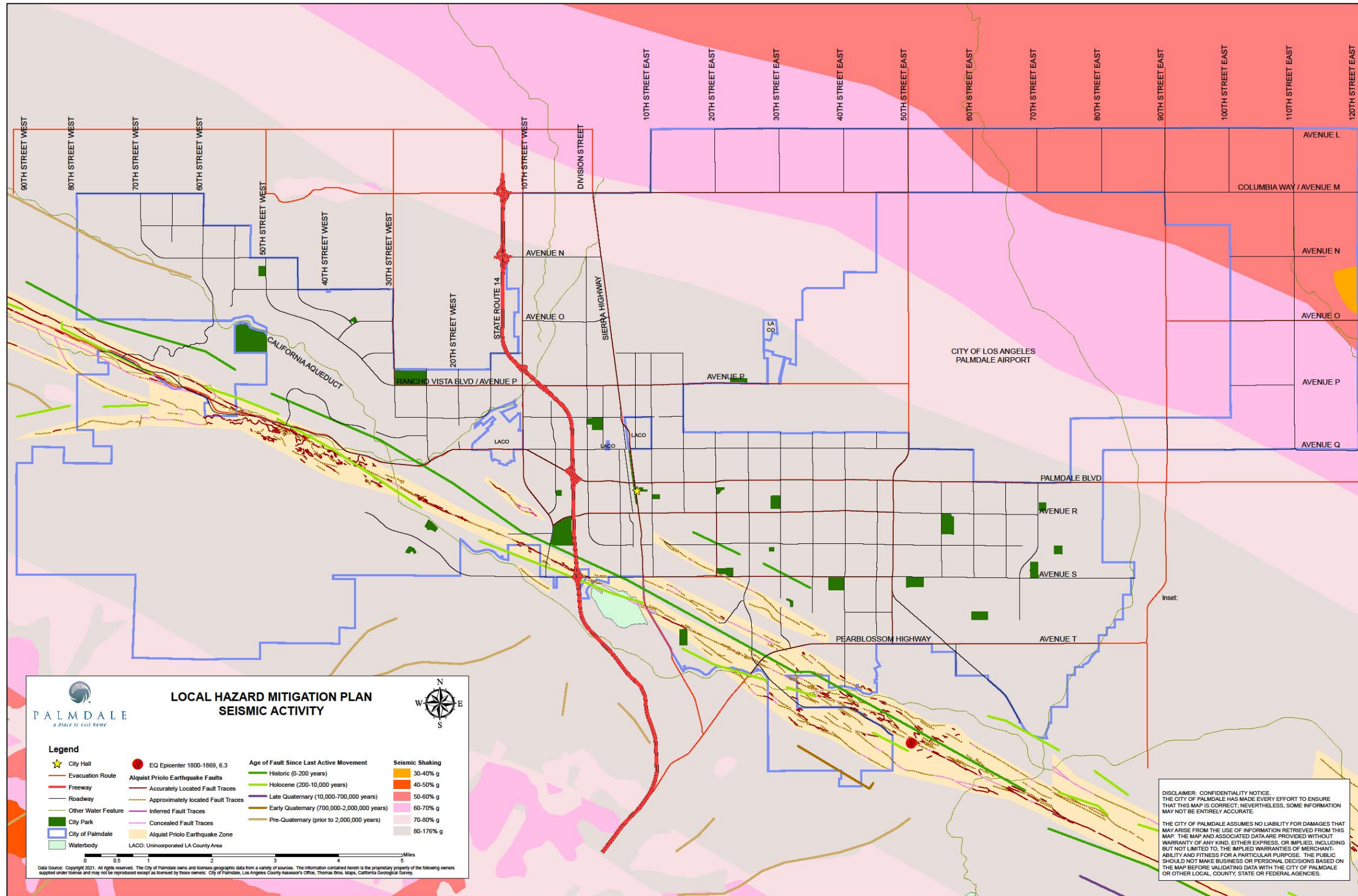
Estimating potential losses involves assessing the damage, injuries, and financial costs likely to be sustained in a geographic area over a given period of time. This level of analysis involves using mathematical models. The two measurable components of any risk analysis are magnitude of the harm that may result and the likelihood of the harm occurring. Describing vulnerability in terms of dollar losses provides the community and the state with a common framework with which to measure the effects of hazards on assets.

Factors included in assessing earthquake risk include population distribution in the hazard area, the frequency of earthquake events, landslide susceptibility, soil saturation, buildings, infrastructure, and local capability. These types of analysis can generate estimates of the damages to the regions due to an earthquake event in a specific location. The FEMA-approved HAZUS loss estimation software was developed in conjunction with the National Institute of Building Sciences (NIBS). The HAZUS estimates include economic loss, building damage, casualties, and shelter needs. In addition, the HAZUS analysis produced estimates of losses to critical facilities, such as bridges, fire stations, police stations, etc.

The HAZUS analysis provided in **Appendix C** evaluates the City's vulnerability to a major seismic event: a general assessment of likely damage to structures, loss of life, and personal injuries; an analysis of potential losses to city facilities; and an analysis of potential losses to critical facilities and infrastructure.

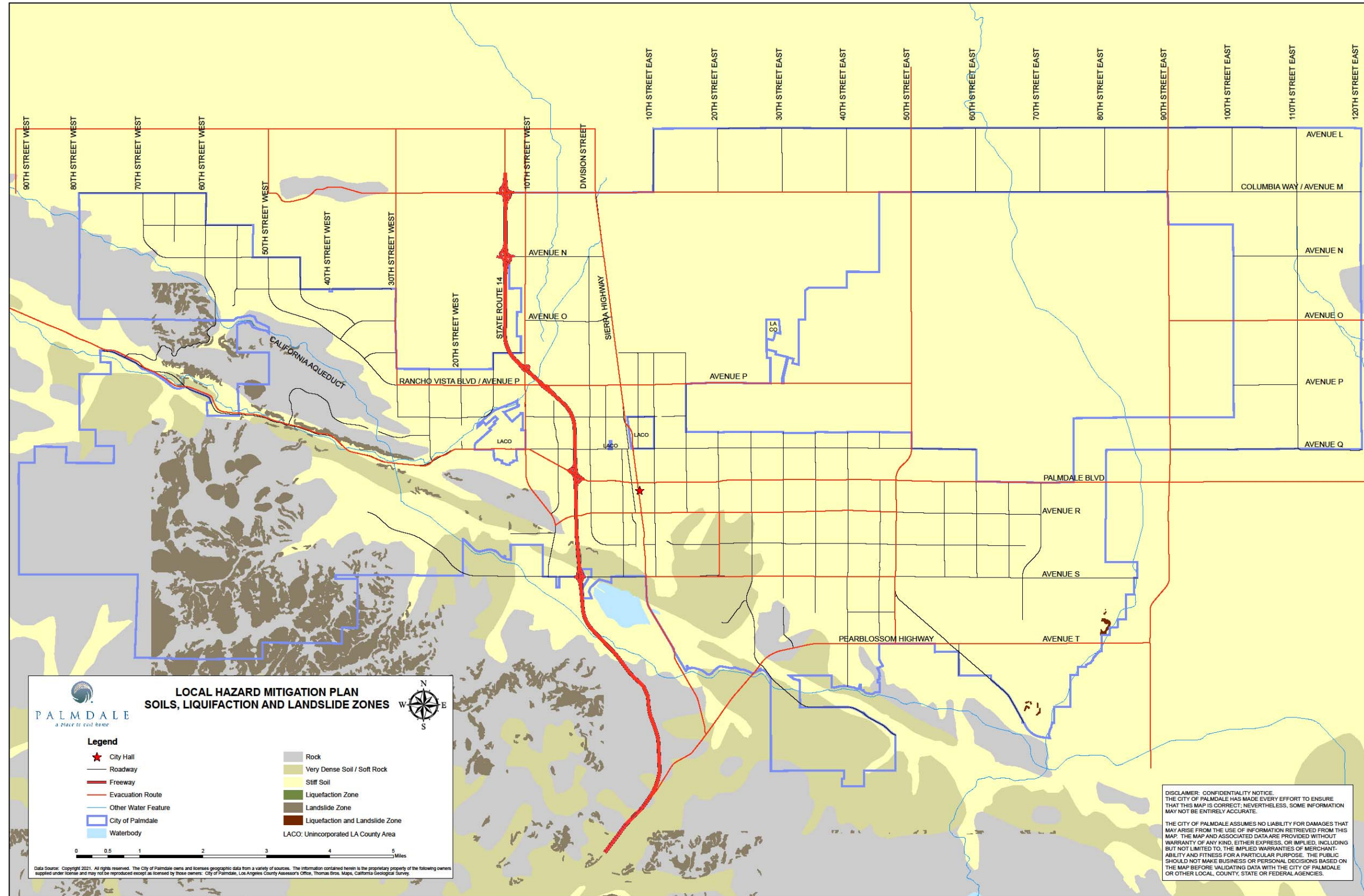
Damages from a large earthquake in urbanized areas of Southern California are likely to run into billions of dollars. Although California building codes are some of the most stringent in the world, tens of thousands of older building stock exists not built to current code. California has enacted laws requiring the retrofit of unreinforced masonry buildings, and laws limiting construction of buildings within a specified distance from a known fault based on occupancy, etc. Structural and non-structural retrofits are both effective life safety mitigation actions to reduce risk to lives and property.

Map 3.5 – City of Palmdale Seismic Activity



06-29-2021_gis_00024-5

Map 3.6 – City of Palmdale Soils, Liquefaction and Landslide Zones



06-29-2021_GIS_00024-6

Climate Change Impacts

Scientists are currently studying the impacts of climate change on seismic activity. While increased temperatures are not linked to an increased risk of earthquake occurrence, scientists are currently studying the seismic consequences of water and how climate change may factor into such phenomena as drought (Source: <https://climate.nasa.gov/news/2926/can-climate-affect-earthquakes-or-are-the-connections-shaky/>). Furthermore, climate change may amplify the secondary effects of earthquakes, including increasing temperatures which could intensify fire risks, or contribute to drought which in turn dries out vegetation and affects available water supply, which could further constrain firefighting efforts during fires caused by an earthquake. Droughts exacerbated by climate change can also lead to subsidence, that could intensify damage resulting from an earthquake.

Vulnerability Assessment

A major seismic event on the San Andreas Fault could cause considerable damage to critical facilities and infrastructure. The following assessment of potential damage is excerpted, in part, from the City of Palmdale Emergency Operations Plan:

DAM AND FLOOD CONTROL CHANNELS

Ground movement from an earthquake may cause the rupture of dams in Palmdale. Rupture of the Lake Palmdale Dam or the Littlerock Dam may result in area flooding.

Aside from dam failure and subsequent flooding, a seismic water wave may occur at Lake Palmdale. The wave could run up the slope and overtop the dam. A reflection of the wave on return is unlikely. The wave volume above the dam would not be substantial enough to cause damaging floods (approximately 1 acre-foot). Flooding over the downstream of the dam would not cause damage to the existing rockfill, as it was designed to withstand it. The Sheriff's Department is responsible for notification and evacuation procedures in the event of dam failure.

FIRE OPERATIONS

There are six fire stations located in the city, Station Nos. 24, 37, 136, 114, 131, and station 93, the Battalion Headquarters at Massari Park.

HIGHWAYS AND BRIDGES

The Antelope Valley Freeway would be closed by failure of one or more overpasses, rockfalls, and fault rupture. All secondary mountain roads between the high desert and the urban areas to the south would be closed until cleared of rockfalls and slides. The Antelope Valley Freeway (SR-14) is the main access route between the Antelope Valley and the urban areas of Los Angeles. This route would be closed for at least 72 hours. Secondary routes paralleling SR-14 between Santa Clarita and Palmdale should be examined for possible utilization as an alternative to the freeway, including Sierra Highway and Soledad Canyon Road.

Sierra Highway would be closed between Pearblossom Highway and Avenue S and Pearblossom Highway (SR-138) would be closed between Sierra Highway and Route 138 due to major damage

resulting from fault rupture. Both routes would be closed for over 72 hours. SR-138 would be closed from SR-14 to Interstate 15 by damage and roadway obstructions. This route would be closed for at least 72 hours. If bridges did fail and/or collapse, the city could be split into west and east halves, each cut off from the other.

NATURAL GAS

Two 30-inch natural gas transmission pipelines are operated along Avenue S. These pipelines come up from Newhall where the gas is pressurized and metered, then sent to Palmdale. Fault ruptures would sever the imported natural gas supplies from the San Joaquin Valley that cross the fault near Tejon Pass. The two 30-inch gas lines that run along Avenue S and cross the fault south of Palmdale could also be impacted. These lines would be shut off automatically by Southern California Gas.

RAILROADS

The Southern Pacific rail lines crossing the San Andreas Fault near Palmdale would suffer major damage and may be closed for over 72 hours. Other lines, from Acton to Lancaster, would be disrupted due to intense ground shaking. Also, rail lines from Palmdale to Interstate 15 in the east would be disrupted due to track displacement and settlement of bridge-approach fills.

WATER SUPPLY

A catastrophic earthquake would cause major damage to both the California Aqueduct and Lake Palmdale, which are primary sources of water for Palmdale. The major reservoirs storing imported water may not be able to deliver water due to damage to downstream transmission facilities. It is expected that residents would have to use conservation measures, and daily water usage would be reduced by approximately 50 percent.

Estimating Potential Losses

Estimates of potential losses were calculated using the Federal Emergency Management Administration HAZUS model. Using information on geology, soils, the history of past events, population data, structure types and characteristics, and inventories of infrastructure, HAZUS produces estimates of property damage, personal injury, and fatalities. The model also produces estimates of economic losses.

For the purposes of this study the three HAZUS scenarios were evaluated based on a M6.7 seismic event on the San Andreas Fault. The three time periods evaluated were: daytime, nighttime, and commute time. Human casualties, in particular, vary according to time of day. For example, a nighttime event would be unlikely to cause significant casualties at schools. An event occurring during daytime would find many commuting residents at their jobs in Los Angeles and the San Fernando Valley. A major earthquake occurring during commute hours would find thousands of commuters on the freeways.

Summary results of the HAZUS scenarios evaluated for this LHMP are presented on the following page, followed by economic loss estimates for transportation systems, utility systems, and

building related losses. For further detailed information, a full detailed copy of the HAZUS model results for all three scenarios appears in **Appendix C**.

Table 3.10 HAZUS Casualty Estimates

		Level 1	Level 2	Level 3	Level 4
2 AM	Commercial	10.69	3.01	0.48	0.95
	Commuting	0.05	0.06	0.11	0.02
	Educational	0.00	0.00	0.00	0.00
	Hotels	0.00	0.00	0.00	0.00
	Industrial	17.38	4.72	0.69	1.35
	Other-Residential	148.96	35.53	3.56	6.59
	Single Family	159.80	22.16	1.08	1.89
	Total	337	65	6	11
	2 PM	Commercial	644.98	181.36	28.96
	Commuting	0.44	0.58	0.99	0.19
	Educational	278.30	77.47	12.57	24.59
	Hotels	0.00	0.00	0.00	0.00
	Industrial	127.96	34.71	5.08	9.84
	Other-Residential	34.80	8.37	0.88	1.61
	Single Family	35.45	4.97	0.28	0.42
	Total	1,122	307	49	93
	5 PM	Commercial	465.27	130.56	20.93
	Commuting	6.75	8.85	15.12	2.92
	Educational	22.41	6.24	1.01	1.98
	Hotels	0.00	0.00	0.00	0.00
	Industrial	79.98	21.70	3.18	6.15
	Other-Residential	54.95	13.18	1.37	2.49
	Single Family	61.64	8.66	0.49	0.73
	Total	691	189	42	55

**Table 3.11 HAZUS Transportation System Economic Losses Estimate
(Millions of Dollars)**

System	Component	Inventory Value	Economic Loss	Loss Ratio (%)
Highway	Segments	2364.6559	0.0000	0.00
	Bridges	98.2216	11.4822	11.69
	Tunnels	0.0000	0.0000	0.00
	Subtotal	2462.8775	11.4822	
Railways	Segments	132.3697	0.0000	0.00
	Bridges	40.0448	3.5553	8.88
	Tunnels	0.0000	0.0000	0.00
	Facilities	0.0000	0.0000	0.00
	Subtotal	172.4145	3.5553	
Light Rail	Segments	41.5904	0.0000	0.00
	Bridges	0.0000	0.0000	0.00
	Tunnels	0.0000	0.0000	0.00
	Facilities	0.0000	0.0000	0.00
	Subtotal	41.5904	0.0000	
Bus	Facilities	1.8306	0.7517	41.06
	Subtotal	1.8306	0.7517	
Ferry	Facilities	0.0000	0.0000	0.00
	Subtotal	0.0000	0.0000	
Port	Facilities	0.0000	0.0000	0.00
	Subtotal	0.0000	0.0000	
Airport	Facilities	14.4161	4.0880	28.36
	Runways	456.5705	0.0000	0.00
	Subtotal	470.9866	4.0880	
	Total	3,149.70	19.88	

**Table 3.12 HAZUS Utility System Economic Losses Estimate
(Millions of Dollars)**

System	Component	Inventory Value	Economic Loss	Loss Ratio (%)
Potable Water	Pipelines	0.0000	0.0000	0.00
	Facilities	0.0000	0.0000	0.00
	Distribution Lines	35.4311	3.7314	10.53
	Subtotal	35.4311	3.7314	
Waste Water	Pipelines	0.0000	0.0000	0.00
	Facilities	0.0000	0.0000	0.00
	Distribution Lines	21.2586	1.8744	8.82
	Subtotal	21.2586	1.8744	
Natural Gas	Pipelines	35.0997	0.0000	0.00
	Facilities	0.0000	0.0000	0.00
	Distribution Lines	14.1724	0.6421	4.53
	Subtotal	49.2721	0.6421	
Oil Systems	Pipelines	0.0000	0.0000	0.00
	Facilities	0.0000	0.0000	0.00
	Subtotal	0.0000	0.0000	
Electrical Power	Facilities	199.0800	30.0043	15.07
	Subtotal	199.0800	30.0043	
Communication	Facilities	0.0000	0.0000	0.00
	Subtotal	0.0000	0.0000	
Total		305.04	36.25	

**Table 3.13 HAZUS – Building Related Economic Losses Estimate
(Millions of Dollars)**

Category	Area	Single Family	Other Residential	Commercial	Industrial	Others	Total
Income Losses							
	Wage	0.0000	1.4878	33.7369	0.5257	1.2732	37.0236
	Capital-Related	0.0000	0.6348	30.3480	0.3009	0.3860	31.6697
	Rental	18.8033	8.4719	16.5401	0.1566	0.6310	44.6029
	Relocation	68.3571	11.0591	23.9363	1.0218	5.9695	110.3438
	Subtotal	87.1604	21.6536	104.5613	2.0050	8.2597	223.6400
Capital Stock Losses							
	Structural	122.0324	27.4644	43.7616	3.9631	8.7495	205.9710
	Non_Structural	663.3415	140.4543	138.8491	14.6816	27.3220	984.6485
	Content	235.4067	33.2096	64.8364	8.7016	13.2932	355.4475
	Inventory	0.0000	0.0000	1.5343	1.2808	0.1549	2.9700
	Subtotal	1020.7806	201.1283	248.9814	28.6271	49.5196	1549.0370
Total		1107.94	222.78	353.54	30.63	57.78	1772.68

3.6.2 FLOODS, DAM FAILURE, AND INUNDATION

The City of Palmdale and the surrounding planning area are subject to potential flooding from the following causes:

- Overflow of underground drainage channels/detention basins into low-lying areas as a result of heavy rainfall (“Sheet flow”)
- Inundation resulting from dam failure (Little Rock Dam and Lake Palmdale, see map)
- Inundation due to a break in the California Aqueduct, see map

Flood plains seem to be changing and, in most cases, growing. Areas of the City within the 100-year flood zone are shown on **Map 3.7**. Better technology (mapping and modeling) and better

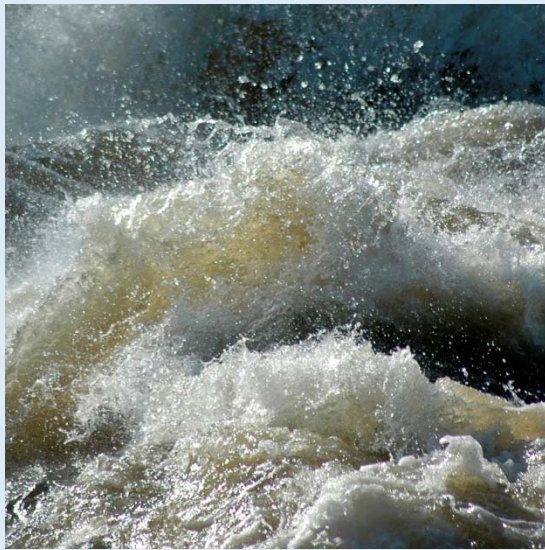


Figure 3.3: Flash Flood

data has yielded a better understanding of what is happening. In other words, it is not that the flood plain is changing necessarily. Rather, it is our understanding of where the flood plain is located that is changing. Palmdale’s Flood Insurance Rate Maps were last updated in September 2008.

Conventional reality dictates that some solutions designed to protect certain areas create problems for other areas. Therefore, there is a need to create integrated solutions combining “tools” that work together. In 2002, the State of California Floodplain Task Force chose the term “reasonably foreseeable flood” to identify potential flood threats, (see **Table 3.14**).

Table 3.14 – Reducing Risks from Reasonably Foreseeable Flooding

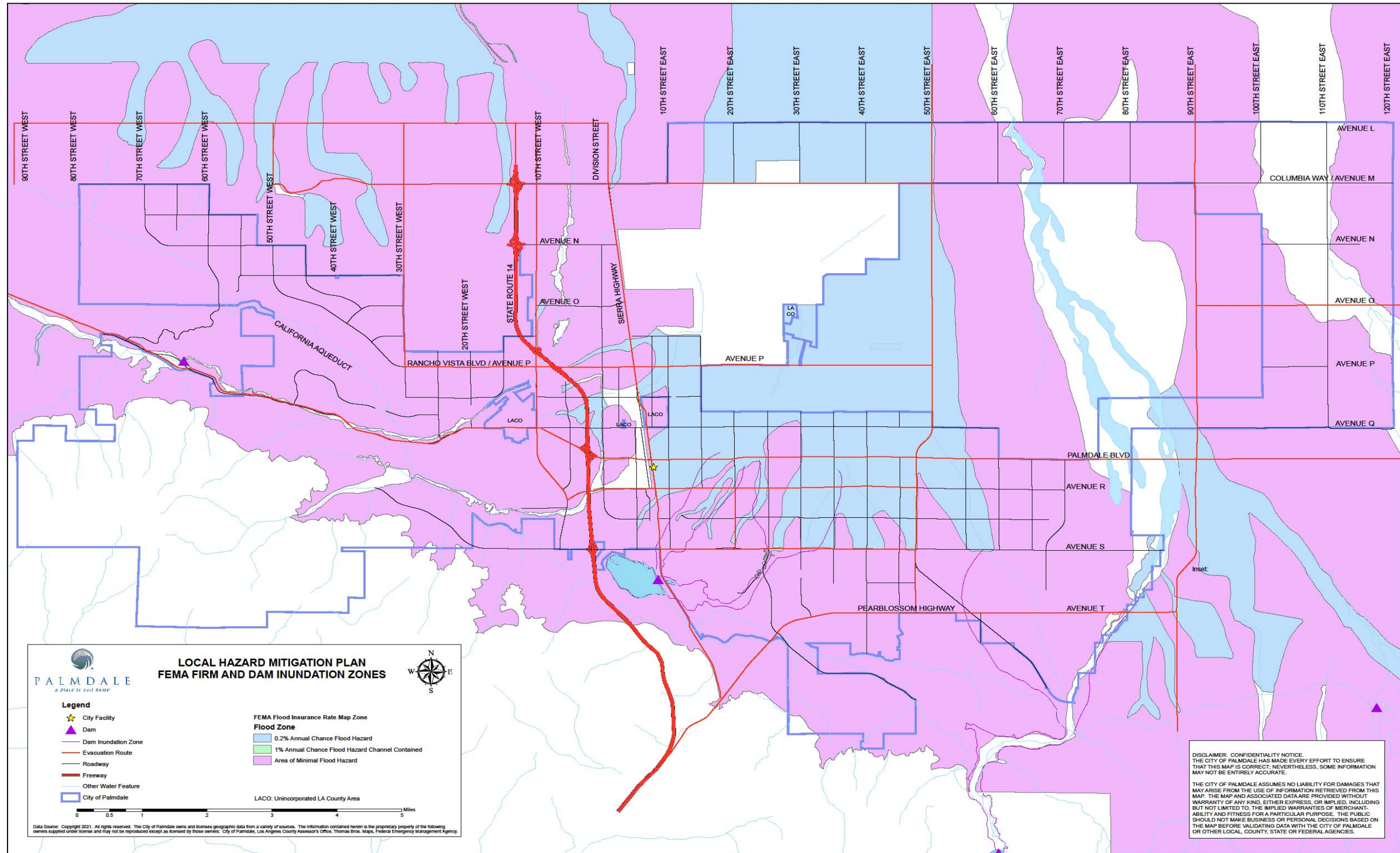
Action	Description
Awareness Floodplain Mapping	The State should expand its Awareness Floodplain Mapping Program for use by local governments and the public.
Future Build-Out Mapping	Local and State agencies preparing floodplain maps should consider current and future planned development.
Watershed-Based Mapping	Wherever practical, floodplain maps should be prepared on a watershed basis.
Geographic Information System (GIS)-Based Flood Maps	Local, State and federal agencies should create, develop, produce, and disseminate compatible GIS based flood maps.

Alluvial Fan Floodplains	Priority for alluvial fan floodplain mapping should be given to those alluvial fan floodplains being considered for development. The State should convene an alluvial fan task force to review information on alluvial fan floodplains, determine future research needs, and develop recommendations specific to alluvial fan floodplain management.
Stream Gauging and Monitoring	DWR and other agencies should sponsor projects in cooperation with the United States Geological Survey (USGS) to install real time gauges in priority locations throughout California.
Repetitive Losses	Local agencies should work with the OES and DWR to identify repeatedly flooded structures and inform qualifying residents of voluntary programs to prevent future flood loss.
Flood Warning and Local Community Flood Response Programs	The State should increase assistance to local agencies to improve flood-warning programs for specific watersheds.
Flood Insurance Rate Map Issues	Decision-makers should gather information and data beyond Flood Insurance Rate Maps to better assess reasonably foreseeable floods.
Exceeding Minimum Flood Insurance Requirements	Local communities should be encouraged to require new and substantially improved buildings to set their lowest floor elevations to at least one foot above the NFIP base flood elevation, thus factoring in the effect of full build-out of the watershed.
Executive Order	The Governor’s 1977 Executive Order should be updated to direct State agencies to meet or exceed NFIP standards for State facilities.
State Model Hazard Mitigation Plan	DWR, OES, and other agencies should incorporate floodplain management measures into the State Model Hazard Mitigation Plan that will meet the FEMA requirements.
Multi-hazard Mapping	OES should coordinate with other hazard mapping efforts to develop GIS-based multi-hazard advisory maps and distribute them to local governments and the public.
State Building Codes	Ensure that the California Building Standards Code meets, at a minimum, NFIP requirements. Ensure that other State codes applicable to public buildings meet, at a minimum, NFIP requirements. Ensure that any local code adoptions or amendments and any development approvals meet, at a minimum, NFIP requirements.

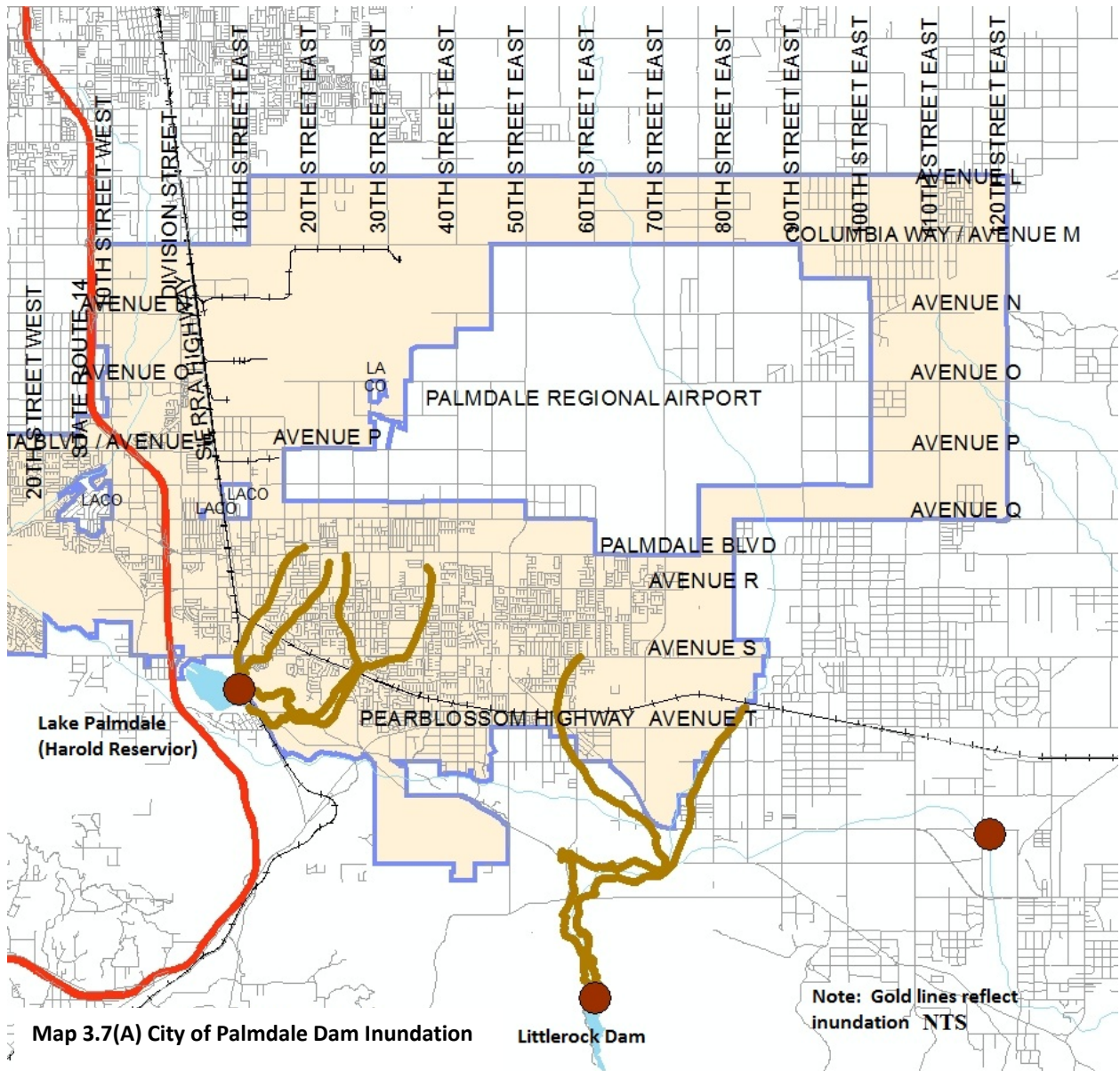
Since the first LHMP in 2009, the City of Palmdale has created an “Emergency Services Notification System – See **Table 4.1**” that is implemented when a hazardous event may take place, including flooding events. Continued efforts are being made with the State to make sure that flooding information is up to date for its citizens and visitors.

Map 3.7 on the following page, prepared by the City of Palmdale GIS Department, depicts areas in the Palmdale vicinity subject to flooding.

Map 3.7 – City of Palmdale Flood Plain



06-29-2021_GIS_00024-7



Previous Occurrences

For the purposes of this LHMP, we have listed only those flood incidents for which FEMA provided repair/recovery funding and a recent event that did not receive FEMA funding. We have concentrated on those incidents that have occurred within the past 15 years.

Table 3.15 City of Palmdale Disaster Incidents

Disaster Number*	Month/Year	Reason
DR-1577-CA	12/04-1/05	Severe storms, flooding, debris flows, and mudslide
DR-1585-CA	2/05	Severe storms, flooding, landslides, and mud and debris flows
CA-00241**	10/15	Severe rain, flooding and debris flows
DR-4305-CA	1/17	Severe winter storms, flooding, and mudslides
DR-4353-CA	12/17-1/18	Wildfires, flooding, mudflows, and debris flows

*The disaster number is assigned by FEMA or the State of California, as applicable.

**This incident was an Administrative declaration for the State of CA; declaration made 11/17/15

The major causes of flooding over the past decade have been heavy winter rains and the accompanying high velocity flows within watercourses and the storm drainage infrastructure. Damages have included roadway and shoulder washouts, culvert inlet damage, retention basin damage, and sediment basin overload (as well as minor damage to private property.)

In January & February 2005, the high winds and heavy rains caused severe damage upstream of the Amargosa Creek arch culvert inlet, including the riprap-sided drainage channel, concrete inlet structure, and sediment basin, and the Avenue O retention basin. Also damaged were several roadside dirt shoulders, two (2) dirt roads, and three (3) asphalt road sections. As this incident was declared by the State, federal funding assistance was provided to repair damage and provide mitigation measures.

Average annual rainfall in the City of Palmdale is negligible, averaging 7.4 inches per year. Due to the lack of rain, major flooding events have not occurred. However, in October 2015, a severe thunderstorm and rain/hail microburst caused intense flooding and mud damage to the Westside of Palmdale, including one (1) fatality. This incident was not declared an emergency by the State and to date the City of Palmdale has encumbered approximately \$1.5 million worth of debris removal and repair of damaged structures.

Probability of Future Events

Given the flood history of Los Angeles County, the Antelope Valley, and the City of Palmdale, it is almost certain that there will be flooding events similar to those that have occurred in the recent past. The probability of future events is increased because it is reasonable to assume that commercial and residential development will continue. Development increases runoff volume and may affect on-site detention effectiveness and downstream channel capacity. Any encroachment into the flood plain reduces flood storage and restricts conveyance when it is needed the most.

The City has made a concentrated effort to mitigate against circumstances contributing to flooding, using such tools as ordinances governing development in flood hazard areas. It also plans to implement mitigation actions to prevent repeated flooding of specific roadways and intersections. These actions are discussed in more detail in Section 4 of this LHMP.

Climate Change Impacts

The IPCC (Intergovernmental Panel on Climate Change) has indicated that climate change has detectably influenced several of the water-related variables that contribute to floods, such as rainfall and snowmelt. While climate change may not induce floods directly, it exacerbates many of the factors that do, such as heavier precipitation, and could create increased flooding when events occur.

Vulnerability Assessment

Periodically Southern California is subject to unusually heavy rainfall from tropical storms flowing in from the Pacific Ocean. Severe tropical storms are associated with *El Nino* conditions, i.e., increased Pacific Ocean surface water temperatures. (A more detailed discussion of tropical storms and other severe weather events is contained in the “Severe Weather” section of this document.)

As a result of heavy rains sheet flow occurs along major drainages and adjoining areas on scattered sites. Areas with flood hazards are the natural drainage channels of Amargosa Creek, Anaverde Creek, Little Rock Wash, and Big Rock Wash. Flat plains and natural depressions are also subject to possible flooding.

- **Amargosa Creek** collects runoff from the northern face of the Sierra Pelona Mountains and the southern slope of both Portal and Ritter ridges. It begins at the mouth of the San Francisquito Canyon, travels the length of Leona Valley, and enters Palmdale along Elizabeth Lake Road, in the vicinity of the intersection of 25th Street West and Elizabeth Lake Road.
- **Anaverde Creek** collects runoff from the Sierra Pelona Range and drains easterly through the Antelope Valley. The creek then flows north along Sierra Highway into USAF Plant 42.
- **Little Rock Wash** collects runoff from the San Gabriel Mountains in Little Rock Canyon and travels just west of Littlerock through the east side of Palmdale in a northerly direction.
- **Big Rock Wash** collects runoff from the San Gabriel Mountains in Pallett and Big Rock creeks. Traveling north from Holcomb Ridge through Pearblossom, it is divided by the Alpine, Lovejoy and Piute Buttes and merges at Avenue E.
- **Pearland Watershed** upstream is divided into five subareas that drain toward Lake Palmdale, through Soledad Siphon to the proposed Barrel Springs Basin, the planned S-37 Detention Basin, the proposed Hunt Canyon Detention Basin, the 45th Street East and SPRR, the existing R-55 Basin at Dominic Massari Park, and to Avenue Q. The downstream Pearland Watershed is divided into three subareas that drain to the L-37 Basin, proposed L-45 and L-50 Basins.
- **Portal Ridge Watershed** drains the areas between 140th Street West and 17th Street West, confluences with Fairmount Wash near Avenue H west of the Antelope Valley Freeway.

Urban development reduces the total ground absorption area by creating impermeable surfaces (structures, pavement, and streets). Excess storm runoff- increased by the presence of impermeable surfaces- flows from developed areas, contributes to compromised storm drains, and results in localized street flooding. Moreover, developed areas generate irrigation water runoff from landscaping that may channel nuisance water flow into nearby undeveloped areas and street gutters.

The amount and frequency of rain varies, and although floodwaters may be diverted, the lack of a completed regional drainage system will continue to result in local flooding problems. The City has a Drainage Master Plan adopted in 1996. It was expected to take approximately 20 years to complete construction of the entire system, according to the City of Palmdale Engineering Division. The 2021-2022 City budget includes an update to the Drainage Master Plan. The DMP addresses storm water runoff from higher slopes and existing and future developments. The Los Angeles County Department of Public Works has completed and adopted the Antelope Valley Comprehensive Plan of Flood Control and Water Conservation (June 1987), which is currently being implemented in the unincorporated portions of the Antelope Valley. The storm drainage section of the Public Services Element of that DMP discusses flood hazards in more detail and is incorporated by inference.

Earthquake faults create vertical barriers to groundwater that may result in shallow groundwater conditions. They may also limit the amount of water that can percolate into the subsurface, thus increasing the amount, velocity, and erosive capacity of storm water runoff on hillsides.

Surface rupture and ground shaking from earthquakes may result in rupture of the Palmdale and Littlerock Dams, causing flooding. Floodwaters could be as deep as 50 feet immediately downstream of the Littlerock Dam. Failure of the Littlerock Dam would result in the inundation of a 300-foot-wide area for 0.25 mile north of the dam. Along this length, the water depth would vary from 50 to 15 feet. Ten minutes after failure, the floodwater would veer eastward for 800 feet to Avenue U where the depth would be reduced to 10 feet. Trending north from Avenue U, the water would eventually dissipate so that the depth is no longer a risk to downstream developments.

In addition to dam failure and subsequent flooding, a seismic event could cause a water wave, or seiche, to occur at Lake Palmdale, which could potentially overtop the dam. The design report for the dam considers a reflection of the wave on return unlikely. Also, wave volume above the dam would not be substantial (approximately 1 acre-foot) and would not result in damaging floods. Overpour on the downstream side of the dam will not cause any damage by erosion as the existing rockfill was designed to withstand it. The Sheriff's Department is responsible for notification and local evacuation in the event of dam failure.

In the event of a large magnitude local earthquake on the San Andreas Fault, some portions of the California Aqueduct are likely to fail. The east branch of the aqueduct is highly vulnerable to widespread damage from ground shaking hazards because it closely parallels the San Andreas Fault for over 62.4 miles. Moreover, the east branch crosses the fault at several locations near Palmdale (Leona Siphon and Barrel Springs) which are susceptible to surface rupture hazards. The Department of Water Resources (DWR) has installed flood control gates to mitigate any

structural failure. By closing the gates upstream, the section of the Aqueduct in the Planning Area will be isolated and will not receive water. Aqueduct water present during failure will be diverted to pools that serve as detention basins.

The Aqueduct crosses the fault at Leona Siphon and Barrel Springs. The extent and rate of inundation is difficult to predict since the amount of water in the Aqueduct varies between seasons and years. Various factors which affect the size and extent of flooding include structural failure of the Aqueduct and pools while the Aqueduct is operating at full capacity, adjacent pools outside the Planning Area draining, and emergency power failure which could result in the Aqueduct gates not closing fast enough.

Map 3.7, prepared by the City of Palmdale GIS Department, depicts those areas in the Palmdale most vulnerable to flooding/inundation.

Estimating Potential Losses

Building on data from the hazard identification and vulnerability assessment, a risk analysis should include two components: (1) the population and property at risk from a flooding event; and (2) the frequency and severity of the flooding event itself.

Table 3.16 identifies the infrastructure located in the FEMA Firm and Dam Inundation Zones.

Table 3.16 Key Assets in Dam Inundation Zones

Flood Zone	Key Infrastructure
A - 100 Year Flood Plain	Palmdale Transportation Ctr
	Railroad – 2 miles
	Maintenance Warehouse
Dam Inundation Flood Plain	Civic Center Area
	5 Fire Stations
	Red Cross Building
	Palmdale Highschool
	Desert Rose Elementary
	Mesquite Elementary
	Manzanita Elementary
	Essential Roads (10 miles)

3.6.3 WILDFIRE/BRUSH FIRES

A wildfire is "any instance of uncontrolled burning in grasslands, brush, or woodlands," whereas "uncontrolled burning within a forested area" is a forest fire. The distinction is important mainly to clarify that wildfire do occur in non-forested areas, which most typifies Palmdale.

Hazards Secondary to Wildfire/Forest Fire:

- Landslides, mudslides, more intense water run-off (potential long-term hazard)
- Deadfall of scorched trees (potential long-term hazard)
- Ignition source for flammable and explosive materials
- Smoke and particulates reduce air quality – trouble especially for people with respiratory ailments
- Volatilized hazardous waste – toxic clouds or plumes
- Damaged infrastructure, such as roads, water supply pipes, sewers, which presents possible health and safety risks

URBAN/WILDLAND INTERFACE

The urban/wildland interface is the area or areas where houses and non-residential structures such as businesses, public buildings, and utility stations encroach on an undeveloped, natural resource area. The interface may be better described as the places where houses and other structures are up against and amidst trees, brush, and grassy areas, whether or not residents consider these areas "wild."

Previous Occurrences

Historically, wildfires have been a recurring feature of the California ecosystem. Naturally occurring wildfires play an important role in renewing and revitalizing woodland, scrub, and brush areas, especially in the mountain and foothill areas. While historical wildfires resulted in short-term damage to flora, fauna, soils, and water quality, loss of life and economic damage were minimized due to the lack of urbanization and the sparse population. With the influx of immigration into California in the 19th Century, that began to change.

"Written documents reveal that during the 19th century human settlement of southern California altered the fire regime of coastal California by increasing the fire frequency. This was an era of very limited fire suppression, and yet like today, large crown fires covering tens of thousands of acres were not uncommon. One of the largest fires in Los Angeles County (60,000 acres) occurred in 1878, and the largest fire in Orange County's history, in 1889, was over half a million acres."

(Source: http://www.usgs.gov/public/press/public_affairs/press_releases/pr1805m.html)

With California's increasing urbanization, especially as urban development has encroached on foothill and mountainous areas, the hazards associated with wildfires have increased dramatically. Wildfires now constitute one of the most dangerous threats to life and property in the state, (see **Map 3.8**).

2003 SOUTHERN CALIFORNIA FIRES

The fall of 2003 marked the most destructive wildfire season to date in California history. In a ten-day period, 12 separate fires raged across Southern California in Los Angeles, Riverside, San Bernardino, San Diego, and Ventura counties. The massive “Cedar Fire” in San Diego County consumed 2,800 homes and burned over a quarter of a million acres.

2007 SOUTHERN CALIFORNIA FIRES

In late October 2007, Southern California experienced an unusually severe fire weather event characterized by intense, dry, gusty Santa Ana winds. This weather event drove a series of destructive wildfires that took a devastating toll on people, property, natural resources, and infrastructure. Although some fires burned into early November, the heaviest damage occurred during the first three days of the siege when the winds were the strongest. During this siege, 17 people lost their lives, ten were killed by the fires outright, three were killed while evacuating, four died from other fire siege related causes, and 140 firefighters and an unknown number of civilians were injured. A total of 3,069 homes and other buildings were destroyed, and hundreds more were damaged. Hundreds of thousands of people were evacuated at the height of the siege.

The fires burned over half a million acres, including populated areas, wildlife habitats and watersheds. Portions of the electrical power distribution network, telecommunications systems, and even some community water sources were destroyed. Transportation was disrupted over a large area for several days, including numerous road closures. Both the Governor of California and the President of the United States personally toured the ongoing fires. Governor Schwarzenegger proclaimed a state of emergency in seven counties before the end of the first day. President Bush quickly declared a major disaster. While the total impact of the 2007 fire siege was less than the disastrous fires of 2003, it was unquestionably one of the most devastating wildfire events in the history of California. (Source: [http://www.fire.ca.gov/fire_protection/downloads/siege/2007/Overview Introduction.pdf](http://www.fire.ca.gov/fire_protection/downloads/siege/2007/Overview%20Introduction.pdf))

2017-2020 SOUTHERN CALIFORNIA FIRES

In terms of property damage, 2017 was the most destructive wildfire season on record in California at the time. Throughout 2017, the fires destroyed or damaged more than 10,000 structures in the state (destroyed 9,470, damaged 810), a higher tally than the previous nine years combined. In total 9,133 fires burned 1,248,606 acres. In December 2017, strong Santa Ana winds triggered a new round of wildfires, including the massive Thomas Fire in Ventura County. At the time, the Thomas Fire was California's largest modern wildfire, which has since been surpassed by the Mendocino Complex's Ranch Fire in 2018. The December 2017 fires forced over 230,000 people to evacuate. 2017 will be remembered as a year of extremes. It was the third-warmest year on record for the United States, and it was the second hottest in California, bringing to the surface the question of long-term climate change and its contribution to the 2017 California fires. The hotter temperatures dry out vegetation, making them easier to burn, predisposing vulnerable regions like California to more wildfires in the coming decades as

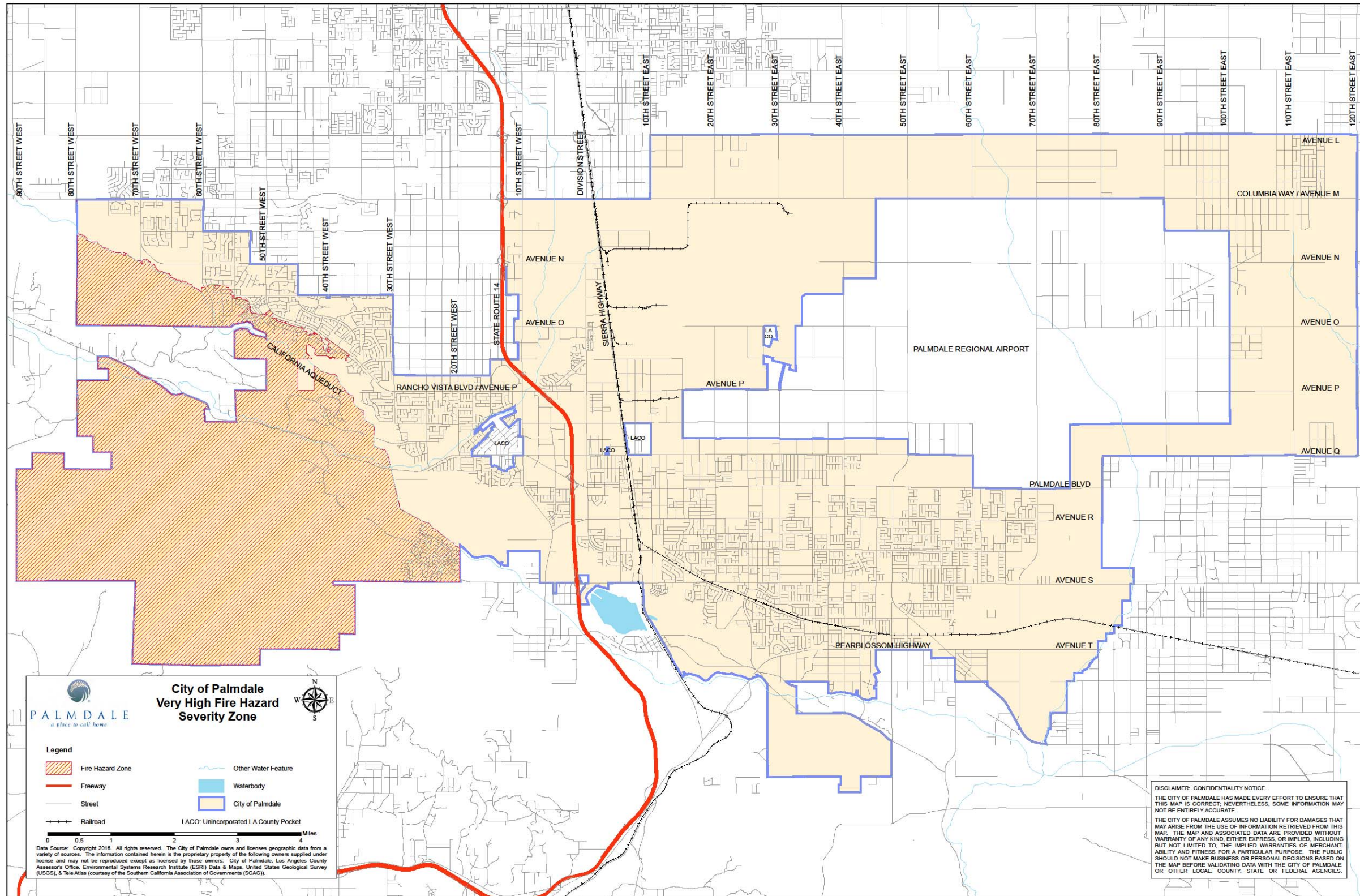
temperatures continue to rise and rainfall continues to decline. (Source: <https://www.fire.ca.gov/incidents/2017/>)

The 2018 wildfire season was the deadliest and most destructive wildfire season on record in California, with a total of over 7,500 fires burning an area of over 1,670,000 acres. In mid-July to August 2018, a series of large wildfires erupted across California, mostly in the northern part of the state. In November 2018, another round of large, destructive fires launched including the Woolsey Fire in Los Angeles and Ventura counties and the Camp Fire in Butte County, which killed at least 85 people. (Source: <https://www.fire.ca.gov/incidents/2018/>)

While 2019 was a relatively mild fire season, it should be noted that Pacific Gas & Electric, Southern California Edison, and San Diego Gas & electric preemptively shut off power to 800,000 electrical customers to reduce the risk of wildfires by preventing electrical arcing in high winds from their above-ground power lines. (Source: <https://www.fire.ca.gov/incidents/2019/>)

The 2020 California wildfire season was characterized by a record-setting year of wildfires that burned across the state. As of the end of the year, nearly 10,000 fires had burned over 4.2 million acres, more than 4% of the state's roughly 100 million acres of land, making 2020 the largest wildfire season recorded in California's modern history. (Source: <https://www.fire.ca.gov/incidents/2020/>)

Map 3.8 – City of Palmdale Very High Fire Hazard Severity Zone



09-28-2016_GIS_00011-49

The most dangerous wildfires occur in “urban interface” areas, i.e., areas where development encroaches on woodland and/or brush land areas. There are three categories of interface fire: The **classic** wildland/urban and suburban development presses up against open expanses of wildland area; the **mixed** wildland/urban interface is characterized by isolated homes, subdivisions, and small communities situated predominately in wildland settings; and the **occluded** wildland/urban interface exists where islands of wildland vegetation occur inside a largely urbanized area. (*Michael e. Martinet, “Wildland/Urban Interface Fire Hazards in Southern California”, 2004*)

Although the City of Palmdale has not been part of a major fire event during the reporting period, it should be noted that all three categories of urban/wildland occur within the planning area of the City of Palmdale and there has been two major fire events that have affected the outlying areas of the Antelope Valley. The Powerhouse fire, May 2013, burned 30,274 acres in the Antelope Valley as well as the Los Angeles County mountains. Another fire event occurred in July 2010, the Crown Fire. This fire was located west of the City of Palmdale in the Leona Valley area, northern LA County high desert, and would be considered a mixed wildland/urban interface. The fire burned more than 14,000 acres, destroyed 10 structures and damaged 6 homes.

Tables 3.17, 3.18 and 3.19 on the following pages list the twenty deadliest wildfires in California by deaths, the twenty largest wildfires occurring in California by acres burned and the twenty most destructive California wildfires by structures burned, respectively.

Map 3.9 classifies geographic areas according to the degree of threat from wildland fires, ranging from “Little to No Threat” to “Extreme Threat”. Most of the City of Palmdale lies within the “Moderate Threat” area. Just east and west of the proposed Palmdale Regional Airport and USAF Plant 42 are areas designated “High Threat.” The southern and western foothills of the City are designated “Very High Threat,” and the mountainous area in the far southwestern corner of the City is designated “Extreme Threat”.

The City of Palmdale GIS Section has prepared a fire hazard map of the Palmdale area, **Map 3.9** “Wildland Fire Hazards”.

Table 3.17 Twenty Deadliest Wildfires in California (to 2020)

Top 20 Deadliest California Wildfires

FIRE NAME (CAUSE)	DATE	COUNTY	ACRES	STRUCTURES	DEATHS
1 CAMP FIRE (<i>Powerlines</i>)	November 2018	Butte	153,336	18,804	85
2 GRIFFITH PARK (<i>Unknown</i>)	October 1933	Los Angeles	47	0	29
3 TUNNEL - Oakland Hills (<i>Rekindle</i>)	October 1991	Alameda	1,600	2,900	25
4 TUBBS (<i>Electrical</i>)	October 2017	Napa & Sonoma	36,807	5,643	22
5 NORTH COMPLEX (<i>Under Investigation</i>)*	August 2020	Butte, Plumas, & Yuba	318,935	2,352	15
6 CEDAR (<i>Human Related</i>)	October 2003	San Diego	273,246	2,820	15
7 RATTLESNAKE (<i>Arson</i>)	July 1953	Glenn	1,340	0	15
8 LOOP (<i>Unknown</i>)	November 1966	Los Angeles	2,028	0	12
9 HAUSER CREEK (<i>Human Related</i>)	October 1943	San Diego	13,145	0	11
10 INAJA (<i>Human Related</i>)	November 1956	San Diego	43,904	0	11
11 IRON ALPS COMPLEX (<i>Lightning</i>)	August 2008	Trinity	105,855	10	10
12 REDWOOD VALLEY (<i>Power Lines</i>)	October 2017	Mendocino	36,523	544	9
13 HARRIS (<i>Undetermined</i>)	October 2007	San Diego	90,440	548	8
14 CANYON (<i>Unknown</i>)	August 1968	Los Angeles	22,197	0	8
15 CARR (<i>Human Related</i>)	July 2018	Shasta County, Trinity	229,651	1,614	8
16 LNU Lightning Complex (<i>Under Investigation</i>)*	August 2020	Napa, Solano, Sonoma, Yolo, Lake, & Colusa	363,220	1,491	6
17 ATLAS (<i>Powerline</i>)	October 2017	Napa & Solano	51,624	781	6
18 OLD (<i>Human Related</i>)	October 2003	San Bernardino	91,281	1,003	6
19 DECKER (<i>Vehicle</i>)	August 1959	Riverside	1,425	1	6
20 HACIENDA (<i>Unknown</i>)	September 1955	Los Angeles	1,150	0	6

** Fires with the same death count are listed by most recent. Several fires have had 4 fatalities, but only the most recent are listed.
 ***This list does not include fire jurisdiction. These are the Top 20 regardless of whether they were state, federal, or local responsibility.
 * Numbers not final



4/28/2021

Table 3.18 Twenty Largest Fires in California (to 2020)

Top 20 Largest California Wildfires

	FIRE NAME (CAUSE)	DATE	COUNTY	ACRES	STRUCTURES	DEATHS
1	AUGUST COMPLEX (<i>Under Investigation</i>)*	August 2020	Mendocino, Humboldt, Trinity, Tehama, Glenn, Lake, & Colusa	1,032,648	935	1
2	MENDOCINO COMPLEX (<i>Under Investigation</i>)	July 2018	Colusa, Lake, Mendocino & Glenn	459,123	280	1
3	SCU LIGHTNING COMPLEX (<i>Under Investigation</i>)*	August 2020	Stanislaus, Santa Clara, Alameda, Contra Costa, & San Joaquin	396,624	222	0
4	CREEK FIRE (<i>Under Investigation</i>) *	September 2020	Fresno & Madera	379,895	853	0
5	LNU LIGHTNING COMPLEX (<i>Under Investigation</i>)*	August 2020	Napa, Solano, Sonoma, Yolo, Lake, & Colusa	363,220	1,491	6
6	NORTH COMPLEX (<i>Under Investigation</i>)*	August 2020	Butte, Plumas & Yuba	318,935	2,352	15
7	THOMAS (<i>Powerlines</i>)	December 2017	Ventura & Santa Barbara	281,893	1,063	2
8	CEDAR (<i>Human Related</i>)	October 2003	San Diego	273,246	2,820	15
9	RUSH (<i>Lightning</i>)	August 2012	Lassen	271,911 CA / 43,666 NV	0	0
10	RIM (<i>Human Related</i>)	August 2013	Tuolumne	257,314	112	0
11	ZACA (<i>Human Related</i>)	July 2007	Santa Barbara	240,207	1	0
12	CARR (<i>Human Related</i>)	July 2018	Shasta County & Trinity	229,651	1,614	8
13	MATILJA (<i>Undetermined</i>)	September 1932	Ventura	220,000	0	0
14	WITCH (<i>Powerlines</i>)	October 2007	San Diego	197,990	1,650	2
15	KLAMATH THEATER COMPLEX (<i>Lightning</i>)	June 2008	Siskiyou	192,038	0	2
16	MARBLE CONE (<i>Lightning</i>)	July 1977	Monterey	177,866	0	0
17	LAGUNA (<i>Powerlines</i>)	September 1970	San Diego	175,425	382	5
18	SQF COMPLEX (<i>Lightning</i>)	August 2020	Tulare	170,384	228	0
19	BASIN COMPLEX (<i>Lightning</i>)	June 2008	Monterey	162,818	58	0
20	DAY FIRE (<i>Human Related</i>)	September 2006	Ventura	162,702	11	0

There is no doubt that there were fires with significant acreage burned in years prior to 1932, but those records are less reliable, and this list is meant to give an overview of the large fires in more recent times.

This list does not include fire jurisdiction. These are the Top 20 regardless of whether they were state, federal, or local responsibility.

*Numbers not final.




4/28/2021

Table 3.19 Twenty Most Destructive Fires in California (to 2020)

Top 20 Most Destructive California Wildfires

FIRE NAME (CAUSE)	DATE	COUNTY	ACRES	STRUCTURES	DEATHS
1 CAMP FIRE (Powerlines)	November 2018	Butte	153,336	18,804	85
2 TUBBS (Electrical)	October 2017	Napa & Sonoma	36,807	5,636	22
3 TUNNEL - Oakland Hills (Rekindle)	October 1991	Alameda	1,600	2,900	25
4 CEDAR (Human Related)	October 2003	San Diego	273,246	2,820	15
5 NORTH COMPLEX (Under Investigation)*	August, 2020	Butte, Plumas, & Yuba	318,935	2,352	15
6 VALLEY (Electrical)	September 2015	Lake, Napa & Sonoma	76,067	1,955	4
7 WITCH (Powerlines)	October 2007	San Diego	197,990	1,650	2
8 WOOLSEY (Under Investigation)	November 2018	Ventura	96,949	1,643	3
9 CARR (Human Related)	July 2018	Shasta County, Trinity	229,651	1,614	8
10 GLASS FIRE (Under Investigation)*	September 2020	Napa & Sonoma	67,484	1,520	0
11 LNU LIGHTNING COMPLEX (Under Investigation)*	August 2020	Napa, Solano, Sonoma, Yolo, Lake, & Colusa	363,220	1,491	6
12 CZU LIGHTNING COMPLEX (Lightning)	August 2020	Santa Cruz, San Mateo	86,509	1,490	1
13 NUNS (Powerline)	October 2017	Sonoma	54,382	1,355	3
14 THOMAS (Powerline)	December 2017	Ventura & Santa Barbara	281,893	1,063	2
15 OLD (Human Related)	October 2003	San Bernardino	91,281	1,003	6
16 JONES (Undetermined)	October 1999	Shasta	26,200	954	1
17 AUGUST COMPLEX (Under Investigation)*	August 2020	Mendocino, Humboldt, Trinity, Tehama, Glenn, Lake, & Colusa	1,032,648	935	1
18 BUTTE (Powerlines)	September 2015	Amador & Calaveras	70,868	921	2
19 CREEK FIRE (Under Investigation)*	September 2020	Fresno & Madera	379,895	856	0
20 ATLAS (Powerline)	October 2017	Napa & Solano	51,624	783	6

"Structures" include homes, outbuildings (barns, garages, sheds, etc) and commercial properties destroyed.
 This list does not include fire jurisdiction. These are the Top 20 regardless of whether they were state, federal, or local responsibility.
 *Numbers not final


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Probability of Future Events

Considering the drought situation, and the compounded effects of climate change, the risk of wildfires and/or urban wildland interface fires in the future is high and will probably continue to rise. The area around Plant 42 and Palmdale Regional Airport is considered a high threat due to the possibility of airplane failures and/or military equipment failure. The foothills surrounding the Palmdale area are considered "Very High Threat" due to the possibility of lightning events that may occur during the summer and fall season and due to the drought, plant material is extremely dry. The chance of a wildfire occurring is measured using an index of "expected fire frequency." The potential of a fire



Figure 3.4 Fire in Palmdale

event to cause change is based on the measure of “potential fire behavior.” Together these two measures comprise the “fire threat.”

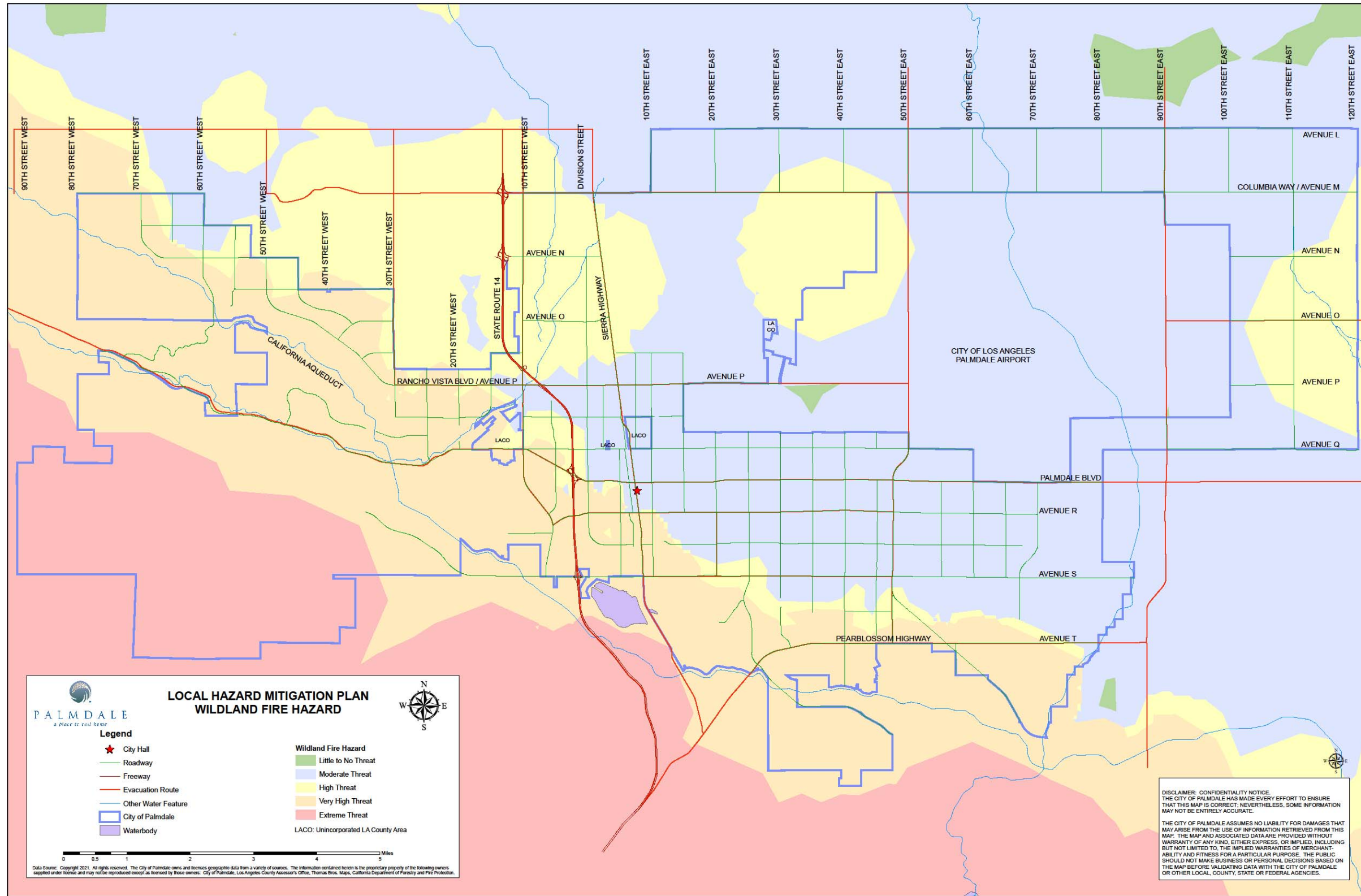
The risk and probability of a wildfire and/or wildland urban interface fire is reflected in statistics that indicate a consistently increasing structure loss from wildland fires (Martin and Sapsis, 1994). The risk is predominantly associated with Wildland-Urban Interface (WUI) areas. As noted previously, all three categories of urban/wildland fires occur within the planning area of the City of Palmdale.

Climate Change Impacts

Climate change is increasing the frequency and severity of wildfires in California. Since 1950, the area burned by California wildfires each year has been increasing, as spring and summer temperatures have warmed, and spring snowmelt has occurred earlier. During the recent “hotter” drought, unusually warm temperatures intensified the effects of very low precipitation and snowpack, creating conditions for extreme, high severity wildfires that spread rapidly. Of the 20 largest fires in California’s history, eight have occurred in the past three years (since 2017). The 2020 August Complex Fire is now the largest recorded wildfire in California, surpassing the 2018 Mendocino Complex Fire.¹

¹ Note: As of the preparation of this report, the Dixie Fire in Northern California has surpassed the August Complex Fire to become the largest in the state’s history. As of August 25, 2021, CalFIRE reported more than 735,000 acres burned across five counties. Source: <https://www.fire.ca.gov/incidents/2021/7/14/dixie-fire/>

Map 3.9 City of Palmdale Wildland Fire Hazards



06-29-2021_GIS_00024-8

Vulnerability Assessment

As noted in the previous section, the City of Palmdale and the surrounding planning area are at considerable risk of wildfire. As stated in the Safety Element of the City's General Plan:

Wildfires occur on mountains, hillsides, and grasslands. The speed and extent of their spread depends on the area's vegetation, climate, and slope. In the Planning Area, native vegetation types such as chaparral and grassland provide the fuel that allows fire to spread easily across large tracts of land. These plant species are capable of regeneration after a fire, making periodic wildfires a natural part of the ecology of these areas. The hot, dry climate of the Antelope Valley keeps the grass dry and readily combustible. The Santa Ana winds can spread fires into adjacent areas. Steep slopes bring grass and brush within reach of upward flames while impeding the access of firefighting equipment. Within Palmdale, wildfire hazards exist within the southern and western portions of the Planning area.

The fire season in the Palmdale Planning Area occurs roughly from September to November, when the Santa Ana winds blow. If rains are minimal, grass may dry as early as May and brush as early as July. From December to April, in the rainy season, wildfires rarely occur.

In addition to natural causes, wildfires may be started by various human-related methods including carelessly used matches, cigarettes discarded in the brush, the lack of spark arrestors on off-road vehicles, target ricochets, and arson.

As indicated previously, most of the City of Palmdale lies within the "Moderate Threat" area. Just east and west of the proposed Palmdale Regional Airport/USAF Plant 42 are areas designated "High Threat". The southern and western foothills of the city are designated "Very High Threat", and the mountainous area in the far southwestern corner of the City is designated "Extreme Threat". **(See Map 3.9)**

A recent fire, the Crown Fire, occurred in July and August 2010, southwest of Palmdale in Los Angeles County, burning approximately 14,000 acres and at one point jumped the California Aqueduct and threatened homes in the Rancho Vista subdivision.

Those facilities that are most vulnerable which are located in Very High Threat fire zones include a proposed fire station and future Elementary, Middle, and High Schools, as well as existing schools such as Highland, Cottonwood, Esperanza, Joe Walker, Rancho Vista (Quartz Hill area), Summerwind, Octotillo, Anaverde, Palmtree, Joshua Hills, Barrel Springs, Buena Vista, Cimarron, and Tumbleweed.

City facilities that are most vulnerable include Tejon Park, Pelona Vista Park, Joshua Ranch Park, Manzanita Park, Marie Kerr Park, Hillside Park, and Rancho Vista Park as well as libraries, future maintenance facility satellites, and future Westside parks.

Cultural and environmental resources occurring in the Very High Fire Hazard Zone include future Warnack Nature Park, Ritter Ranch Open Space, significant Ecological areas, and various prehistoric archaeological and paleontological sites. As development continues to occur in the Ritter Ranch and City Ranch areas, parks, schools, community buildings, and other cultural facilities will be constructed in the areas currently designated as Very High Fire Hazard. However,

the development of these areas with urban uses will eliminate existing chaparral, grass, and other fuels, which could reduce the overall fire hazard in these areas. Fuel reduction and landscape modifications surrounding the new development will further reduce this hazard.

The environmental resources within Very High Fire hazard areas existed prior to the establishment of the community; they have persisted through previous wildfires. No specific measures are required to protect these resources. The natural vegetation communities are, in many cases, fire dependent. Mechanical or chemical fuel reductions in proximity to urban areas are the only measures required in the open space areas.

Estimating Potential Losses

Modeling and mapping programs use several factors to determine the communities “base hazard factor.” Components evaluated are: Topographical location, characteristics, and fuels; site/building construction and design; site/region fuel profile (landscaping); defensible space; accessibility; fire protection response and availability of water. The use of Geographic Information Systems (GIS) technology allows for further integration of fuels, weather, and topography data for predicting fire behavior, watershed evaluation, mitigation strategies, and hazard mapping.

Table 3.20 identifies the infrastructure located in the Wildland Fire Hazard.

Table 3.20 Key Assets in Wildland Fire Hazard Zones

Threat Level	Key Infrastructure
Very High Threat - Schools	Highland Highschool
	Summerwind
	Ocotillo
	Anaverde
	Palmtree
	Joshua Hill
	Barrel Springs
	Buena Vista
	Cimarron
	Tumbleweed
City Facilities	Marie Kerr Park – Recreation Facility (EOC)
	Pelona Vista Park
	3 fire stations

3.6.4 TRANSPORTATION ACCIDENT/HAZMAT SPILL

The City of Palmdale faces significant threats from transportation accidents. Palmdale is located at a critical “choke point” for a number of transportation facilities. Due to the city’s geography, and the limited number of access corridors, a serious transportation accident has the potential to cause death, personal injury, and property damage in the immediate area, and in addition, cause substantial economic and social damage if there was an extended closure of critical transportation arteries.

Possible accidents which could occur and cause substantial damage include:

- Major highway accident on SR 14 or SR 138 resulting in extended closure.
- Aircraft accident related to USAF Plant 42
- Rupture of 36” gas pipelines traversing the city. This could result in fire and explosion, and/or release of large quantities of hazardous materials. Railway accident (Metrolink or freight).

Due to the City’s strategic position as an entry/exit point for the Greater Los Angeles Basin, there is a high probability that a major transportation accident would also involve the release of hazardous materials.

As of the 2016, the City of Palmdale has not had a major transportation accident or a hazardous material spill. The figure on the following page indicates the average number of spills per month involving hazardous materials per county. Los Angeles County has one of the highest averages, which would appear to be correlated to population and economic activity.

Previous Occurrences and the Potential for Future Events

There is a detailed discussion about past events and the probable risk of future events in the discussion on assessing vulnerability and estimating losses, later in this Section. The discussion explores the possibility of several types of transportation accidents and/or incidents involving the release of hazardous materials.

Because of the tremendous volume of commercial and private vehicle traffic in and out of Los Angeles County and the Palmdale area specifically, the potential for a disastrous transportation related event always exists. Combine a transportation accident with the release of a hazardous material and you have an event that can affect a large number of people or a large area. According to the Department of Transportation (CALTRANS), there were a total of 3,606 fatal vehicle accidents in California in 2019 (the highest in the nation), with the highest number being in LA County. **Figure 3.5** illustrates the average number of hazardous materials spills per month by county. The County of Los Angeles experiences an average of 226 to 250 hazardous materials spills per month.

MAJOR TRANSPORTATION ROUTES AND PIPELINES IN PALMDALE

Much of the land area of the City of Palmdale lies near or adjacent to major transportation corridors; a substantial portion of the population also resides in proximity to these corridors.

State Highway 14 (Antelope Valley Freeway) bisects the city on a north-south axis. SR 14 is heavily used by trucks bringing goods into and out of the Los Angeles Basin. According to the Southern California Association of Governments, 5.54 % of traffic on the freeway includes heavy duty vehicles. It is estimated that this percentage will increase to 13-17% by the year 2030.

State Highway 138 intersects with SR 14 near the center of the city and proceeds east and south east through the City. SR 14 is frequently used as a “bypass” by traffic going to or from the Inland Empire.

Union Pacific/BNSF Railway runs north-south through the City, approximately one (1) mile east of SR 14. The freight railway transports a wide variety of cargo, including hazardous and flammable materials.

Metrolink commuter trains share the Union Pacific right-of-way through the city.

USAF Plant 42/Palmdale Regional Airport runway approach/departure paths cross the city in east west (runway 07-25) and southwest-to-northeast (runway 04-22) direction over heavily populated areas.

Large (36 inch) Natural Gas Pipelines cross the southern portion of the city in an east-west direction along Avenue S.

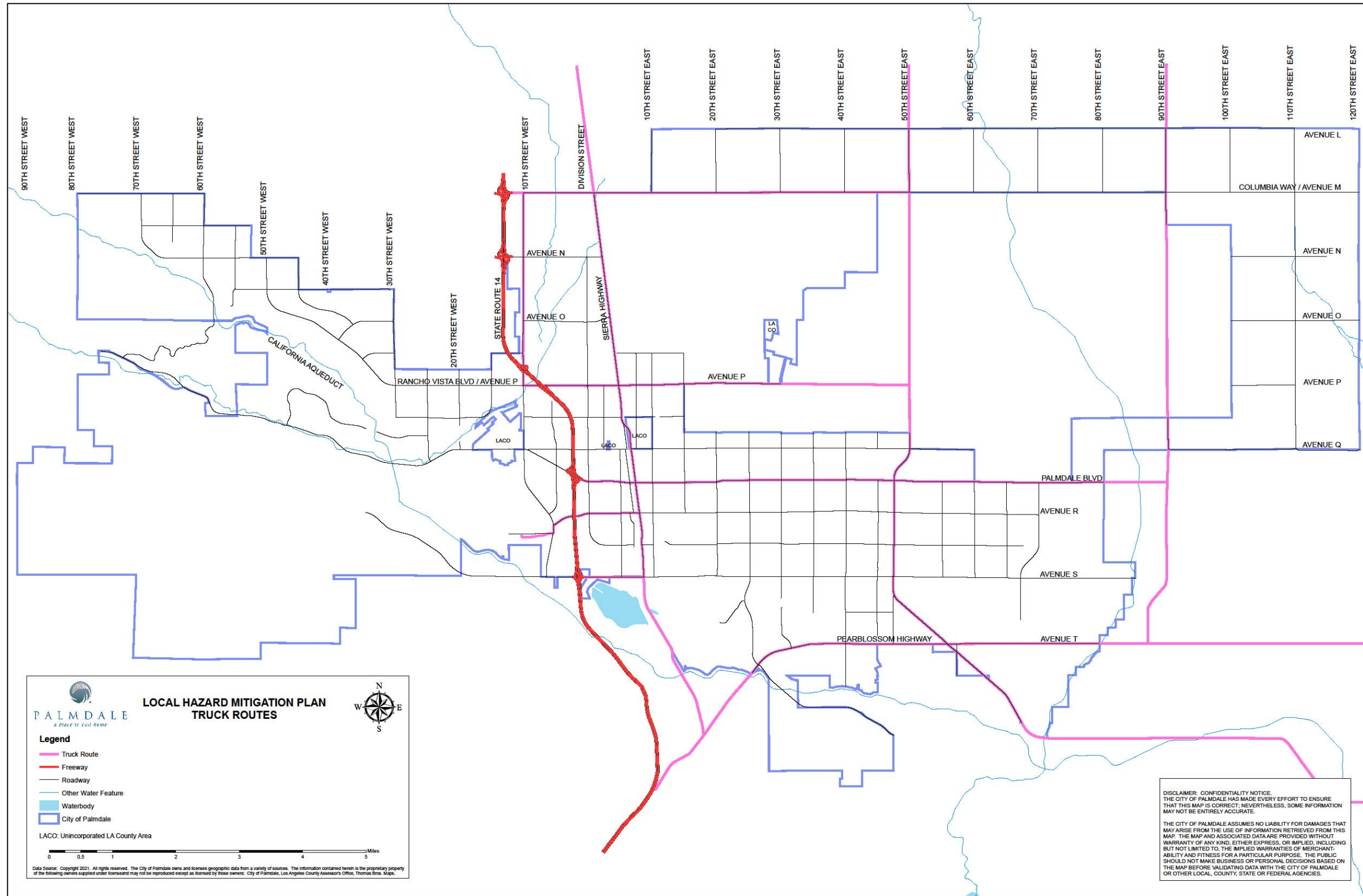
Major Arterials running both north-south and east-west throughout the city carry large volumes of traffic, including heavy duty trucks.

Major transportation areas are shown on **Map 3.10, 3.11**, and HAZ MAT facilities are shown on **Map 3.12**.

Climate Change Impacts

Climate change may indirectly contribute to the frequency of transportation accidents and HAZMAT spills due to the acceleration of severe weather events which contribute to vehicular accident occurrences.

Map 3.10 – City of Palmdale Truck Routes



06-29-2021_GIS_00024-10

Vulnerability Assessment

As with other accidents, transportation accidents and hazardous materials spills are unpredictable events. The damage and loss of life associated with a particular event depends upon the confluence of circumstances surrounding the specific occurrence.

For example, the severity of a Metrolink accident in Glendale, California on January 26, 2005, was substantially increased by two chance occurrences – another Metrolink train was traveling in the opposite direction on an adjacent track just as the accident occurred, and there was a freight train parked at an adjacent siding at the exact location where the Metrolink train derailed. As a result, in addition to experiencing derailment due to collision with a vehicle parked on the track, the train also collided with two other trains.

Assessment of risks to life and property associated with transportation accidents is an inexact science based on historical and local vulnerability rather than on statistical models. Despite the unpredictability of transportation accidents, application of preventive measures and mitigation actions can reduce, if not eliminate, personal injury, loss of life, and property damage. The following analysis examines potential risks to the city for each of the identified hazards.

PIPELINE RUPTURE/ACCIDENT

Table below from the National Transportation Safety Administration, Office of Pipeline Safety, summarizes transmission pipeline accidents in the California from 2011 through 2020. “Transmission Operators” include operators of high-capacity pipelines that deliver from terminal to terminal, as opposed to “Distribution Operators” who distribute from terminals to homes and businesses. The large gas lines in the Avenue S corridor are classified as transmission lines.

Table 3.21 Office of Pipeline Safety Natural Gas Pipeline Operators Incident Summary Statistics by Year 2011-2020 For the State of California Transmission Operators

Year	No. of Incidents	Fatalities	Injuries	Cost
2011	36	0	0	\$12,925,484
2012	43	3	1	\$7,622,071
2013	37	0	0	\$13,371,951
2014	59	2	2	\$35,442,868
2015	48	4	17	\$161,207,864
2016	45	0	1	\$29,992,895
2017	50	0	3	\$34,251,818
2018	38	0	8	\$331,942,230
2019	33	1	1	\$7,083,269
2020	30	0	0	\$9,905,164
Total	419	10	33	\$643,745,614

RAILWAY ACCIDENT

The Federal Railroad Administration (FRA), Office of Safety Analysis maintains and publishes railroad safety information by railroad, and by state (www.safetydata.fra.dot.gov/officeofsafety). According to the FRA, there were a total of 1,884 train accidents in Los Angeles County between January 2012 and June 2021. Of these, 152 were derailments, 109 accidents were due to human error, and 44 were due to faulty track.

Freight railroad accidents can present serious risks, especially when release or potential release of hazardous materials represents serious risks to the community. However, passenger operations may also present serious risks. Metrolink operates 16 trains per day (weekdays) on the line connecting the Antelope Valley with the Los Angeles Basin. These commuter trains operate along the same right-of-way as BNSF freight traffic, on adjacent tracks. Commuter trains operate at relatively high speeds (up to 55 mph) and may carry as many as 200 passengers. In addition, a passenger train derailment has the potential to affect trains on adjacent tracks, and the surrounding community.

AVIATION ACCIDENT

While very rare, aviation accidents in built-up urban areas can cause substantial personal injury, property damage and loss of life on the ground, in addition to passenger and crew injuries/fatalities. The majority of aircraft accidents involve take-offs or landings.

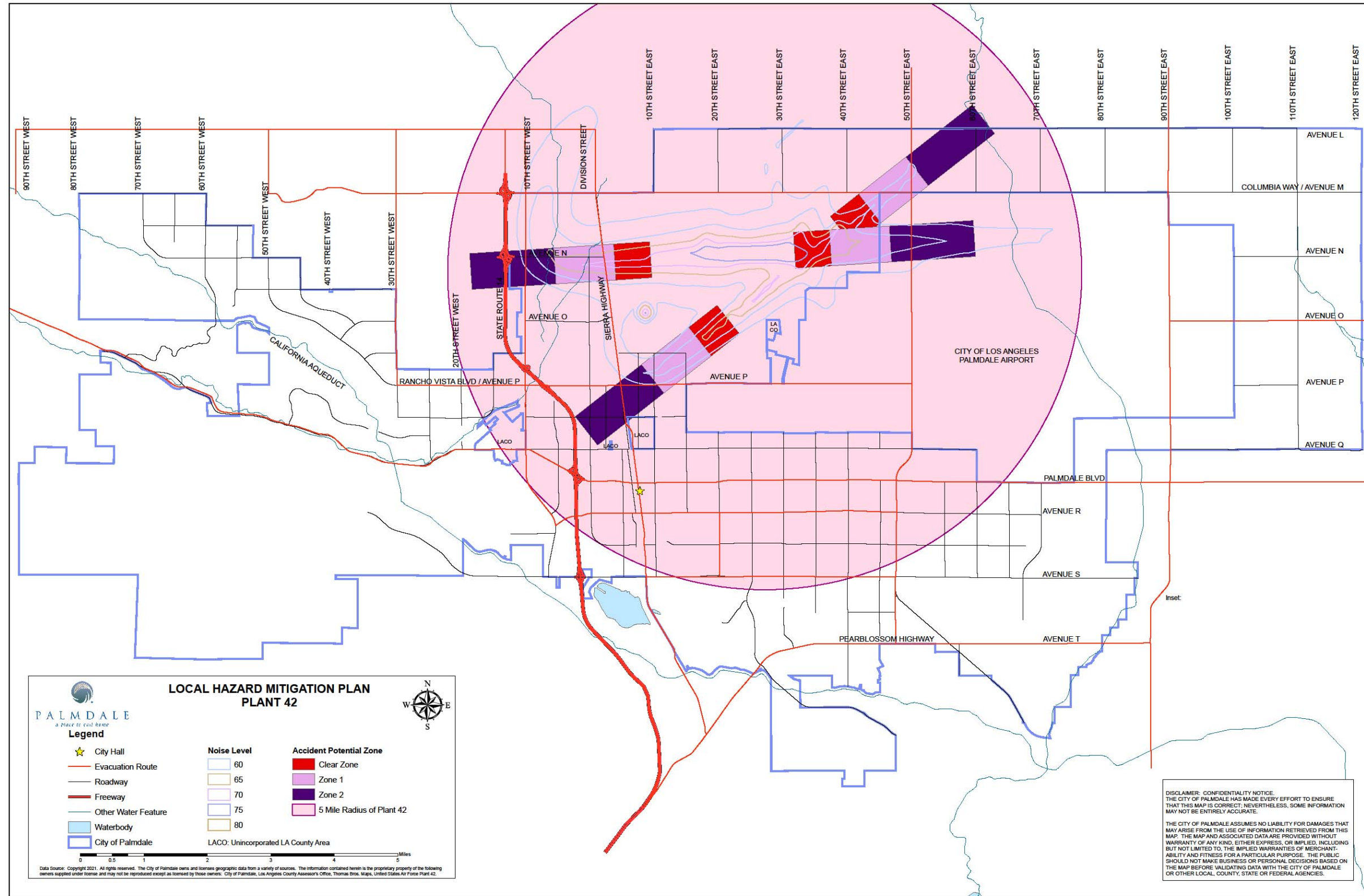
Palmdale is home to USAF Plant 42/Palmdale Regional Airport, located in the northeastern sector of the city. The airport consists of two runways, 07-25, which runs roughly east-to-west, and 04-22 which runs roughly in a southwest-to-northeast direction. Approach and departure paths for both runways are over relatively densely populated areas of the city to the east and southeast of the airport, including both existing and proposed new development

Operations at the airport are currently limited to military use. The Palmdale Regional Airport could potentially serve a broad geographic area consisting of the Antelope Valley (Palmdale and Lancaster) and portions of western Ventura, northern San Bernardino, and southern Kern Counties.

The Palmdale Regional Airport hosted commercial air carrier operations from 1991 until 1997 when they were discontinued due to dwindling passengers. Service was reinstated in late 2004 and then eliminated in 2008.

Considering current and historical information, a major aviation disaster event is highly unlikely. However, given the potential severity of such an event, it cannot be discounted as a potential hazard to the community.

Map 3.11 – City of Palmdale Plant 42



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HIGHWAY ACCIDENTS

The City of Palmdale is traversed by two state highways; SR 14, the Antelope Valley Freeway, bisects the city in a north-south direction, and SR 138, known as Pearblossom Highway, goes through the heart of the city, from the intersection with SR 14, proceeding east and southeast toward San Bernardino County. Both routes, especially SR 14, carry heavy traffic volumes of inter-city traffic. SR 14 constitutes the primary link – and the only freeway link - between the Antelope Valley and the Los Angeles Basin to the south, and Kern County and the High Desert on the north.

In addition, several major arterials also carry heavy traffic loads. These include the Sierra Highway which runs north and south roughly parallel to SR 14, and Avenue S, Avenue P, and Palmdale Blvd. which run in an east-west direction.

The threats posed to the city by these facilities are two-fold:

1. A major accident on SR 14 resulting in closure of the freeway would virtually cut off the city from vehicular access to the north or to the south, causing significant economic and social damage.
2. A truck accident occurring on SR 14, SR 138, or any of the City's major arterials involving release of hazardous materials could result in serious personal injury, property damage, and loss of life.

As truck accidents, with or without hazardous material involved, pose the most significant risk to the city compared to other transportation accidents, this analysis will focus on potential truck accident hazards.

Truck traffic volumes on both of the state highways that traverse the city are significant and growing. According to data provided by the Southern California Association of Governments (SCAG), the regional transportation planning agency, truck volumes will grow significantly as population and employment increase in the Antelope Valley. SCAG's projections are shown in **Table 3.22** below (SR 14 north of Palmdale Blvd, SR 138 south of Avenue S):

Table 3.22 Truck Volumes

CURRENT AND PROJECTED TRUCK VOLUMES (Average Daily – Both Directions)				
	2000	2005	2020	2030
SR 14	8067	8305	10,517	12,076
SR 138	1457	1544	2545	2738

Source: Southern California Association of Governments

These projections were used for the 2020 Regional Transportation Plan (RTP). However, other studies suggest that these numbers may be low. The North County Combined Highway Corridors Study completed for the Los Angeles County Metropolitan Transportation Authority (LACMTA) by Parsons and released as a draft in July 2002, estimates that substantial increases in truck traffic

are likely to result from major planned developments outside the City of Palmdale. These include the proposed Centennial Ranch (23,000 housing units, 30,000 jobs); Newhall Ranch (20,885 housing units, 18,800 jobs) and the Southern California Logistics Airport, and other logistics facilities in Southern California.

The principal hazard associated with truck traffic is an accident that involves the release of hazardous materials posing threats to the surrounding community from fire, explosion, or exposure to toxic chemicals.

According to data provided by the California Highway Patrol, the number of collisions involving a HAZMAT spill for the years 2015 - mid-June 2021 in the greater Antelope Valley are included in the table below:

Table 3.23 Collisions Involving HAZMAT Spills in Antelope Valley

Number of Collisions Involving a HAZMAT Spill	
2015	1
2016	3
2017	3
2018	5
2019	3
2020	8
2021 (to June)	4

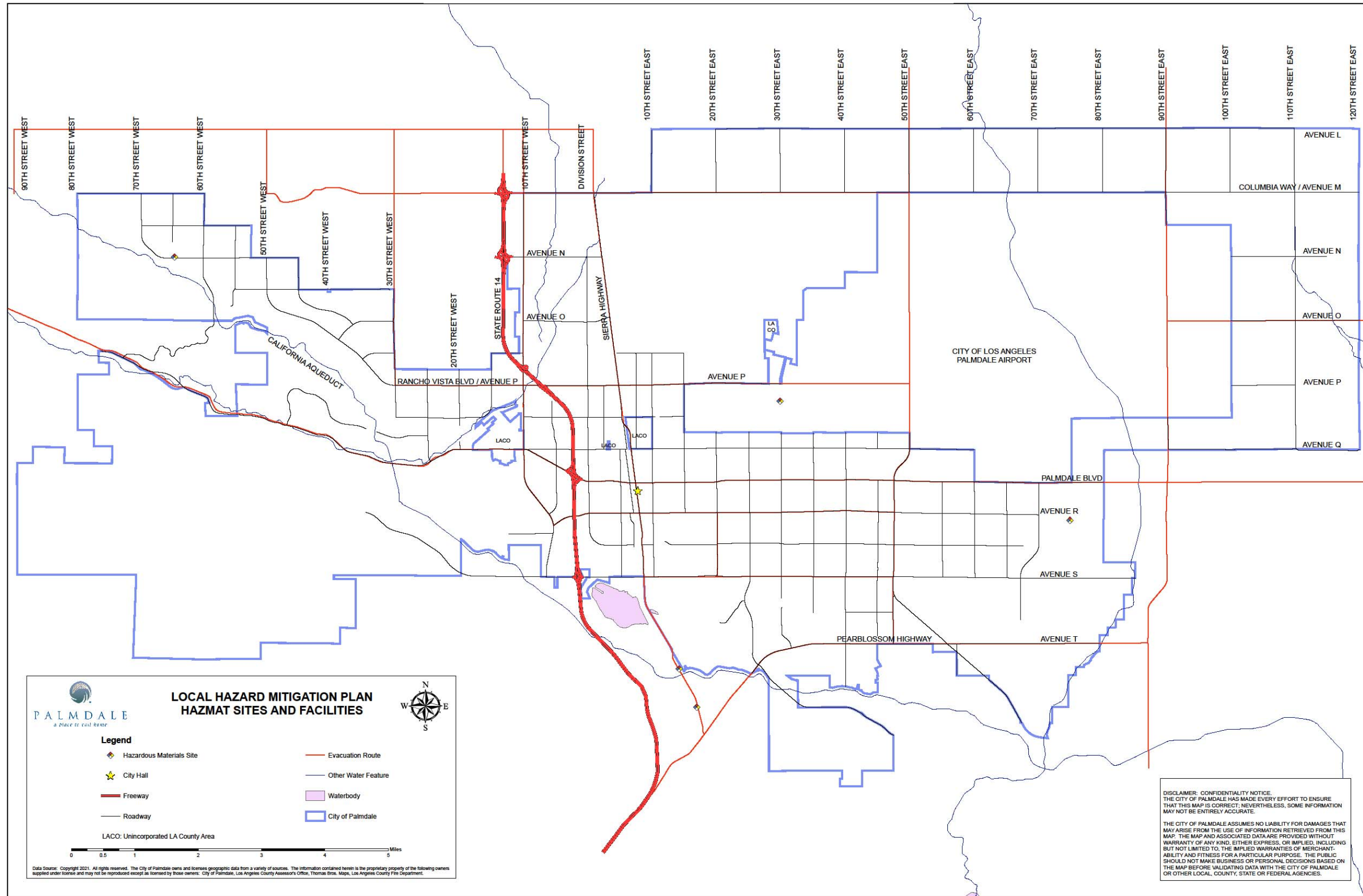
Map 3.12, on the following page details the location of hazardous material sites and facilities within the City of Palmdale. Los Angeles County is one of the areas within California that experiences a high number of hazardous materials spills each year; see **Figure 3.5**.

Estimating Potential Losses

Because of the unpredictability of the time, location, and severity of potential transportation accidents, it is extremely difficult to estimate potential losses with any degree of confidence.

As of current, the City of Palmdale has not identified the critical facilities within a ¼ mile “band” on each side of major highways and arterials with their replacement values list. This is identified as a potential project for this HMP cycle.

Map 3.12 – City of Palmdale HAZMAT Sites and Facilities



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3.6.5 DROUGHT

According to the, USGS, drought is a period of drier-than-normal conditions that results in water-related problems.

Precipitation (rain or snow) falls in uneven patterns across the country. The amount of precipitation at a particular location varies from year to year, but over a period of years, the average amount is fairly constant. When rainfall is less than normal for several weeks, months, or years, the flow of streams and rivers declines, water levels in lakes and reservoirs fall, and the depth to water in wells increases. If dry weather persists and water-supply problems develop, the dry period can become a drought.

Unlike most other natural hazards, drought is not a sudden, catastrophic occurrence. Droughts occur over several years. In fact, it is almost impossible to tell when a drought begins and often difficult to determine when it ends.

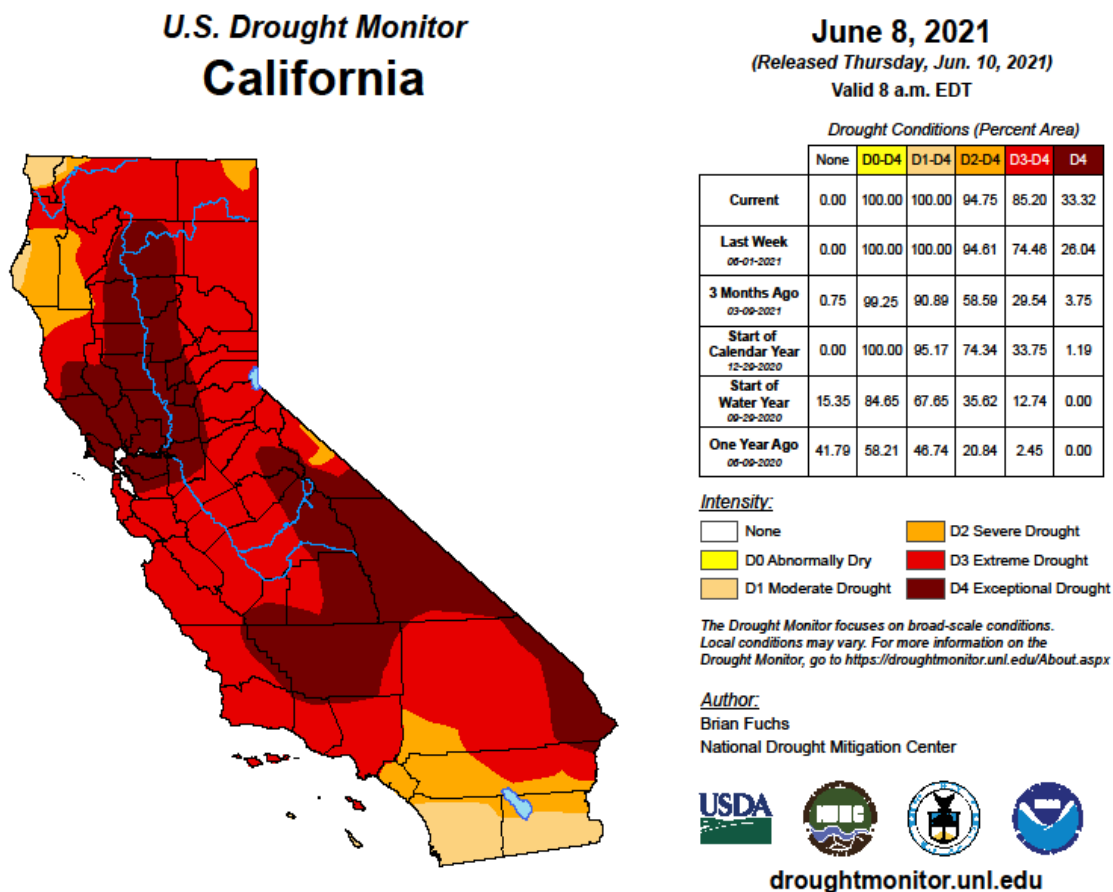


Figure 3.6 U.S. Drought Monitor-California

Droughts may be measured by a number of indicators, including:

- Levels of precipitation
- Soil conditions (moisture)
- Temperature

There are four ways in which droughts can be viewed:

METEOROLOGICAL

A measure of departure of precipitation from normal. Due to climatic differences, what may be considered a drought in one location of the country might not be a drought in another location.

AGRICULTURAL

Refers to a situation where the amount of moisture in the soil no longer meets the needs of a particular crop.

HYDROLOGICAL

Occurs when surface and subsurface water supplies are below normal.

ANNUAL INDICATORS

The California Department of Water Resources uses three indicators to evaluate water conditions in California. These are Snowpack, Precipitation, and Reservoir Storage as percentages of the annual average.

The impacts of drought may be defined as direct and indirect. Direct impacts include reduction in crop yields, livestock losses, and reservoir depletion. Direct effects also include damage/destruction of natural flora and fauna. Wetlands may also be damaged or reduced in extent. Indirect impacts include economic damage (loss of income to farmers, increased cost of water supplies due to increased cost to water purveyors); social (increased stress and negative effects on health); and environmental (degradation or water quality, increased susceptibility to disease). In terms of economic impacts, droughts are the costliest of natural disasters in the United States. According to the National Oceanic and Atmospheric Administration (NOAA) "Drought does not always offer the same immediate and dramatic visuals associated with events such as hurricanes and tornadoes, but it still has a huge price tag. In fact, droughts rank second in types of phenomena associated with billion-dollar weather disasters during the past three decades. With annual losses nearing \$9 billion per year, drought is a serious hazard with substantial socioeconomic risks for the United States." (Source: <https://www.ncdc.noaa.gov/news/drought-monitoring-economic-environmental-and-social-impacts>).

Droughts may also exacerbate the effects of other natural events. The reduction in natural vegetation in hillside areas due to drought may significantly increase the risk of mudslides or landslides during periods of wet weather. Dry vegetation resulting from drought increases both the risk and the potential severity of wildfires.

Previous Occurrences

The first major recorded drought in California occurred between 1928-1934. Another major drought occurred between 1987-1992.

More recently, between 2012-2016, California experienced another round of significant drought which resulted in well-documented agricultural, physical, and environmental impacts. On January 17, 2014, California State Governor Jerry Brown declared a drought state of emergency. On April 2, 2017, Governor Brown lifted the drought emergency, but declared that California must continue water conservation efforts.

As of May 18, 2021, 93% of the Southwest and California was in drought, with 38% of this region in exceptional (D4) Drought, the highest level. Twelve months prior, most of the West was drought-free, but drought conditions began developing around May 2020. High temperatures and very low rainfall totals through spring and summer of 2020 set new records across the Southwest, and the combination of extremely low soil moisture leading into winter and snow drought through winter means that run-off in the spring of 2021 has been very low. Most reservoir levels in California and Southwest are below or much below normal. Reservoir levels and forecasts are alarming.

Probability of Future Events

Considering the history of the Antelope Valley and Palmdale's location on the edge of the Mojave Desert, the current existing drought conditions in the region as a whole, and the accelerating effects of climate change, the City is likely to deal with the effects of drought in the future.

While not very likely to result in direct personal injury or loss of life, drought conditions could result in extensive economic damage. In addition, drought conditions increase the potential for damage from mudslides and brushfires, which could result in loss of life. Indirect impacts of droughts that are not quantified, but can be anticipated in future events, include:

- Injury and loss of life
- Disruption of and damage to public infrastructure
- Significant economic impact (jobs, sales, tax revenue) upon the community
- Negative impact on commercial and residential property values
- Fire Damage
- Economic cost of Forest Management

Climate Change Impacts

Climate change can affect the potential for droughts to occur. As average temperatures have risen because of climate change, the Earth's water cycle has sped up through an increase in the rate of evaporation from soil and transpiration from plants. An increase in evapotranspiration makes more water available in the air for precipitation, but contributes to drying over some land areas, leaving less moisture in the soil. As the climate continues to change, many historically wet areas are likely to experience increased precipitation and increased risk of flooding, while historically dry areas are likely to experience less precipitation and increased risk of drought.

Vulnerability Assessment

Located on the edge of the Mojave Desert, the City of Palmdale is vulnerable to the effects of drought. While unlikely to result in personal injury or loss of life, drought conditions could result in extensive economic damage. In addition, drought conditions increase the potential for damage from wildfires and, later on, mudslides, which could result in loss of life.

The Antelope Valley has a limited amount of water to begin with being a high desert community. This fact, coupled with a rapidly increasing population and decreasing water table levels is cause for concern. The level of dependency on the water supplied by the California Aqueduct is increasing. Local water supplies remain static at best and more often are being depleted faster than they can recover. Pollution of wells and subsurface pools has mandated importation of water, along with the infrastructure required to capture and deliver it. As water is used more efficiently (drip systems and water saver products), monitored better (water meters) – there is a reduction in wasted water and water purveyors are able to meet new demands. As demand rises and supply decreases, costs of water service at all levels must go up. Increased revenues foster additional water development, and the cycle starts anew.

Estimating Potential Losses

Because drought is not a sudden, catastrophic occurrence and often occurs over several years, it is difficult to estimate potential losses with any certainty. When the effects of drought also include the destruction of flora and fauna, there is an esoteric value that is not translatable into dollars. Across the United States, the cost of losses due to drought averages about 9.6 billion per occurrence. Losses can include reduction in crop yields and loss of livestock, reservoir depletion, wetlands degradation, etc. Other losses include loss of income, increased cost of water, and degradation of water quality. According to the National Oceanic and Atmospheric Administration (NOAA), in terms of economic impacts, aside from tropical cyclones, droughts are the costliest natural disasters in the United States in terms of average event cost.

Mitigation of the Impacts of Drought

Mitigation of the effects of drought is often costly and difficult to implement. Among the measures that may be taken to reduce the adverse effects of drought are:

- Development of irrigation systems in drought-prone areas
- Inter-basin water transfer agreements
- Crop and soil management programs
- Zeroscape landscape in urban areas
- Development of water storage and reclamation projects
- Moratoriums on new development/growth
- Ordinance 1362 – Water efficient landscaping requirement to include recent updates to state law (approved October 2008)

3.6.6 SEVERE WEATHER

Southern California enjoys a relatively mild, temperate climate. However, the area is subject to severe weather episodes. According to the National Weather Service, between July 30, 2004, and December 31, 2020, Los Angeles County experienced:

- 111 Flash Flood events
- 3 Heavy Rain events
- 319 Strong Wind events
- 7 Tornado events
- 14 Hailstorm events

Previous Occurrences

TORNADOS

While tornados have caused significant property damage, there is no record of a fatality directly resulting from a tornado in the area. As many of the tornados that occur in the region begin as waterspouts in Santa Monica Bay, the occurrence of tornadoes in the Antelope Valley is extremely rare.

MICRO-BURSTS

Unlike tornados, micro-bursts are strong damaging winds that strike the ground and often give the impression a tornado has struck. They frequently occur during intense thunderstorms. The origin of a microburst is downward moving air from a thunderstorm's core. But unlike a tornado, they affect only a rather small area. On October 15, 2015, a freak storm hit Palmdale and produced large hail, heavy rain, flash flooding as well as significant mud and debris flows and one death.

HAILSTORMS

While rare, hailstorms occasionally occur in the Palmdale area and can cause substantial damage. On October 15, 2015, a freak storm hit Palmdale and produced large hail, heavy rain, flash flooding as well as significant mud and debris flows and one death.



Figure 3.7 Flooding during the October 2015 storm

THUNDERSTORMS

Thunderstorms occur relatively infrequently in the basin (estimated average of 4.1 days per year in downtown Los Angeles) but can cause significant property damage, personal injury and loss of life.

The Antelope Valley receives sporadic summer thunderstorms. On occasion, these thunderstorms are influenced by tropical weather patterns creating the potential for significant short-term, intense rainfall. Flood hazards, property damage from gusting winds, and power outages occur during and/or following the most intense storms. A storm event occurred in July 2015, caused by thunderstorms that generated flash flooding as well as mud and debris flows and resulted in over two feet of water across Pearblossom Highway. The most recent event, October 15, 2015, produced large hail, heavy rain, and flash flooding as well as significant mud and debris flows and one death.

SUB-FREEZING (FREEZE/THAW CYCLES)

Temperatures during the winter months commonly fall below freezing; however, occasionally, those sub-freezing conditions can persist for over a week. When these conditions occur, hazards related to icy roadways and sidewalks, property damage caused by broken water lines, and extensive damage to crops and landscape plants can affect the community.

SNOW

As with the hazards associated with sub-freezing conditions, substantial snowfall can result in traffic hazards and impede emergency vehicles. Although snow does not typically persist for extended periods, the City does maintain a fleet of snow removal equipment to aid in the reduction of snow-related hazards on local streets. The last reported measurable snowfall was in December 2019, where the Valley received between 1" to 2" of snow.

TROPICAL STORMS

The average number of tropical storms in the eastern Pacific Ocean is 16.7 per year. Only about 7 develop into hurricanes. Due to prevailing wind patterns, however, most hurricanes and tropical storms move westward across the Pacific, away from the Southern California land mass. However, residual rains and heavy surf occasionally impact Southern California.

SANTA ANA WINDS

Santa Ana winds are generally defined as warm, dry winds that blow down from the East or northeast into the basins; see Figure 3.4. These winds are usually strongest in the valley and canyon areas near the mountains and usually occur in the fall and winter. Santa Ana winds often blow with exceptional speed in some areas. The term “Santa Ana” winds are generally used for wind conditions exceeding 30 miles per hour (25 knots). Typically, Santa Ana winds blow in the 40 – 55 mile per hour range, but may gust up to 90 mph.

The complex topography of Southern California, combined with various atmospheric conditions, creates numerous scenarios that can cause widespread or isolated Santa Ana events. Commonly Santa Ana winds develop when a region of high pressure builds over the high plateau east of the

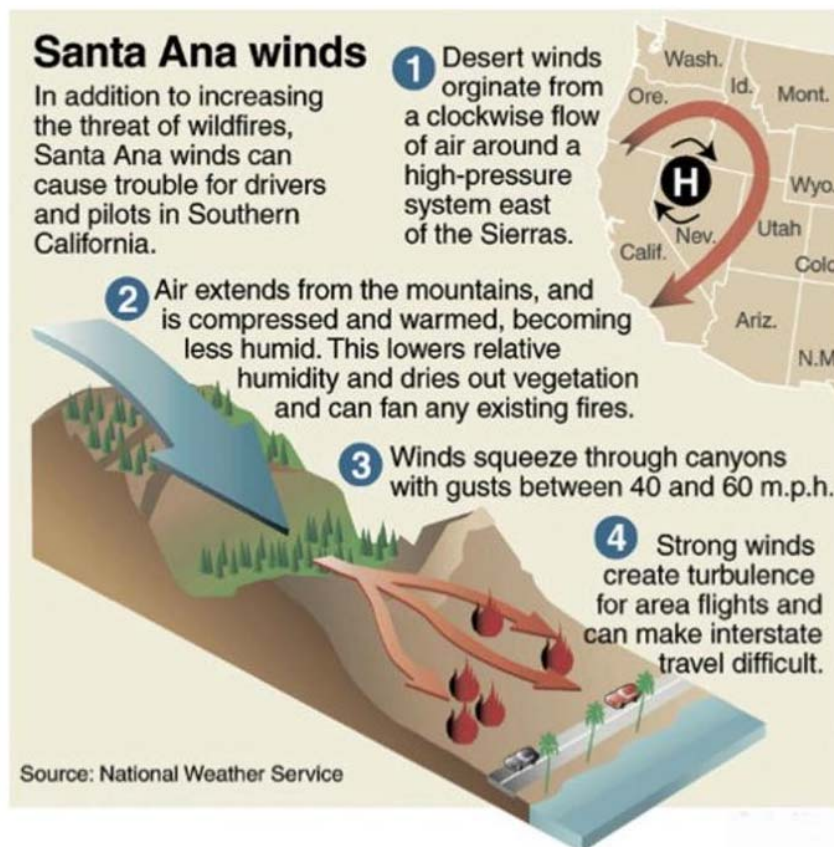


Figure 3.8 Santa Ana Winds

Sierra Mountains and west of the Rock mountains. Clockwise circulation around the center of a high-pressure area forces air down the slope from the high plateau. The air warms as it descends toward the California coast due to heating of the air caused by compression. This heating of the air as it is compressed provides the primary source of warming. The air is dry since it originated in the desert, and its moisture will continue to dissipate as it is heated.

Santa Ana winds commonly occur between October and February with December having the highest frequency of events. Summer events are rare.

Santa Ana Winds may cause damage such as downed power lines, blown over trees, and blown debris. Typical Santa Ana wind conditions are depicted in the figure at the end of this section.

California Department of Forestry and Fire Protection (CDF) maintain Remote Automated Weather Stations (RAWS) throughout Southern California. “Red Flag” Warning days are declared when Santa Ana conditions prevail. The public announcements and increased visibility heighten readiness, activate neighborhood awareness, and increase citizen involvement.

Since 2009, the National Center for Environmental Information has reported 24 events of high wind in the Antelope Valley and Palmdale area, not all related to Santa Ana Winds.

***EL NINO* CONDITION**

El Nino is the name given to one of several major ocean-atmosphere conditions that influence weather patterns in Southern California. Increases in the surface temperature of the eastern Pacific equatorial sector correlate with a southward shift of the northern hemisphere jet stream. *El Nino* conditions are thought to be a significant factor contributing to inter-annual variations in rainfall in the region, with unusually wet periods occurring during *El Nino* conditions, followed by unusually dry years. The phenomenon is not totally predictable but on average occurs once every four years. A typical *El Nino* condition lasts about 18 months.

URBAN FLOODING

Southern California has historically experienced very heavy rains during an El Nino condition. The part of an El Nino condition that impacted southern California is referred to as the Southern Oscillation which is an irregular “see-saw” in which atmospheric pressure and wind patterns shift across the Pacific.

The El Nino storm track affects the location of jet streams, which are a major factor in producing winter weather patterns at mid-latitudes. Instead of coming ashore in the Pacific Northwest as usual, the southern jet stream hits California, carrying moisture and storms. In general, the effect of El Nino on Southern California is increased rainfall with accompanying floods, landslides, and coastal erosion.

HIGH AND LOW TEMPERATURES

Generally Southern California is considered to have a Mediterranean type of climate. However, the area occasionally experiences both very high and significantly low temperatures. High-low extremes are especially pronounced in the Antelope Valley. High temperatures may cause significant economic damage due to loss of crops and livestock, workers sent home, and temporary closure of schools. Very high temperatures in August 1997 contributed to five deaths. Heat-related illness and death tends to be underreported and vary depending on annual conditions. In 2006, California experienced a prolonged heat wave resulting in a high number of heat-related illness and deaths, shown on **Figure 3.9**. During what is referred to as California's fire season, high temperatures may impede firefighting efforts and increase the severity of wildfires. While the Antelope Valley has experienced comparatively low temperatures, with occasional snow and freezing, these events are usually of short duration. The most significant impacts are economic losses due to business/school closures, and loss of crops and vegetation.

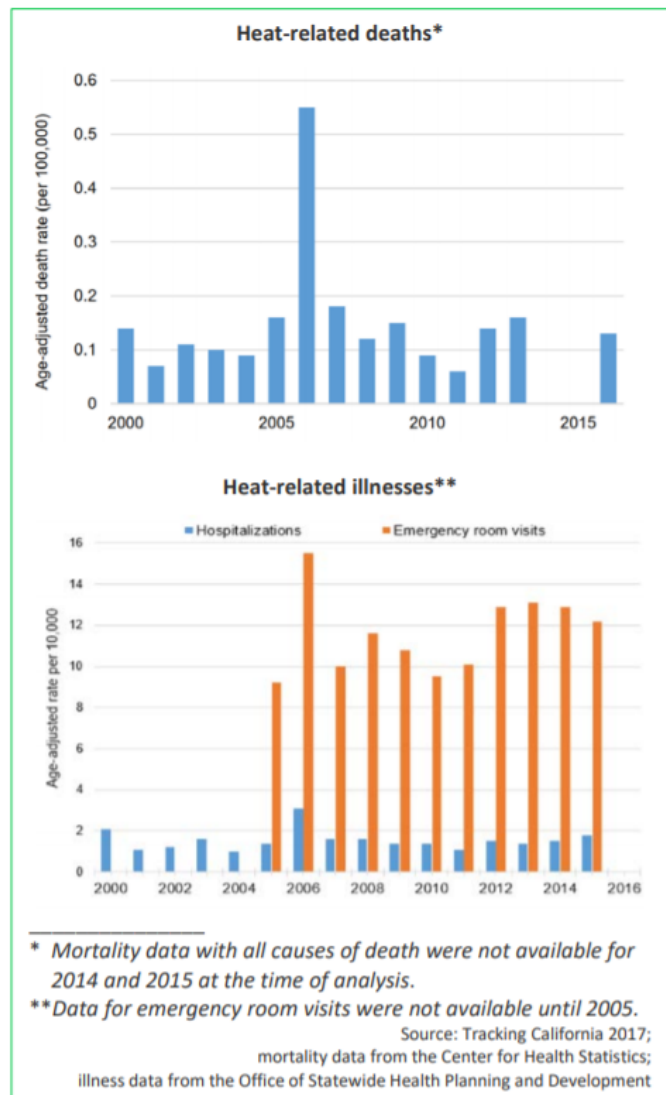


Figure 3.9 Heat-related Deaths and Illnesses

Probability of Future Events

It is near certain that the City of Palmdale will experience severe weather conditions in the near and distant future. Weather patterns in the region are strongly influenced by periodic *El Nino* conditions. The area is also subject to annual Santa Ana wind conditions, which can generate winds up to 90 miles per hour. While individual severe weather events are usually not as catastrophic as earthquakes, their relative frequency poses a significant threat to life and property in the City of Palmdale. Additional severe weather conditions that affect the Antelope Valley include extended periods of sub-freezing conditions, snowfalls which can exceed one foot in depth and monsoon rains which can cause localized flooding and property damage.

Climate Change Impacts

Rising global average temperature is associated with widespread changes in weather patterns. Scientific studies indicate that extreme weather events such as heat waves and large storms are likely to become more frequent or more intense with human-induced climate change.

Vulnerability Assessment

Severe weather poses a potential hazard to City citizens, facilities, and personnel. Property damage, personal injury, and loss of life may occur as a direct or indirect result of severe weather events. Specific vulnerabilities include:

- Wind-caused damage to City structures
- Damage caused by secondary events, such as blown over trees, flying debris, etc.
- Personal injury or death resulting from structure damage, downed power lines, etc. on City property
- Personal injury or death on City streets and sidewalks.
- Damage to utilities and other infrastructure

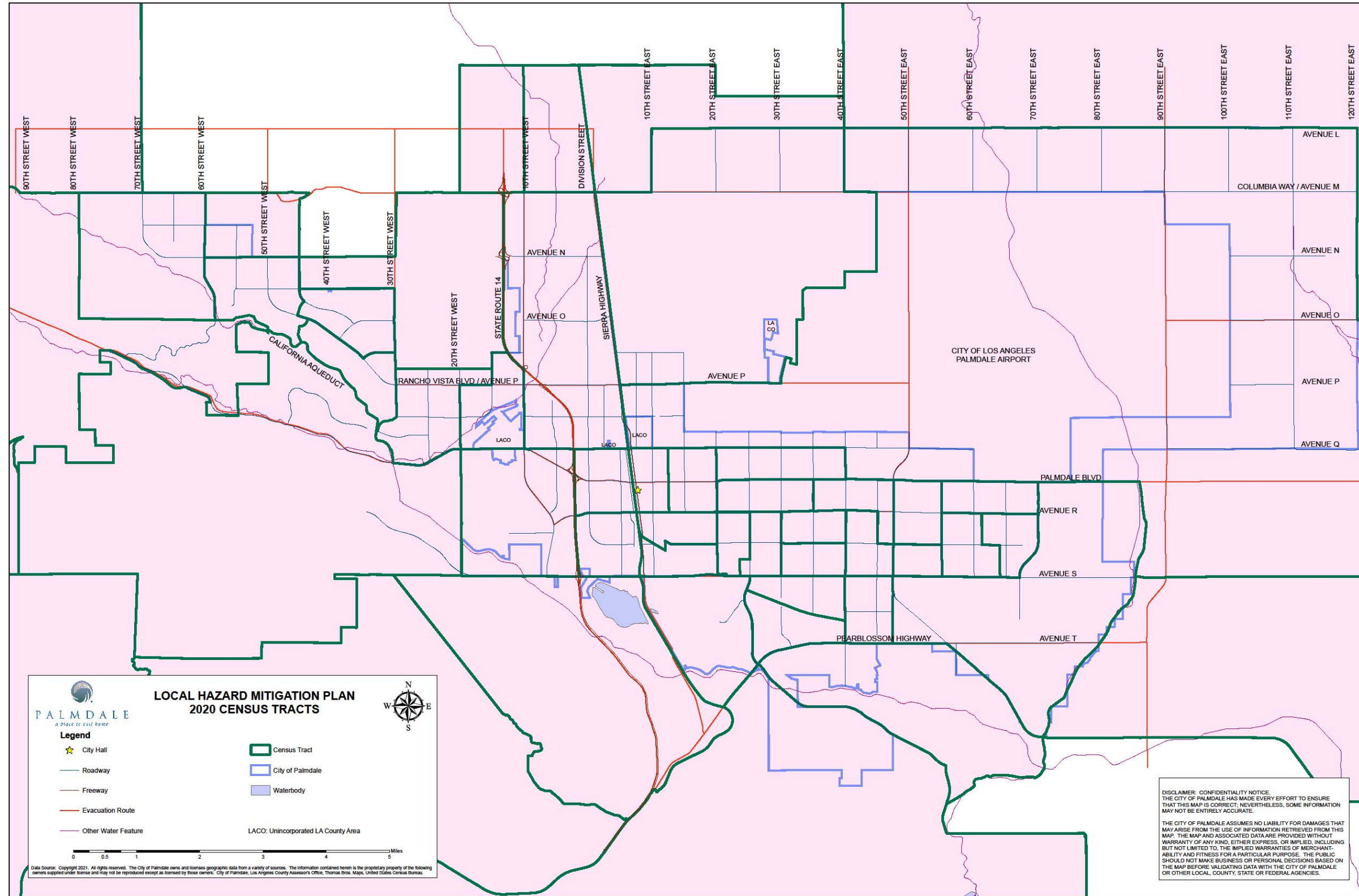
Estimating Potential Losses

While no single event is likely to cause complete loss of all City facilities, any facility is vulnerable to partial damage or complete destruction due to a Severe Weather event; the values of City facilities are listed in **Table 3.3**.

Because of the variety and severity of events involving severe weather, it is difficult to estimate the potential losses that might occur.

Map 3.13, prepared by the City of Palmdale GIS Section, identifies the census tract boundaries that are used by the City to calculate the costs associated with recovery from severe weather events.

Map 3.13 – City of Palmdale Census Tracts



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3.6.7 POWER/UTILITY FAILURE

Power outages are a region-wide problem in Los Angeles County. It is not unusual to experience several outages a year. In the past, outages have ranged between a few minutes to several days in some areas of the County.

Power failures of longer durations are usually caused by natural events that damage or disrupt large areas of the power transmission and/or distribution systems. Some of the causes of longer duration power failures have been severe winter storms, often accompanied by high winds. Another cause is high-pressure induced windstorms, which can last from 3 to 5 days and disrupt the power distribution system. Vehicular accidents involving power poles or transmission lines and trees falling on transmission lines are often the causes of localized outages of shorter duration.

Those individuals or facilities at greatest risk from loss of power are the elderly, home health care patients, health care facilities, emergency services providers/facilities, and similar entities.

Previous Occurrences

Energy disruptions on a small scale have occurred on a regular basis, including localized power failures due to downed utility poles and faulty or failed equipment

In October 2019, power outages impacted areas of west Palmdale, Agua Dulce, Acton, and Tehachapi and surrounding areas.

Two major items related to power and utility reliability that have come to light since the prior HMP reporting period that impact California as a whole, including the Southern California region, that are particularly noteworthy are described below.

PLANNED BLACKOUTS AS A WILDFIRE PREVENTION METHOD

Antelope Valley is served by SCE and is located within District 36 of the North Coast Region. In late 2018, Southern California Edison (SCE) implemented proactive de-energization known as Public Safety Power Shutoffs (PSPS). This is an operational protocol that SCE implements under extreme weather conditions in order to minimize the threat of wildfires.

ROLLING BLACKOUTS OF AUGUST 2020 DUE TO LACK OF ENERGY SUPPLY

In August 2020, the California Independent Service Operator (CAISO) initiated rotating outages which resulted in 492,000 customers experiencing rolling blackouts on August 14 and another 321,000 customers being affected on August 15.

Following these incidents, the Governor's office ordered a "Root Cause Analysis" to be conducted. A preliminary report was prepared on October 6, 2020, by the California Independent System Operator (CAISO), California Public Utilities Commission (CPUC), and California Energy Commission (CEC) and a final report was released on January 13, 2021.

The reports listed three major factors that led to rotating outages, the first of which was the climate change-induced extreme heat wave across the western United States which resulted in

demand for electricity exceeding existing electricity resource adequacy and planning targets. From August 14 through 19, 2020, the Western United States as a whole experienced an extreme heat storm, with temperatures 10-20 degrees above normal. During this period, California experienced four out of the five hottest August days since 1985; August 15 was the hottest and August 14 was the third hottest. This heat event was the equivalent of the hottest year of 35. The only other period on record with a similar heat wave was July 21–25, 2006, which included three days above the highest temperature in August 2020.

Probability of Future Events

There is always the possibility that equipment will fail, and as Los Angeles County and Palmdale continue to grow and be subject to weather cycles that place high demands on power, the probability of future power failures/outages is high. It is apparent that wildfire threats and climate change will continue to have an impact on power/utility reliability in the foreseeable future.

Climate Change Impacts

As referenced above in the Root Cause Analysis report on the regional August 2020 rolling blackouts, climate change-induced extreme heat waves across the western United States resulted in demand for electricity exceeding existing electricity resource adequacy and planning targets. This demand put a strain on the grid and resulted in loss of power to millions of customers in California. While climate change is not directly impacting power/utility failure, it has clear implications for extreme weather and wildfires which can both threaten the reliability of power supply.

Vulnerability Assessment

Power/utility failure/outages can pose a potential hazard to the residents, assets/facilities, and personnel of the City. Property damage, personal injury, and at the extreme, loss of life may occur as a direct or indirect result of a power/utility failure. The risk to City facilities is reduced by the capacity for back-up power at several buildings. At the present time, the following facilities have stationary back-up power capacity:

- Development Services Building
- City Administration
- The Playhouse
- Maintenance Facility
- Pelona Vista Park (back-up power for sanitary sewer lift station only)
- Marie Kerr Park Recreation Center
- Legacy Commons – Senior Center

There are the obvious risks of power loss to critical infrastructure buildings such as health care facilities (hospitals, convalescent facilities, nursing homes, etc.), and fire and life-safety facilities. However, power failure can also compromise public utilities, such as water and wastewater

treatment plants. To mitigate possible public health and safety impacts due to a loss of power, the Los Angeles County Water Division recommends that all water companies with pressurized systems and all sewer companies install backup generators. This will ensure system integrity in times of power loss.

Estimating Potential Losses

Unfortunately, it is extremely difficult to estimate potential losses because of the diverse nature and potential complexity of this hazard. Southern California Edison has suggested that a formula could be developed by a city, county or region that would allow an order of magnitude estimate of loss. The formula would have to include a significant amount of demographic and economic information, as well as the particular entity's history with power/utility failure. At the present time, City staff does not have the resources necessary to collect the data and develop the predictive model.

It is certainly safe to assume, however, that several areas of the private economy of the city can suffer losses if a power failure exists for more than a few hours. The magnitude of the loss is dependent on the breadth and duration of the failure.

3.6.8 INFECTIOUS DISEASE

This LHMP is being prepared in 2021, during a worldwide pandemic created by the COVID-19 virus. As of August 28, 2021, there have been approximately 38.7 million cases and 636,838 deaths in the United States alone attributed to the virus, which has sparked nationwide stay-at-home orders, shuttered schools, caused severe economic distress, stressed the medical system, and taken a toll on the nation’s physical, psychological, and economic well-being. More about the current pandemic is covered further below in this report.

Pandemics are defined as large-scale outbreaks of infectious disease for which there is little or no human immunity. Pandemics cause disease and death over a wide geographic area and cause significant economic disruption.

The California Department of Public Health (CDPH) and Los Angeles County Department of Public Health have identified seasonal influenza and viral disease pandemics as specific hazards that would have a significant impact throughout Palmdale.

Previous Occurrences

There have been five worldwide pandemics over the past 102 years:

1. **1918 “Spanish Flu” (H1N1 Virus)**—The 1918-1919 Spanish Flu was estimated to have sickened 20%-40% of the world’s population. Over 20 million people lost their lives. Between September 1918 and April 1919, 500,000 Americans died. The flu spread rapidly; many died within a few days of infection; others from secondary complications. The attack rate and mortality were highest among adults 20-50 years old; the reasons for this are uncertain. By late September 1918, over 35,000 people throughout California had contracted the Spanish Flu. According to state officials, influenza was most prevalent in the southern part of California, but the death toll was high across the state.
2. **1957-1958 “Asian Flu” (H2N2 Virus)**—This virus was quickly identified due to advances in technology, and a vaccine was produced. Infection rates were highest among school children, young adults, and pregnant women. The elderly had the highest rates of death. A second wave was developed in 1958 and in total, there were about 70,000 deaths in the United States. Worldwide deaths were estimated between roughly 1 and 2 million.
3. **1968-1969 “Hong Kong Flu” (H3N2 Virus)**—The strain of the H3N2 Hong Kong Flu caused approximately 34,000 deaths in the United States and more than 700,000 deaths globally. It was first detected in Hong Kong in early 1968 and spread to the United States later that year. Those over the age of 65 were most likely to die. This virus returned in 1970 and 1972 and still circulates today.



4. **2009 H1N1 Influenza Virus**—The first influenza pandemic of the 21st century occurred in 2009–2010 and was caused by an influenza A (H1N1) virus. It was the first pandemic for which many member States had developed comprehensive pandemic plans describing the public health measures to be taken, aimed at reducing illness and fatalities. For the first time, pandemic vaccinations were developed, produced, and deployed in multiple countries during its first year.

While most cases of pandemic H1N1 were mild, globally it is estimated that the 2009 pandemic caused between 100,000–400,000 deaths in the first year alone. Children and young adults were disproportionately affected in comparison to seasonal influenza, which causes severe disease mainly in the elderly, persons with chronic conditions, and pregnant women.

5. **2019-2021 (Ongoing) Covid-19 Coronavirus (SARS-CoV-2)**—The world is currently facing a global viral pandemic caused by a novel coronavirus disease, SARS-CoV-2. Coronaviruses are a large family of viruses that usually cause mild respiratory disease, such as the common cold, but can also cause more serious illness. The virus that causes the Covid-19 is passed from person to person through respiratory secretions, such as saliva or discharge from the nose when one coughs or sneezes. Experts currently researching the virus believe that the virus can also be spread when airborne through aerosols.

The severity of Covid-19 symptoms ranges from mild to severe and affects different people in different ways. Most infected people will develop mild to moderate illness and recover without hospitalization. Some of the most common symptoms include fever, dry cough, and fatigue. Less common symptoms include aches and pains, nasal congestion, sore throat, diarrhea, conjunctivitis, headache, loss of taste or smell, a rash on skin, or discoloration of fingers or toes. The most serious symptoms include difficulty breathing or shortness of breath, chest pain or pressure, or loss of speech or movement.

In March of 2020, the World Health Organization characterized the outbreak as a pandemic, the United States declared the novel coronavirus a national emergency, Los Angeles County declared a local state of emergency, and the City of Palmdale issued a local emergency declaration in response to the coronavirus pandemic.

According to Johns Hopkins University Coronavirus Resource Center, as of August 28, 2021, there have been roughly 215.6 million confirmed cases globally, 4.49 million global deaths, 38.7 million confirmed cases in the United States, and 636,838 US deaths. According to the California Department of Public Health, as of August 26, 2021, there have been 4,171,104 confirmed cases in California and 65,033 deaths, with 1,334,372 confirmed cases in Los Angeles County and 25,199 confirmed deaths. According to the Los Angeles County Department of Public Health, there have been 27,646 confirmed cases and 329 deaths in the City of Palmdale to date.

At the time that this is being written, a nationwide and worldwide vaccine campaign is currently underway, with vaccines approved in the United States under emergency use authorization for individuals age 12 and older, with one vaccine gaining full FDA approval in August 2021. At the same time, variants of the disease are spreading, and public health officials are continually monitoring these developments.

Palmdale, as well as other cities and regions across the world, faced or are facing high levels of illness, mortality, social disruption, political instability, mass unemployment, and economic losses. Recent impacts range from school and business closings to the interruption of basic essential services such as public transportation, health care/first aid, and the delivery of food and essential medicines to those in need.

Probability of Future Events

Evidence suggests that the likelihood of pandemics has increased over the past 100 years because of increased global travel and integration, urbanization, changes in land use, and greater exploitation of the natural environment. These trends likely will continue and will intensify.

The precise timing of a pandemic-scale health-related emergency is uncertain. Pandemic occurrences are most likely when a virus makes a dramatic change, or antigenic shift, that results in a new or “novel” virus to which the population has no immunity. Epidemic occurrences are more likely when there are ecological changes, the pathogen mutates, or the pathogen is introduced into an unprepared host population.

According to the World Bank, increased exposure to wildlife increases the risk to health, biosafety and global security. The current SARS-CoV-2 originated in wildlife; the virus managed to break the species barrier into humans, a phenomenon called zoonosis. Numerous other emerging vector-borne diseases also originated in wildlife and were transmitted to humans.

Climate Change Impacts

Researchers are studying the impacts of climate change on infectious disease. Loss of biodiversity, destruction of wildlands, and warming temperatures may all be contributing to the spread of infectious disease.

According to the CDC, climate change, together with other natural and human-made health stressors, influences human health and disease in numerous ways. Some existing health threats will intensify, and new health threats will emerge. In the U.S., public health can be affected by disruptions of physical, biological, and ecological systems, including disturbances originating here and elsewhere. The health effects of these disruptions include increased respiratory and cardiovascular disease, injuries and premature deaths related to extreme weather events, changes in the prevalence and geographical distribution of food- and water-borne illnesses and other infectious diseases, and threats to mental health.

According to the World Health Organization, climatic conditions strongly affect water-borne diseases and diseases transmitted through insects, snails, or other cold-blooded animals. Changes in climate are likely to lengthen the transmission seasons of important vector-borne

diseases and to alter their geographic range. Malaria is strongly influenced by climate. Transmitted by Anopheles mosquitoes, malaria kills over 400,000 people every year – mainly children under 5 years old in certain African countries. The Aedes mosquito vector of dengue is also highly sensitive to climate conditions, and studies suggest that climate change is likely to continue to increase exposure to dengue.

While developing nations are more vulnerable to many of these diseases than the United States or the City of Palmdale, all populations will be affected by climate change.

Vulnerability Assessment

While the entire population of the planning area may be at risk of infectious diseases and pandemics, some portions of the population may be at greater risk, including the very young, the elderly, and immune-compromised individuals. The recent COVID-19 pandemic also illustrated a greater risk for portions of the population living in areas of concentrated pollution and poverty, who may have greater risk of comorbidity factors that can influence immune response, may not have adequate access to shelter, transportation, healthy foods, and health care, and may not have the opportunity to work from home, or to take time off from work if they become ill.

Critical facilities, the natural environment, and structures would not be impacted by an infectious disease outbreak or pandemic. The most vulnerable aspects of the community are loss of life and potentially long-term health impacts, impacts to essential public services due to closure or limited operating hours of facilities, and the economy, which can suffer great losses if businesses are not able to operate at full capacity. The areas of the economy that are most vulnerable are service oriented, recreation and entertainment, and tourist sectors.

Estimating Potential Losses

There is no way to adequately predict the loss of life, impacts to essential public services, or the economy as a result of an infectious disease outbreak or pandemic, particularly in the case of an emerging infectious disease (EID) or novel virus, where no vaccine exists, little is known about how the disease is spread, the virulence of the disease and how quickly it spreads, how to treat it, and who is at greatest risk.

SECTION FOUR

MITIGATION STRATEGY

SECTION FOUR – MITIGATION STRATEGY

Requirement §201.6(c)(3): *The plan shall include a mitigation strategy that provides the jurisdiction's blueprint for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs and resources, and its ability to expand on and improve these existing tools.*

Requirement §201.6(c)(3)(i): *The hazard mitigation strategy shall include a] description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.*

Requirement §201.6(c)(3)(ii): *The mitigation strategy shall include a section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure.*

Requirement: §201.6(c)(3)(iii): *The mitigation strategy section shall include an action plan describing how the actions identified in section (c)(3)(ii) will be prioritized, implemented, and administered by the local jurisdiction. Prioritization shall include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.*

OVERVIEW

The risk assessment section of this LHMP has identified the "what, when, and how" of hazard impacts and possible effects on the community of Palmdale. The mitigation strategy provides for the development of specific mitigation actions that will reduce or possibly remove the City's exposure and vulnerability to the risks associated with natural and technological/human-caused hazards.

As indicated previously, the mitigation plan process includes:

- 4.1 Local Capabilities Assessment
 - 4.1.1 Plans, Programs Policies and Ordinances
 - 4.1.2 Administrative & Technical Mitigation Capabilities
- 4.2 Existing Mitigation Goals
- 4.3 Mitigation Strategy
- 4.4 National Flood Insurance Program (NFIP) Compliant Mitigation Actions

4.1 Local Capabilities Assessment

This chapter shows the existing capacity of the City of Palmdale, together with its mutual partners and community involvement, to respond to disasters. This helps to show any gaps in services that should be provided.

4.1.1 Plans, Programs, Policies and Ordinances Supporting Mitigation

Public Safety Programs - Existing public safety policies recommend a number of programs that will reduce loss of life, injury, and damage to property and the environment in the event of a disaster. These programs focus on educating the public concerning the proper procedures for avoiding hazards, the need for increased emergency preparedness, and prevention or mitigation of existing and potential hazards.

Emergency preparedness means the awareness of existing and potential hazards and the adoption of mitigation measures to preserve public health and safety. The City's policy is to give first priority to saving human lives; reducing property damage is second. The City also seeks to eliminate a hazard, reduce the risks if the hazard cannot be eliminated or avoided; but above all, to plan for any potential disasters. The prioritized hazard mitigation actions recommended in this LHMP will facilitate the allocation of public funds for safety programs with compatible goals and objectives.

Coordination with County Public Safety Agencies - Palmdale is policed by the Los Angeles County Sheriff's Department under a formal contract with the County of Los Angeles and has its municipal judicial system intertwined with the Los Angeles County Superior Court. The Los Angeles County Sheriff's Department (LASD) operates the Palmdale Station in Palmdale.

The city is served by the Los Angeles County Fire Department for its fire and paramedic services through the Consolidated Fire Protection District. Palmdale currently has five fire stations that cover the city boundaries.

The Fire Department and Sheriff's Department are encouraged to participate in the development plan review process to ensure adequacy of services and planning for safety. The City also supports mutual aid programs with the Angeles National Forest and the USAF Plant 42 in providing public services to the Planning Area. In addition, the City coordinates long range master planning with Los Angeles County for Fire Department and Sheriff's Department Services.

Master Drainage Plan - The Master Drainage Plan is designed to provide the City with a comprehensive storm drainage system to reduce the risk of flooding.

Floodplain Standards - The City reviews development proposals for compliance with floodplain standards. Residential development is prohibited in floodplain areas unless the flood hazard has been adequately mitigated.

Hazardous Waste Management Plan - The City's Emergency Plan and Los Angeles County Hazardous Waste Management Plan both deal with detailed emergency response procedures under various conditions for hazardous materials spills. The Los Angeles County Fire Department and Environmental Health Division work with the City and County representatives to prevent the uncontrolled release of toxic substances into the environment by conducting inspections of toxic materials facilities, enforcing storage and use requirements, and educating local businesses on proper storage and handling of hazardous materials.

Hazardous Materials require special care in handling because of the hazards they pose to the public's health and safety, and the environment. For this, the City of Palmdale coordinates the

handling with the County of Los Angeles. The Los Angeles County Fire Department responds to uncontrolled releases within the city limits, identifies the category of chemicals involved, contains the spill if possible, oversees cleanup activities, and makes sure that the site is safe to be occupied again.

The City also works with the State Department of Health Services to establish cleanup plans and to monitor the cleanup of known hazardous waste sites within the City.

Building Codes - The City strictly enforces building and fire safety codes to minimize hazards and the demand for emergency services. The City also requires the provision of fire alarms, fire escapes, and extinguishing systems within all commercial, industrial, and multi-family developments.

Public Awareness Programs - The City promotes public awareness programs to educate and integrate Hazard Mitigation principals into all facets of community life. This public education effort is aimed at reducing or eliminating injury or death and damage to property and the environment. Educational programs include earthquake safety and fire prevention.

Provision for Public Financing of Infrastructure - The City may assist in financing of the infrastructure needed to support new development through establishment of special financing districts, where appropriate. The City will investigate the use of similar mechanisms to finance hazard mitigation projects

Mutual Aid - Mutual aid agreements enable different jurisdictions to request aid from another when necessary. Through the California Master Mutual Aid and Los Angeles County Mutual Aid Plans, mutual aid regions are established under the Emergency Services Act by the Governor. Six mutual aid regions numbered I-VI have been established within California. The City of Palmdale is within Region I. Each mutual aid region consists of designated counties. Region I is in the OES Southern Administrative Region.

Evacuation Routes - Earthquakes, fires, and flooding can all necessitate evacuation. However, it is not possible to know with certainty how many people will actually need to be evacuated in any given situation. Similarly, the rate at which people will evacuate and their specific routes of travel and ultimate destinations are subject to wide variation. Therefore, in the case of an emergency, it is necessary to evaluate each situation on an individual basis and respond accordingly. At the time of an emergency, the Evacuation Coordinator will evaluate the situation, access various routes (many of which will have been planned out in advance), determine the best routes, alert the public via radio and/or TV of evacuation routes and procedures, and coordinate the evacuation with state and local officials, such as the Highway Patrol, Caltrans, etc.

4.1.2 Administrative and Technical Mitigation Capabilities:

The administrative and technical capability assessment identifies the personnel and community resources available within the city to engage in mitigation planning and carry out mitigation projects. The administrative and technical mitigation capabilities are listed below:

Table 4.1 Administration and Technical Resources

Personnel Resources	Role/Department
Director of Emergency Services	City Manager
Planner or engineer with knowledge of land development	Planning and Engineering Department
Engineers or professional trained in construction practices related to building and/or infrastructure	Public Works Program Management, Public Works Inspection and Public Works Maintenance, Building and Safety
Planner or engineer or emergency response personnel with an understanding of natural or human made hazards	Planning, Building and Safety, Public Works Program Management, Public Works Inspection and Public Works Maintenance
Floodplain Manager	City Engineer and/or Director of Public Works
Personnel skilled in GIS	GIS Coordinator and/or GIS staff
Purchasing	Finance
Public Information Officer	City Manager's office
Full time Building Official	Building and Safety Department
Law & Fire Enforcement	Los Angeles County Sheriff's & Fire Department
Personnel skill in water, sewer, storm drain, traffic, and lighting during hazardous conditions	Public Works Maintenance Department, Public Works Inspection

Key Legal and Regulatory Capabilities - The City currently supports hazard mitigation through its regulations, plans and programs. The City of Palmdale Municipal Code contains hazard mitigation-related ordinances.

Table 4.2 lists planning and land management tools typically used by local jurisdictions to implement hazard mitigation activities and indicate those that are in place in the City of Palmdale. Detailed descriptions of the plans, policies, regulations, and programs follow to provide more information on existing mitigation capabilities.

Table 4.2 Legal and Regulatory Resources

Legal and Regulatory Resources	Used by City of Palmdale
Plans	
General Plan Safety Element (1993)	X
Public Safety Programs	X
Capital Improvement Plan	X
Local Emergency Operations Plan	X
Master Drainage Plan	X
Hazard Waste Management Plan	X
Programs	
National Flood Insurance Program (NFIP)	X (see more detail below)

Public Awareness Programs	X
Public Financing of Infrastructure	X
Policies	
Zoning & Subdivision Ordinance	X
Site Plan Review Ordinance	X
Building Code	X
Floodplain Ordinance	X
Water Conservation Ordinance	X

National Flood Insurance Program (NFIP) - The goals of the NFIP are to reduce future flood damage through floodplain management and to provide people in participating communities with flood insurance. Community participation is voluntary. The City of Palmdale has participated in the NFIP since 1983. The City of Palmdale maintains full compliance with the NFIP through Chapter 15.28, Floodplain Management, under the City of Palmdale Municipal Code, which sets forth means to reduce losses from floods. These standards focus on areas located within or near the 100-year floodplain. Developments are conditioned to comply with code, standards, and programs to prevent vulnerability to floods from increasing. Compliance with the City’s flood program is also required of certain building rehabilitations and reconstructions.

Flood Insurance Rate Maps (F.I.R.M) - Flood Insurance Rate Maps (F.I.R.M.) are used to identify areas of flood risk in the community. FEMA has provided the City of Palmdale with all FIRM maps for City Limits and surrounding unincorporated areas. These maps provide detailed flood information for the planning area and are periodically updated to reflect new information. FIRM maps have received large scale changes and local revisions requested by developers and independent property owners. The most recent map revision was issued by FEMA with a date of September 2008.

Upon review of the FEMA’s National Flood Hazard mapping area and **Map 3.7**, there is approximately 200-250 structures located in the 1% annual chance flood areas. The remaining areas in the Palmdale city limits are located in the 0.2% chance flood areas. During the reporting period, there has been no 100-year flooding event, thus no claims filed.

Repetitive Loss Properties - FEMA insures properties against flooding losses through the NFIP. As part of the process to reduce or eliminate repetitive flooding to structures across the United States, FEMA has developed an official Repetitive Loss Strategy. The purpose behind the national strategy is to identify, catalog, and propose mitigation measures to reduce flood losses to the relatively few numbers of structures that absorb the majority of the premium dollars from the National Flood Insurance Fund. A repetitive loss property is defined by FEMA as a “property for which two or more NFIP losses of at least \$1,000 each have been paid within any 10-year period since 1978.” The City of Palmdale has no repetitive loss properties. In order to ensure this, the Public Works Department conduct storm drain improvements as part of the Capital Improvement Project budget that help with flood control in the flood prone areas.

4.2 Existing City of Palmdale Goals and Objectives that Support Hazard Mitigation Actions

SAFETY ELEMENT SECTION OF THE GENERAL PLAN

Specifically, the Safety Element informs the public of public safety goals, objectives, and policies of the City for development and was updated in July 2015. The General Plan is currently undergoing a comprehensive update with tentative adoption in September 2021. Changes to the Goals and Objectives listed below will be implemented in the next 5-year LHMP. It provides a comprehensive risk management program to serve as a guide for the day-to-day operational decisions of City staff. The Element evaluates the seismic, flood, geologic, wildfire, and urban fire hazards in the Planning Area, as well as aircraft accident potential, hazardous materials, and crime. It seeks to eliminate or reduce the risks to public safety through planning for the prevention of hazardous situations and for the provision of adequate emergency services. Following are the Safety Element Section Goals:

GOAL S1: Minimize danger and damage to public health, safety, and welfare resulting from natural hazards.

Objective S1.1: Review development within or adjacent to geologic hazards, to ensure adequate provisions for public safety.

Objective S1.2: Minimize hazards associated with flood plains in the area.

Objective S1.3: Ensure compatible development in areas within or adjacent to natural high fire risk areas (urban-wildland interface), and other high fire risk areas.

GOAL S2: Minimize damage associated with man-made hazards.

Objective S2.1: Minimize damage from catastrophic failure of infrastructure.

Objective S2.2: Minimize damage resulting from aircraft accidents.

Objective S2.3: Protect the public from hazardous materials and the hazards associated with the transport, storage, or disposal of such materials.

Objective S2.4: Ensure that development of a federal, state, or county prison in Palmdale shall not impact the health, safety, and lifestyle of residents.

Objective S2.5: Minimize potential hazards related to crime through the development review process and through on-going public education programs.

Objective S2.6: Minimize exposure of residents to other man-made hazards, to the extent feasible.

GOAL S3: Maintain and enhance City emergency services.

Objective S3.1: Prepare the Palmdale community to be self-sufficient in the event of an emergency.

GOAL S4: Protect public safety through the implementation and enforcement of City Ordinances and through public education.

Objective S4.1: Develop, implement, and enforce City Codes to ensure safe and sanitary living and working conditions throughout the City.

Objective S4.2: Support the development and continued updating of public education programs on health and safety.

PUBLIC SERVICES ELEMENT OF THE GENERAL PLAN

The Public Services Element of the General Plan establishes a framework for provision of infrastructure and public services to existing and new development in a timely and cost-efficient manner. The Element provides background information on issues and opportunities relative to infrastructure planning, as well as goals, objectives and policies to ensure effective coordination of public service provision with development.

Because of Palmdale's rapid growth and dispersed development pattern, the City faces significant challenges in providing public improvements such as regional drainage and traffic facilities.

GOAL PS3: Develop and maintain adequate storm drainage and flood control facilities.

Objective PS3.1: Maintain and implement the City's adopted Master Drainage Plan.

Objective PS3.2: Coordinate drainage master planning with environmental resource management.

GOAL PS5: Support the provision of adequate public and community services to meet the needs of residents.

Objective PS5.1: Ensure provision of fire protection facilities and equipment needed to protect existing and future development.

Objective PS5.2: Support the provision of adequate law enforcement services to meet the needs of City residents.

Objective PS5.7: Provide enforcement services to ensure compliance with municipal codes and ordinances, to protect public health and safety, preserve property values, and maintain a clean and orderly environment for Palmdale residents.

Objective PS6.2: Adopt and implement the City's Hazardous Waste Management Plan (HWMP).

GOAL PS7: Provide for open space elements throughout the planning area that preserve significant natural, historic, scenic, and topographic features while minimizing fiscal impacts to the City and its residents.

Objective PS7.1: Ensure that any land proposed for acquisition, dedication or that is maintained by the City will contribute benefits to the general public, and that short- and long-term impacts of accepting responsibility for such land are adequately evaluated by the City.

4.3 Setting New Hazard Mitigation Goals

The Risk Assessment element of this LHMP documents the risks from and vulnerabilities to the natural hazards that threaten the City of Palmdale. Coupled with the additional information

provided through the assessment of existing mitigation capabilities, the City was able to begin to formulate mitigation planning goals.

Before formulating the goals, the planning team first reviewed planning goals in general. Each planning team member was provided with a written and graphic explanation of Goals and Objectives, the purpose they serve and how they are developed and written. Following this activity, each planning team member was provided with a list of sample goal statements. Some of these goals were from the State of California and the Los Angeles County mitigation plans and from nearby cities. Others were developed as a result of analyzing the Risk Assessment and some were existing community planning goals, such as “Improve Public Safety Services,” that are compatible with hazard mitigation.

The planning team participated in a discussion on the sample goal statements and developed an understanding of the relationship between goals and objectives and the recommended actions that they would later be tasked to formulate.

Based upon the planning data review, the planning team reviewed the goal statements and related objectives. These final goals and objectives provide direction for reducing future hazard-related losses within City of Palmdale.

4.4 City of Palmdale Hazard Mitigation Goals & Objections

MISSION

The mission of the City of Palmdale’s Local Hazard Mitigation Program is to establish and promote a comprehensive mitigation policy and program to protect, from natural and manmade hazards, 1) the lives of citizens and workers within the City; 2) property and facilities of residents, businesses, institutions, and governmental agencies; and 3) infrastructure and the environment.

GOALS

1. Protect Life and Property

OBJECTIVES:

- 1A. Continue to identify natural and manmade hazards that threaten life and property in the City of Palmdale.
- 1B. Implement programs and projects that assist in protecting lives by making infrastructure, critical facilities, and other property more resistant to losses from all hazards.
- 1C. Maintain standards, codes, and construction practices that to assist in protecting life and property.
- 1D. Reduce losses and repetitive damages from repetitive hazard events, while promoting insurance coverage for catastrophic hazards.

- 1E. Continue to implement facility and/or retrofit projects in both the City's 10-year Capital Improvement Project Plan and in the City's annual budget plan. These projects will help reduce damage during either a natural or manmade hazard.
- 1F. Improve traffic circulation during floods and other events.

2. Increase Public Awareness

OBJECTIVES:

- 2A. Increase public awareness of existing threats and the means to reduce these threats by conducting educational and outreach programs to all the various community groups in the City of Palmdale.
- 2B. Develop informational material for distribution to the public regarding general emergency preparedness. Promote this material through the Palmdale newsletter, Channel 27 promotional announcement, and displays at community events.

3. Strengthen Partnerships

OBJECTIVES:

- 3A. Strengthen communications and coordinate participation between the City and public agencies, schools, non-profit organizations, business, and industry to gain a vested interest in mitigation measures.
- 3B. Encourage and support leadership within the private sector, non-profit agencies and community-based organizations to promote and implement local hazard mitigation activities.
- 3C. Forward development plans as appropriate to the Los Angeles County Fire Department, State Department of Mines and Geology and other agencies who evaluate potential hazards and ensure that the recommendations from these agencies are incorporated into the project design through required conditions of approval.
- 3D. Encourage property-owner self-protection measures.

4. Provide Responsive Emergency Services

OBJECTIVES:

- 4A. Establish policies to ensure the implementation of mitigation programs and projects for critical facilities, services, and infrastructure.
- 4B. Continue to provide training and invest in equipment for City workers to address all identified hazards.
- 4C. Continue developing and strengthening inter-jurisdictional coordination and cooperation in the area of emergency services.

5. Promote Environmental Preservation

OBJECTIVES:

- 5A. Consider natural and manmade hazard mitigation in developing land use plans to protect life, property, and the environment.

6. Provide Responsible Stewardship of Public Funds

OBJECTIVES:

- 6A. Prioritize mitigation projects, starting with sites facing the greatest threat to life, health, and property.
- 6B. Use public funding to protect public services and critical facilities.
- 6C. Maximize the use of outside funding sources.

4.5 Selecting and Prioritizing Hazard Mitigation Measures

MITIGATION STRATEGIES

In order to ensure that proposed mitigation actions were developed in a systematic fashion, the first step was to determine an overall strategic approach. The Hazard Mitigation Steering Committee developed the following mitigation strategies:

Enforcement. The City has previously adopted numerous ordinances and policies that relate to hazard mitigation. Among these are the building codes, specific plan requirements, and policies found in the General Plan. Existing regulations should be periodically reviewed and modified as necessary to take advantage of experience gained from hazard events and new technology.

Inter-Agency Coordination. By working with other agencies in the Antelope Valley, the City benefits from the resources and expertise that these agencies have to offer. Joint projects increase efficiency, can be extremely effective, avoid duplication, and stretch scarce resources.

Public Information and Education. Public information and education programs are a cost-effective method to motivate individuals and institutions to implement hazard mitigation actions on their own.

Management. Effective hazard mitigation programs do not just happen; they are the result of management attention and direction. A management structure that includes designated responsibility and accountability for implementation of hazard mitigation actions is necessary for success.

Mitigation Projects. Mitigation projects may include measures to protect City facilities and critical infrastructure from damage, non-structural mitigation projects, and staff training.

SELECTION/PRIORITIZATION

The process of selecting and prioritizing mitigation actions began with each member of the Core Team developing a “wish list,” that considered community planning assessment responses and included input from the Local Hazard Mitigation Planning Committee, as well as their own ideas. Individual “wish lists” were then consolidated into a single list of several dozen projects. The Core

Team determined that the list needed to contain no more than 25 projects, and preferably less. In order to select the measures/actions that should be part of this LHMP, the Core Team initially used three criteria:

- What actions had the most serious consequences if not implemented?
- What actions could be implemented by existing staff with funding resources available internally (or externally)?
- What actions responded to the primary concerns of the community?

After much discussion within the Core Team, a final list of 25 actions was developed, reviewed, and approved by the full Committee. The actions were not prioritized, however. (At the suggestion of FEMA, and with the consensus of the Committee, an additional action was added to this iteration of the LHMP that is aimed at protecting future buildings and infrastructure).

Once the projects had been selected, the Core Team established priorities. Establishment of priorities for hazard mitigation helps to assure that projects will be implemented in a systematic fashion. Priorities are intended as guidelines for action, not as a rigid requirement. The order that projects are listed in is not necessarily the order that they will be implemented; projects ranked High by the City are of the first priority. Many factors were taken into consideration in the development of hazard mitigation priorities. These factors included, but were not limited to:

- Percent of population at risk
- Frequency, intensity, and likelihood of hazard; repetitive loss areas
- Types/percent of land areas at risk; development pressure
- Cost effectiveness of measure; Sources of available funding

Benefit-Cost Analysis Requirements

The FY 2003 Pre-Disaster Mitigation (PDM) program was established by Congress as a nationally competitive mitigation grant program. The benefit-cost ratio (BCR) of each mitigation project is a major factor in the evaluation of PDM projects. Mitigation projects with higher BCRs are more likely to be funded in the nationally competitive PDM program.

The Federal Office of Management and Budget OMB Circular A-94 describes the economic principles and methods by which most federal programs must determine the cost effectiveness (i.e., BCR) of funded projects. OMB A-94 states: *“Analyses should include comprehensive estimates of the expected benefits and costs to society based on established definitions and practices for program and policy evaluation. Social net benefits, and not the benefits and costs to the Federal Government, should be the basis for evaluating government programs or policies that have effects on private citizens or other levels of government.”*

The benefits of mitigation projects can simply be the value of avoided damages, losses, and casualties. Other benefits generated could be environmental, economic, cultural, and societal in nature.

Examples of common benefits include avoided (or reduced):

- Damages to buildings, contents, or infrastructure
- Economic impacts of loss of function of buildings
- Displacement costs for temporary quarters
- Loss of public services
- Loss of net business income
- Economic impacts of loss of function of infrastructure
 - Road or bridge closures
 - Loss of utility services
- Deaths and injuries

While cost magnitude was a consideration in establishing hazard mitigation priorities, detailed cost-benefit analyses were not performed. A BCR will be calculated for any projects that are submitted for federal funding at the time of grant application preparation.

4.6 2021 Updated Mitigation Actions

This section provides proposed mitigation actions (in the form of recommendations) under the following six (6) categories: *Prevention; Property Protection; Public Education and Awareness; Natural Resource Protection; Emergency Services; and Structural Projects.*

The recommendations that follow are those that would have a long term, beneficial impact upon the entire city, neighboring communities, and participating districts. These recommendations will be made with the knowledge and consent of the entire Palmdale community by virtue of the formal adoption of this LHMP. The initial priorities were based upon the following criteria: *High, Medium, Low priority with regard to protection of life/property and risk. The City also evaluated per an approved FEMA method based upon the following levels. See Table 4-3.*

- *Level 1* - Requires human resources, but not necessarily financial resources
- *Level 2* - Can be accomplished primarily by City staff, but requires financial resources, internal or external
- *Level 3* - Requires external expertise/consultant and financial resources, internal or external
- *Level 4* - Requires multiple entity/agency participation, environmental reviews, and external human and financial resources.

Table 4.3 2021 Mitigation Action Prioritization

ITEM	PROJECT	CATEGORY	RANKING (CITY)	RANKING (FEMA)	UPDATE STATUS INFORMATION
1	Implement community based Nonstructural Mitigation program	Property Protection	Medium	2	Funding provided through General Fund. Project is ongoing on a case-by-case basis.
2	Develop Seasonal Multi-Hazard Public Education Campaign	Public Education and Awareness	Medium	2	Funding provided through General Fund. Project is ongoing. The City partners with Los Angeles County Emergency Management Department for education programs
3	Earthquake Education Program	Public Education and Awareness	Medium	2	Funding provided through General Fund. Project is ongoing. The City partners with Los Angeles County Emergency Management Department for education programs
4	Update the City's Master Plan of Drainage	Natural Resource Protection	High	3	Funding provided through General Fund. Project scheduled to begin in 2022.
5	Provide for water savings techniques for irrigation & landscaping	Natural Resource Protection	High	1	Funding provided through General Fund. Water conservation ordinance adopted in 2008 and updated as necessary.

ITEM	PROJECT	CATEGORY	RANKING (CITY)	RANKING (FEMA)	UPDATE STATUS INFORMATION
6	Amargosa Creek Upper Recharge Project	Natural Resource Protection	High	4	Funding provided through Drainage Funds, grants and multi-jurisdictional funding. Portion of project complete with work ongoing.
7	**Upgrade existing City EOC	Emergency Services	High	3	Funding provided through General Plan. Some work completed; additional work TBD based on available funding.
8	**Develop 3–7-day shelter, food and water plan	Emergency Services	Medium	2	Although still a priority, staff and funding are not available
9	**Establish shelter	Emergency Services	Medium	4	Funding to be provided from Hazard Mitigation Grant, City General Funds and City of Lancaster. Project approved at Joint City Council meeting in May 2021. Start of work TBD.
10	**Update GIS Aerial Imagery	Emergency Services	High	3	Funding provided through Hazard Mitigation Grant and General Fund. Budgeted for 2022 with annual subscription to follow upgrade.
11	**Re-evaluate the City's evacuation routes	Emergency Services	High	2	Funding to be provided from Hazard Mitigation Grant and General

ITEM	PROJECT	CATEGORY	RANKING (CITY)	RANKING (FEMA)	UPDATE STATUS INFORMATION
					Fund when available. Implementation TBD.
12	**Create shelter and medication disbursement plan	Emergency Services	Low	3	Funding to be provided from Hazard Mitigation Grant and General Fund when available. Implementation TBD.
13	**Create additional emergency related GIS layers	Emergency Services	Low	2	City has updated GIS information and has updated and provided additional emergency related GIS layers. Additional layers to be provided when funding and staff are available.
14	Construction of Navigation Access Center	Emergency Services	Medium	4	Funding to be provided through Hazard Mitigation Grant and General Fund. Design budgeted for 2022.
15	Creation of Palmdale Community Renaissance Plan	Emergency Services	Medium	4	Funding to be provided through Hazard Mitigation Grant and General Fund. Policy implemented in 2020 and could be implemented as necessary for future events.
16	Creation of Al Fresca Dining Policy	Emergency Services	Medium	4	Funding to be provided through

ITEM	PROJECT	CATEGORY	RANKING (CITY)	RANKING (FEMA)	UPDATE STATUS INFORMATION
					Hazard Mitigation Grant and General Fund. Policy implemented in 2020 and could be implemented as necessary for future events.
17	Manage COVID-19 Testing and Vaccination Sites	Emergency Services	Medium	4	Funding to be provided through Hazard Mitigation Grant and General Fund. Policy implemented in 2020 and could be implemented as necessary for future events.
18	Amargosa Creek Flood Control Improvement	Structural Projects	Medium	4	Funding to be provided through Hazard Mitigation Grants and General Fund. Project is currently identified in 10-year CIP based on availability of funds.
19	Anaverde Creek Regional Channel Improvements	Structural Projects	Medium	4	Funding to be provided through Hazard Mitigation Grant and General Fund. Watershed study and preliminary design to be completed June 2022. Final design and construction TBD.
20	Hunt Canyon Drainage Basin	Structural Projects	High	4	Funding to be provided from

ITEM	PROJECT	CATEGORY	RANKING (CITY)	RANKING (FEMA)	UPDATE STATUS INFORMATION
					Hazard Mitigation Grant and City Drainage Fund when available. Implementation TBD.
21	Avenue P Pearland Drainage Improvements	Structural Projects	Medium	4	Funding to be provided from Hazard Mitigation Grant and City Drainage Fund when available. Implementation TBD.
22	Avenue S Pearland Drainage Improvements	Structural Projects	Low	4	Funding to be provided from Hazard Mitigation Grant and City Drainage Fund when available. Implementation TBD.
23	Palmdale Blvd. Pearland Drainage Improvements	Structural Projects	Low	4	Funding to be provided from Hazard Mitigation Grant and City Drainage Fund when available. Implementation TBD.
24	Avenue O Portal Ridge Drainage Improvements	Structural Projects	Low	4	Funding to be provided from Hazard Mitigation Grant and City Drainage Fund when available. Implementation TBD.

** Preparedness/Response Activity

Each of the reviewed and recommended 2021 mitigation actions proposed by the City of Palmdale is described in the following pages. Each description contains:

- Project Title & Description
- Issue/Background Statement
- Other Alternatives Considered
- Responsible Office/Person
- Funding Source
- Cost
- Benefits
- Implementation Schedule
- Priority

4.6.1 PROPERTY PROTECTION

Recommended Action #1:

Project Title/Description: Implement a community based Non-structural Mitigation Program

Goal Addressed: GOAL # 1 – Protect Life and Property; GOAL # 2 – Increase Public Awareness; GOAL # 3 – Strengthen Partnerships; GOAL # 4 – Provide Responsive Emergency Services; GOAL #6 - Provide Responsible Stewardship of Public Funds

Objectives Involved: 1A; 1B; 1C; 1D; 1E; 2A; 2B; 3B; 3D; 4A; 6A; 6B

Issue/Background Statement: Securing non-structural elements may best be seen as an inherent part of local governments' responsibility to maintain a safe working environment for its employees. Non-structural mitigation actions can reduce earthquake-induced damage and injury and help maintain a satisfactory level of service following an earthquake event.

The program includes the identification of non-structural earthquake hazards in building spaces and the implementation of protection measures. Program issues related to necessary skills, safety, budgets, consistency, and liability generally require that City staff manage the non-structural protection program.

Guiding principles

The assumptions and philosophies behind the City Nonstructural Earthquake Protection Program are:

- Strong earthquake ground shaking will damage non-structural elements in buildings.
- City buildings on or near known faults are at great risk of being damaged by an earthquake; Palmdale, and all of Los Angeles County can be exposed to earthquake hazards capable of damaging nonstructural elements of the building.
- Maintenance of existing mechanical systems, bracing, and retrofitting of vulnerable non-structural elements of the facility will reduce damage and foster sustainability.

Other Alternatives Considered: Do nothing

Responsible Offices/Persons: Emergency Management/Building & Safety Dept.

Funding Source: City General Fund

Cost: Case-by-case basis

Benefit: Life Safety, reduced losses, increased insurance coverage

Updated Implementation Schedule: Ongoing as discovered during inspections and renovations

Priority: Medium (2)

4.6.2 PUBLIC EDUCATION AND AWARENESS

Recommended Action Item #2:

Project Title/Description: Develop a Seasonal Multi-Hazard Public Education Campaign to be implemented annually.

Goal Addressed: GOAL # 1 – Protect Life and Property; GOAL # 2 – Increase Public Awareness; GOAL # 3 – Strengthen Partnerships

Objectives Involved: 1A; 1B; 1C; 1D; 1E; 1F; 2A; 2B; 3A; 3B; 3D

Issue/Background Statement: The planning team gathered important and interesting information regarding the hazards that pose a threat to the health and safety of City of Palmdale, the likely impacts of such hazards, and reasonable measures that can be undertaken by individuals and organizations to reduce the impact of such inevitable events. This information needs to be made public in a multifaceted approach that addresses the hazards when they occur and where they occur. Public Education is one of the primary mechanisms in reducing future hazard related losses, and one that is inexpensive in comparison to other mitigation projects. This effort should be coordinated between the many organizations that already have extensive and/or limited programs in place.

Other Alternatives Considered: Utilize other innovative outreach methods to get the public's attention

Responsible Offices/Persons: Emergency Management

Funding Source: City General Fund

Cost: Incremental. A single citywide mailing to 42,000 residential units (at \$.49 per mailing) would cost \$20,580. This program should build on existing programs and agencies that are already incurring these costs, and explore other avenues of public outreach, schools, public utility newsletters, flyers, etc.

Benefit: Life Safety, reduced losses, increased insurance coverage

Implementation Schedule: Ongoing, annual campaign.

Priority: Medium (2)

Recommended Action Item #3:

Project Title/Description: Earthquake Education Program

Goal Addressed: GOAL # 2 – Increase Public Awareness, GOAL # 3 – Strengthen Partnerships

Objectives Involved: 2A; 2B; 3A; 3B; 3D

Issue/Background Statement: Hold public meetings to acquire information from homeowners on their specific needs, explain what resources available and what procedures are to take in the event of a major earthquake. Send literature to all homeowners addressing earthquake problems and what homeowners can do to reduce vulnerability.

Other Alternatives Considered: Utilize other innovative outreach methods to get the public’s attention, including the City of Palmdale website.

Responsible Offices/Persons: Emergency Management in participation with the LA County Fire Department (LACFD)

Funding Source: City General Fund

Cost: Incremental. A single citywide mailing to 42,000 residential units (at \$.49 per mailing) would cost \$20,580. This program should build on existing programs and agencies that are already incurring these costs, and explore other avenues of public outreach, schools, public utility newsletters, flyers, etc.

Benefit: Life Safety, reduced losses, increased insurance coverage

Implementation Schedule: Ongoing meetings, timeline determined by the LACFD.

Priority: Medium (2)

4.6.3 NATURAL RESOURCE PROTECTION

Recommended Action Item #4:

Project Title/Description: Update the City’s Drainage Master Plan

Goal Addressed: GOAL # 1 - Protect Life and Property; GOAL #5 – Promote Environmental Preservation; GOAL #6 – Provide Responsible Stewardship of Public Funds

Objectives Involved: 1A; 1B; 1C; 1D; 1E; 1F; 5A; 6A; 6B; 6C

Issue/Background Statement: The City’s Master Plan of Drainage is intended to provide the basis for making decisions regarding storm drainage and overall watershed management as well as to provide a funding mechanism for implementing such decisions. The most recent revision to the

DMP was prepared in 1996 and needs to be updated to address the latest requirements imposed by Federal and State authorities and other watershed issues.

Other Alternatives Considered: Continue use of existing Drainage Master Plan

Responsible Offices/Persons: Public Works/City Consultant

Funding Source: City General Fund

Cost: \$650,000

Benefit: Life Safety, reduced losses

Updated Implementation Schedule: Included in fiscal year 2022 budget.

Priority: High (3)

Recommended Action Item #5

Project Title/Description: Provide for water savings techniques in irrigation and landscaping

Goal Addressed: GOAL #5 – Promote Environmental Preservation; GOAL #6 – Provide Responsible Stewardship of Public Funds

Objectives Involved: 5A; 6A; 6B; 6C

Issue/Background Statement: Continue to update the City's Water Conservation Ordinance to include recent updates to State Law. Ordinance promotes the values and benefits of landscaping while recognizing the need to utilize water and other resources as efficiently as possible. Use water efficiently without waste by setting a Maximum Applied Water Allowance as an upper limit for water use; establish a structure for planning, designing, installing, maintaining, and managing water efficient landscapes in new and rehabilitated projects; establish provisions for water management practices and water waste prevention for existing landscapes; implement water conservation policies contained in the City's General Plan

Other Alternatives Considered: Continue to monitor water consumption

Responsible Offices/Persons: Public Works/City Consultant

Funding Source: City General Fund

Cost: Costs negligible

Benefit: Drought reduction, reduced cost for water; reduced losses of water

Implementation Schedule: Water conservation ordinance went into effect in October 2008; City provides ongoing evaluations and updates based in State laws and new developments in water efficient landscaping.

Priority: High (1)

Recommended Action Item #6

Project Title/Description: Upper Amargosa Creek Flood Control, Recharge & Habitat Restoration Project

Goal Addressed: GOAL # 1 – Protect Life and Property; GOAL #5 – Promote Environmental Preservation

Objectives Involved: 1A; 1B; 1C; 1D; 1E; 1F; 5A

Issue/Background Statement: The Upper Amargosa Creek Flood Control, Recharge, and Habitat Restoration Project will provide the Antelope Valley with flood control along the Amargosa Creek between 20th Street West and 25th Street West and along Elizabeth Lake Road. The recharge facility will utilize water supplies available from the California State Water Project (aqueduct) and percolate this water into the Antelope Valley aquifer so the water may be extracted for beneficial use. In addition, the Upper Amargosa Creek Recharge Project will provide a community Habitat Restoration Park, inviting local citizens to exercise, relax, and learn about their natural surroundings

Other Alternatives Considered: Continue allowing water to travel its natural course with no percolation into the aquifer

Responsible Offices/Persons: Public Works/City Consultant

Funding Source: Drainage Funds/Grants/Multi-jurisdictional

Cost: \$13.5 million

Benefit: Recharge aquifer; provide community park; control flooding

Implementation Schedule: Water recharge portion of project is completed, remaining mitigation actions still ongoing.

Priority: High (4)

4.6.4 EMERGENCY SERVICES

Recommended Action Item #7: Preparedness Activity

Project Title/Description: Upgrade existing City of Palmdale Emergency Operations Center (EOC) to meet current seismic standards and provide for better communication infrastructure, data implementation, and visual aids.

Goal Addressed: GOAL # 1 - Protect Life and Property

Objectives Involved: 1A; 1B; 1C; 1D; 1E; 1F

Issue/Background Statement: The City Emergency Management department and Steering Committee and the Public Works Department will gather necessary information and requirements to bring the existing City of Palmdale's EOC up to current seismic standards. The team will also work on providing up to date database information about City's critical facilities via the City's GIS system to all departments involved in the EOC operation. Additional equipment for transmission of information between field EOC staff and administrative EOC staff will be necessary to allow for continues updates to the GIS database.

Other Alternatives Considered: Continue use of existing equipment and provide additional training for staff.

Responsible Offices/Persons: City Emergency Management/Steering Committee

Funding Source: City General Fund

Cost: Costs are to be determined at a later date upon further research of the existing structural facility and necessary equipment.

Benefit: Life Safety, reduced losses, better response time

Updated Implementation Schedule: TBD; Improvements to communication infrastructure, date implementation, and visual aids are completed

Priority: High (3)

Recommended Action Item #8: Preparedness Activity

Project Title/Description: Develop three-to-seven-day shelter, food, and water plan for emergency workers. This would include isolating and use of specific grocery stores, water storage tanks, gas stations, hotels, etc.

Goal Addressed: GOAL # 1 – Protect Life and Property, GOAL # 3 – Strengthen Partnerships and GOAL # 4 – City Emergency Services

Objectives Involved: 1A; 1B; 1C; 1D; 1E; 1F; 3A; 3B; 3D; 4C

Issue/Background Statement: The Steering Committee is to implement a plan with local commercial services (i.e., housing, food, water, gas, etc.) to provide specific services to emergency workers in the event of either a natural or manmade hazard.

Other Alternatives Considered: Utilize other innovative outreach methods to get the public's attention.

Responsible Offices/Persons: City Emergency Management offices

Funding Source: City General Fund

Cost: Cost cannot be determined at this time until negotiations and agreements with commercial services have been implemented.

Benefit: Life Safety, reduced losses

Updated Implementation Schedule: TBD; Limited funding and staff

Priority: Medium (2)

Recommended Action Item #9: Preparedness Activity

Project Title/Description: Establish a shelter for use in a disaster.

Goal Addressed: GOAL # 1 – Protect Life and Property, GOAL # 3 – Strengthen Partnerships, GOAL # 4 – City Emergency Services

Objectives Involved: 1A; 1B; 1C; 1D; 1E; 1F; 3A; 3B; 3D; 4C

Issue/Background Statement: The City of Palmdale does not have many buildings that are categorized as emergency and/or evacuation shelters. The City of Palmdale and the City of Lancaster have identified the need for a large event center, that may also serve as a regional evacuation center for the entire Antelope Valley. In the event of a disaster, both cities would be able to use this facility as a shelter and emergency operations center.

Other Alternatives Considered: Continue using the existing facilities.

Responsible Offices/Persons: City of Palmdale

Funding Source: Hazard Mitigation Grant/City General Fund/Park and Recreation

Cost: TBD; Cost shared with City of Lancaster

Benefit: Life Safety, reduced losses

Updated Implementation Schedule: TBD; Project approved at Joint City Council Meeting on May 10, 2021

Priority: Medium (4)

Recommended Action Item #10: Preparedness Activity

Project Title/Description: Update Aerial Imagery in City's GIS Database

Goal Addressed: GOAL # 4 – City Emergency Services

Objectives Involved: 4A; 4B; 4C

Issue/Background Statement: To provide for the purchase of annual purchase of aerial imagery to be used by the City's GIS system.

Other Alternatives Considered: Continue using existing aerial data that is not the most current in many instances.

Responsible Offices/Persons: GIS Department

Funding Source: Hazard Mitigation Grant/City General Funds

Cost: \$30,000 annually

Benefit: Expand the capacity of the City's existing GIS system

Updated Implementation Schedule: Budgeted in fiscal year 2022; with annual subscription.

Priority: High (3)

Recommended Action Item #11: Preparedness Activity

Project Title/Description: Re-evaluate the City's Evacuation Routes and create new GIS layer for EOC purposes

Goal Addressed: GOAL # 1 – Protect Life and Property, GOAL # 4 – City Emergency Services

Objectives Involved: 1A; 1B; 1C; 1D; 1E; 1F; 4A; 4B

Issue/Background Statement: City needs additional information to determine evacuation routes out of the City, should an emergency be declared.

Other Alternatives Considered: Continue following the existing evacuation route data

Responsible Offices/Persons: GIS Section

Funding Source: Hazard Mitigation Grant/City General Funds

Cost: \$75,000

Benefit: Increased emergency response effectiveness, expansion of GIS system data

Updated Implementation Schedule: TBD, limited funding and staff.

Priority: High (2)

Recommended Action Item #12: Preparedness Activity

Project Title/Description: Create a comprehensive emergency shelter and medication disbursement plan for EOC purposes

Goal Addressed: GOAL # 1 – Protect Life and Property, GOAL # 4 – City Emergency Services

Objectives Involved: 1A; 1B; 1C; 1D; 1E; 1F; 4A; 4B; 4C

Issue/Background Statement: A comprehensive plan for the disbursement of medication and shelter provision during and after a disaster does not exist.

Other Alternatives Considered: Continue following existing EOC plan which may not have most current information

Responsible Offices/Persons: Emergency Operations Center

Funding Source: Hazard Mitigation Grant/City General Funds

Cost: \$75,000

Benefit: Increase in the effectiveness of 1st responders and EOC staff and protection of health and safety.

Updated Implementation Schedule: TBD, limited funding and staff.

Priority: Low (3)

Recommended Action Item #13: Preparedness Activity

Project Title/Description: Create several other Emergency Related GIS layers as identified and needed by the City

Goal Addressed: GOAL # 1 – Protect Life and Property, GOAL # 4 – City Emergency Services

Objectives Involved: 1A; 1B; 1C; 1D; 1E; 1F; 4A; 4B

Issue/Background Statement: Additional information is needed to increase efficiency of Emergency Operations and 1st responders.

Other Alternatives Considered: Continue using the existing GIS data

Responsible Offices/Persons: GIS Section

Funding Source: Hazard Mitigation Grant/City General Funds

Cost: \$25,000 to \$30,000/per layer

Benefit: Increase information to provide to the City's existing GIS system.

Updated Implementation Schedule: TBD, limited funding and staff.

Priority: Low (2)

Recommended Action Item # 14: Preparedness Activity

Project Title/Description: Construction of Navigation Access Center

Goal Addressed: GOAL #1 – Protect Life and Property, GOAL #4 – City Emergency Services

Objectives: 1A, 1B, 1C, 1D, 1E, 1F, 4A;

Issues/Background Statement: Construction of an access center which would include a new South Antelope Valley Emergency Services (SAVES) facility, partner common office space, and temporary housing.

Other Alternatives Considered: Do not construct the access center and have the existing South Antelope Valley Emergency Services (SAVES) facility remain at its current location.

Responsible Offices/Persons: Public Works

Funding Source: Hazard Mitigation Grant/City General Fund

Cost: \$1.0 million

Benefit: Provide additional space and resources for a new South Antelope Valley Emergency Services (SAVES) facility and reduce homelessness through temporary housing.

Updated Implementation Schedule: TBD; Budgeted in fiscal year 2022 for design only. Project Construction dependent upon availability of funds.

Priority: Medium (4)

Recommended Action Item #15:

Project Title/Description: Creation of the Palmdale Community Renaissance Plan

Goal Addressed: GOAL # 1 – Protect Life and Property, GOAL #2 – Increase Public Awareness, GOAL # 3 – Strengthen Partnerships, GOAL # 4 – City Emergency Services

Objectives Involved: 1A; 1B; 1C; 1D; 2A; 2B; 3A; 4A

Issue/Background Statement: The intent of the Palmdale Community Renaissance Plan is to fully open the City of Palmdale while continuing to prevent the spread of COVID19 through the practice of reasonable infection control precautions. The plan applies to all businesses, corporations, and non-profit organizations in Palmdale to allow them to conduct basic operations.

Other Alternatives Considered: Wait for public health protocols to return to pre-pandemic conditions.

Responsible Offices/Persons: City Manager's Office / City Attorney's Office

Funding Source: Hazard Mitigation Grant/City General Fund

Cost: Negligible (Policy Change Only)

Benefit: Allow all businesses, corporations, and non-profit organizations in Palmdale to conduct basic operations during a pandemic.

Updated Implementation Schedule: Policy implemented April 2020; on-going updates based on current public health protocols. Same or similar strategies may be used for future pandemic/infectious disease outbreaks.

Priority: Medium (4)

Recommended Action Item #16:

Project Title/Description: Creation of the AI Fresco Dining Policy

Goal Addressed: GOAL # 1 – Protect Life and Property, GOAL #2 – Increase Public Awareness, GOAL # 3 – Strengthen Partnerships, GOAL # 4 – City Emergency Services

Objectives Involved: 1A; 1B; 1C; 1D; 2A; 2B; 3A; 4A

Issue/Background Statement: Restaurants may find more opportunities for enjoying their meals outdoors in Palmdale as the City rolls out a program to help local restaurants deal with the public health requirements during a pandemic. The AI Fresco dining program will allow restaurants to temporarily expand their seating to sidewalks and off-street parking areas to help meet the spacing requirements of the public health protocols.

Other Alternatives Considered: Wait for public health protocols to return to pre-pandemic conditions.

Responsible Offices/Persons: City Manager's Office / City Attorney's Office

Funding Source: Hazard Mitigation Grant/City General Fund

Cost: Negligible (Policy Change Only)

Benefit: Provide restaurants an option to remain open and the public an option to dine out.

Updated Implementation Schedule: Policy implemented June 2020; on-going updates based on current public health protocols. Same or similar strategies may be used for future pandemic/infectious disease outbreaks.

Priority: Medium (4)

Recommended Action Item #17:

Project Title/Description: Manage COVID-19 Testing and Vaccination Sites

Goal Addressed: GOAL # 1 – Protect Life and Property, GOAL # 2 – Increase Public Awareness, GOAL # 4 – City Emergency Services,

Objectives Involved: 1A; 1B; 1C; 1D; 2A; 2B; 4A

Issue/Background Statement: The World Health Organization called the coronavirus situation a pandemic on March 11th, 2020, and on March 12th, 2020, the City of Palmdale declared a state of emergency to gain better access to the tools and resources needed to fulfill the mission of protecting residents while carrying out the functions of the City government. These functions including dedicating City facilities as testing and vaccination sites and providing staff to maintain operations.

Other Alternatives Considered: Wait for public health protocols to return to pre-pandemic conditions.

Responsible Offices/Persons: City Manager's Office, Public Works, Emergency Management

Funding Source: Hazard Mitigation Grant/City General Fund

Cost: Unknown

Benefit: Provide the public with a safe place to be tested for the COVID-19 virus and receive the vaccination for the COVID-19 virus.

Updated Implementation Schedule: Testing Sites opened April 2020; Vaccination Sites opened March 2021; on-going updates based on current public health protocols. Same or similar strategies may be used for future pandemic/infectious disease outbreaks.

Priority: Medium (4)

4.6.5 STRUCTURAL PROJECTS

Recommended Action Item #18:

Project Title/Description: Amargosa Creek Flood Control Improvements

Goal Addressed: GOAL # 1 – Protect Life and Property, GOAL # 4 – City Emergency Services, GOAL # 5 – Environmental Preservation

Objectives Involved: 1A; 1B; 1C; 1D; 1E; 1F; 4A; 5A

Issue/Background Statement: Construction of improvements to the Amargosa Creek between Avenue O and Avenue M, including channelization of the ephemeral creek, the upgrade of the existing box culverts at Avenue O and Avenue M, and the installation of a box culvert at Avenue "N".

Other Alternatives Considered: Continue allowing water to travel its natural course and continually install traffic closures and repair of intersections due to floodwater.

Responsible Offices/Persons: Public Works

Funding Source: Hazard Mitigation Grant/City Drainage Funds

Cost: \$6.5 million

Benefit: Reduce flood damage to street intersections, provide for safer travel for citizens, reduce costs for pavement and channel repair.

Updated Implementation Schedule: Project is currently budgeted in the City of Palmdale's 10-year Capital Improvement program. Project is dependent upon availability of funds.

Priority: Medium (4)

Recommended Action Item #19:

Project Title/Description: Anaverde Creek Regional Channel Improvements

Goal Addressed: GOAL # 1 – Protect Life and Property, GOAL # 4 – City Emergency Services, GOAL # 5 – Environmental Preservation

Objectives Involved: 1A; 1B; 1C; 1D; 1E; 1F; 4A; 5A

Issue/Background Statement: Regional improvements to the ephemeral creek and its tributaries, within the area bounded by Avenue R, Rancho Vista Blvd, State Highway 14, and 15th Street East, including channelization, storm drain piping and box culverts, as well as the detention basins at the northeast corner of Avenue M-12 and Sierra Highway as well as at the northeast corner of Avenue R and Division Street.

Other Alternatives Considered: Continue allowing water to travel its natural course and continually install traffic closures and repair of intersections due to floodwater.

Responsible Offices/Persons: Public Works

Funding Source: Hazard Mitigation Grant/City Drainage Funds

Cost: \$30.0 million

Benefit: Reduce flood damage to street intersections, provide for safer travel for citizens, reduce costs for pavement and channel repair.

Updated Implementation Schedule: Watershed Study: June 2022

Preliminary Design: June 2022

Final Design: TBD

Construction: TBD

Priority: Medium (4)

Recommended Action Item #20:

Project Title/Description: Hunt Canyon Drainage Basin

Goal Addressed: GOAL # 1 – Protect Life and Property, GOAL # 4 – City Emergency Services, GOAL # 5 – Environmental Preservation

Objectives Involved: 1A; 1B; 1C; 1D; 1E; 1F; 4A; 5A

Issue/Background Statement: Acquisition and construction of a 3000 acre-foot regional detention basin, south of Pearblossom Hwy. at 47th Street East.

Other Alternatives Considered: Continue to allow water to travel its natural course/spend funds to upgrade existing underground storm drain systems.

Responsible Offices/Persons: City of Palmdale

Funding Source: Hazard Mitigation Grant/City Drainage Funds

Cost: \$35.5 million

Benefit: Reduce flood damage to downstream critical facilities

Updated Implementation Schedule: TBD; Project dependent upon availability of funds.

Priority: High (4)

Recommended Action Item #21:

Project Title/Description: Avenue P Pearland Drainage Improvements

Goal Addressed: GOAL # 1 – Protect Life and Property, GOAL # 4 – City Emergency Services, GOAL # 5 – Environmental Preservation

Objectives Involved: 1A; 1B; 1C; 1D; 1E; 1F; 4A; 5A

Issue/Background Statement: To provide for the construction of storm drain piping, box culverts and detention basins within the Pearland Watershed, south of Avenue P and north of Palmdale Blvd, including the Q-West Basin, Q-East Basin.

Other Alternatives Considered: Continue allowing water to travel its natural course and install traffic closures and/or repair of intersections as necessary due to repeated flooding.

Responsible Offices/Persons: Public Works

Funding Source: Hazard Mitigation Grant/City Drainage Funds

Cost: \$32.0 million

Benefit: Reduce flood damage to street intersections, provide for safer travel for citizens, reduce costs for pavement and channel repair.

Updated Implementation Schedule: TBD; Project dependent on availability of funds.

Priority: Medium (4)

Recommended Action Item #22:

Project Title/Description: Avenue S Pearland Drainage Improvements

Goal Addressed: GOAL # 1 – Protect Life and Property, GOAL # 4 – City Emergency Services, GOAL # 5 – Environmental Preservation

Objectives Involved: 1A; 1B; 1C; 1D; 1E; 1F; 4A; 5A

Issue/Background Statement: To provide for the construction of storm drain piping, box culverts and detention basins within the Pearland Watershed, south of Avenue S and north of Pearblossom Highway, including the Barrel Springs Basin.

Other Alternatives Considered: Continue allowing water to travel its natural course and install traffic closures and/or repair intersections as necessary due to repeated flooding.

Responsible Offices/Persons: Public Works

Funding Source: Hazard Mitigation Grant/City Drainage Funds

Cost: \$29.4 million

Benefit: Reduce flood damage to street intersections, provide safer travel for citizens, reduce costs for pavement and channel repair, reduced impact to downstream properties.

Updated Implementation Schedule: TBD; Project dependent on availability of funds.

Priority: Low (4)

Recommended Action Item #23:

Project Title/Description: Palmdale Blvd Pearland Drainage Improvements

Goal Addressed: GOAL # 1 – Protect Life and Property, GOAL # 4 – City Emergency Services, GOAL # 5 – Environmental Preservation

Objectives Involved: 1A; 1B; 1C; 1D; 1E; 1F; 4A; 5A

Issue/Background Statement: To provide for the construction of storm drain piping, box culverts and detention basins within the Pearland Watershed, south of Palmdale Blvd and north of Avenue S, including the 25th St. East Basin

Other Alternatives Considered: Continue allowing water to travel its natural course and install traffic closures and/or repair intersections as necessary due to repeated flooding.

Responsible Offices/Persons: Public Works

Funding Source: Hazard Mitigation Grant/City Drainage Funds

Cost: \$14.9 million

Benefit: Reduce flood damage to street intersections, provide for safer travel for citizens, reduce costs for pavement and channel repair.

Updated Implementation Schedule: TBD; Project dependent on availability of funds.

Priority: Low (4)

Recommended Action Item #24:

Project Title/Description: Avenue O Portal Ridge Drainage Improvements

Goal Addressed: GOAL # 1 – Protect Life and Property, GOAL # 4 – City Emergency Services, GOAL # 5 – Environmental Preservation

Objectives Involved: 1A; 1B; 1C; 1D; 1E; 1F; 4A; 5A

Issue/Background Statement: To provide for the construction of storm drain piping, box culverts and detention basins within the Portal Ridge Watershed, south of Avenue O, including the Fulham Basin.

Other Alternatives Considered: Continue allowing water to travel its natural course and install traffic closures and/or repair intersections as necessary due to repeated flooding.

Responsible Offices/Persons: Public Works

Funding Source: Hazard Mitigation Grant/City Drainage Funds

Cost: \$4.3 million

Benefit: Reduce flood damage to street intersections, provide for safer travel for citizens, reduce costs for pavement and channel repair.

Updated Implementation Schedule: TBD; Project dependent on availability of funds.

Priority: Low (4)

SECTION FIVE

**PLAN MAINTENANCE
PROCEDURES**

SECTION FIVE – PLAN MAINTENANCE PROCEDURES

Requirement §201.6(c)(4)(i): [The plan maintenance process shall include a] section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle.

Requirement §201.6(c)(4)(ii): The plan shall include a process by which local governments incorporate the requirements of the mitigation plan into other planning mechanisms, such as comprehensive or capital improvement plans, when appropriate.

Requirement §201.6(c)(4)(iii): [The plan maintenance process shall include a] discussion on how the community will continue public participation in the plan maintenance process.

OVERVIEW

As indicated previously, the mitigation plan process includes four broad tasks:

- **Organize Resources**
- **Assess Risks**
- **Develop LHMP**
- **Implement the LHMP and Monitor Progress**

The final step in the development of a local hazard mitigation plan is to define and set forth procedures for the following:

- Monitoring, Evaluating, and Updating the LHMP;
- Implementing the LHMP;
- Potential for Incorporation into Other Agency or Jurisdictional Planning Mechanisms; and,
- Continued Public Participation

It is important to remember that this LHMP is not intended to be a static, one-time document, but rather a “living” document with regularly scheduled monitoring and evaluation. Per DMA 2000, a LHMP must be reviewed annually and updated at least every five years. As of 2021, the Emergency Services Administrator, City of Palmdale, Department of Neighborhood Services, has been assigned the responsibility for coordinating the annual LHMP maintenance and evaluation and can be reached at (661) 267-5126. The Emergency Services Administrator will work closely with the Planning Team, who will review and evaluate the LHMP.

5.1 Monitoring and Evaluation

At a minimum, the evaluation process will assess if goals and objectives still reflect current or anticipated conditions, whether the nature or magnitude of risks has changed, if current resources are sufficient to implement the LHMP, and if outcomes are as expected.

- **Schedule.** The LHMP will be reviewed and evaluated on an annual basis, during the month of June or July; it will also be reviewed following a disaster. A brief report or memorandum

documenting the review findings will be prepared and included as an Appendix to this LHMP. Each review shall include an evaluation of the following:

- **Public Involvement.** Public involvement successes and challenges should be reviewed and noted, with any recommendations for changes.
- **Risk Assessment.** The identified hazards and associated risks should be evaluated with respect to the previous year's events, and any significant differences should be noted.
- **Mitigation Actions.** The proposed Projects should be reviewed and updated regarding status and implementation (e.g., "proposed project is now fully complete"). Any changes should be noted, along with the successes and/or challenges associated with the implementation.
- **Responsibility.** The assignments of responsibilities to individuals and departments should be reviewed and updated, as necessary. This includes the department/person responsible for coordinating the annual plan maintenance. Information should, at a minimum, include a name, position, department or agency, address, contact phone numbers, and e-mail.

Another tool in establishing a plan maintenance mechanism is to institutionalize hazard mitigation planning as a regular part of the community's governmental services. This goal could be accomplished by the following:

- Update department work plans, policy, and procedural changes to include hazard mitigation concepts and activities.
- Change job descriptions of government and/or partner organization staff to include mitigation-related duties – provide appropriate training, workload, and salary.
- Governing body or local government executive can issue resolutions, orders, ordinances, or other directives, to order local departments and agencies to carry out hazard mitigation activities, such as providing progress reports.

5.2 Plan Implementation

LHMP IMPLEMENTATION

The first step is to officially adopt and "promulgate" the LHMP. This official adoption demonstrates the City's commitment to hazard mitigation and legitimizes the hazard mitigation planning effort. In addition, potential opportunities for incorporation of the hazard mitigation plan into other existing planning mechanisms should be investigated.

At a Project level, projects may be incorporated into capital improvement projects, annual operational budgets, and applications for Federal and state grants, as deemed appropriate.

Upon adoption, the LHMP faces the truest test of its worth: implementation. Implementation implies two concepts: action and priority. These are closely related.

While this LHMP puts forth many worthwhile recommendations, the decision of which action(s) to undertake initially will be the first issue that the City faces. There are two essential elements in that decision-making process. First, there are the priorities established in this LHMP, and

second, the availability of funding. At face value, pursuing low or no-cost high-priority recommendations will have the greatest likelihood of success.

It will be important to monitor funding opportunities that can be leveraged to implement some of the more costly recommended actions. This can include creating and maintaining a bank of ideas on how any required local match or participation requirement can be met.

Then, when funding does become available, Palmdale will be in a position to capitalize upon the opportunity. Funding opportunities that can be monitored include special pre- and post-disaster funds, special district budgeted funds, state or federal ear-marked funds, and grant programs, including those that can serve or support multi-objective applications.

With adoption of this LHMP, the City of Palmdale commits to:

- Pursuing the implementation of the high priority, low/no-cost Recommended Actions.
- Maintaining a vigilant monitoring of multi-objective, cost-share opportunities to assist in implementing the recommended actions of LHMP.

It is envisioned that the Steering Committee will continue as an ongoing body with the responsibility for monitoring plan implementation issues. At the minimum, they will:

- Act as a forum for hazard mitigation issues;
- Monitor implementation of this LHMP;
- Report on progress and recommended changes to the City Manager and Council, as appropriate; and,
- Inform and solicit input from the public.

5.3 Continued Public Involvement

Keeping the public informed of local hazard mitigation planning is an important way to garner continued public support for the planning process. The following is a brief list of public information recommendations:

- Provide periodic summary updates of hazard mitigation measures, hazard mitigation projects under construction, and most importantly, hazard mitigation success stories (following a disaster event), using local media, social media, and posted on City web site.
- Hold periodic public meetings, workshops, and “open house” events to present hazard mitigation planning elements.
- Participate in annual community events.

5.4 Plan Maintenance

Plan maintenance is the ongoing effort to monitor and evaluate the implementation of the LHMP and to update the LHMP as progress, roadblocks, or changing circumstances are recognized.

This monitoring and updating will take place through an annual review by the Steering Committee, at the minimum, and a 5-year written update to be submitted to the state and FEMA Region IX, unless a disaster or other circumstances (e.g., changing regulations) lead to a different time frame.

When the Committee reconvenes for the review, they will coordinate with all stakeholders interested in participating in the planning process to update and revise the LHMP. Public notice will be given, and public participation will be invited, at a minimum, through available web-postings and press releases to local media outlets, primarily newspapers and radio stations.

The Committee is an advisory body only. Its primary duty is to see the LHMP successfully carried out and to report to the City Manager and City Council the status of Plan Implementation and mitigation opportunities. Other responsibilities include reviewing and promoting mitigation proposals, hearing stakeholder concerns about hazard mitigation, and passing the concerns on to the appropriate entities.

The evaluation of the progress can be achieved by monitoring changes in the vulnerability identified in the LHMP. Changes in vulnerability can be identified by noting:

- Lessened vulnerability as a result of implementing Recommended Actions;
- Increased vulnerability as a result of failed or ineffective mitigation actions; and/or,
- Increased vulnerability as a result of new development (and/or annexation).

5.5 Coordinating Mitigation Planning Activities

As part of the annual LHMP review process, the Hazard Mitigation Steering Committee will evaluate the opportunities to coordinate and include local hazard mitigation planning with other planning efforts in the city. A high priority mitigation project is the development and implementation of a formal process that can help assure this occurs. Work has already begun on developing those mechanisms that will facilitate the process. The Neighborhood Services Department will take the lead and will assume overall responsibility for assuring that the LHMP planning process, risk assessment, mitigation strategy, LHMP update process, and mitigation priorities are coordinated with the goals and objectives of the General Plan. In addition, other plans that will be coordinated with the LHMP may include, but are not necessarily limited to: Specific Plans, special purpose plans such as the Drainage Master Plan and Hazardous Materials Plan Emergency Operations Plan.

All new ordinances affecting land development will be reviewed by the Steering Committee to assure that mitigation measure is always part of land development planning.

Recommended actions that will result in the coordination of the LHMP with other planning activities will be developed by the Core Team, reviewed by the Hazard Mitigation Steering Committee, and forwarded to the appropriate department or agency for consideration and action.

In an ideal situation, Palmdale would be part of the Los Angeles County Multi-Jurisdictional Hazard Mitigation Plan. We will continue to work with Los Angeles County to try and make the ideal a reality.

5.6 Assurances

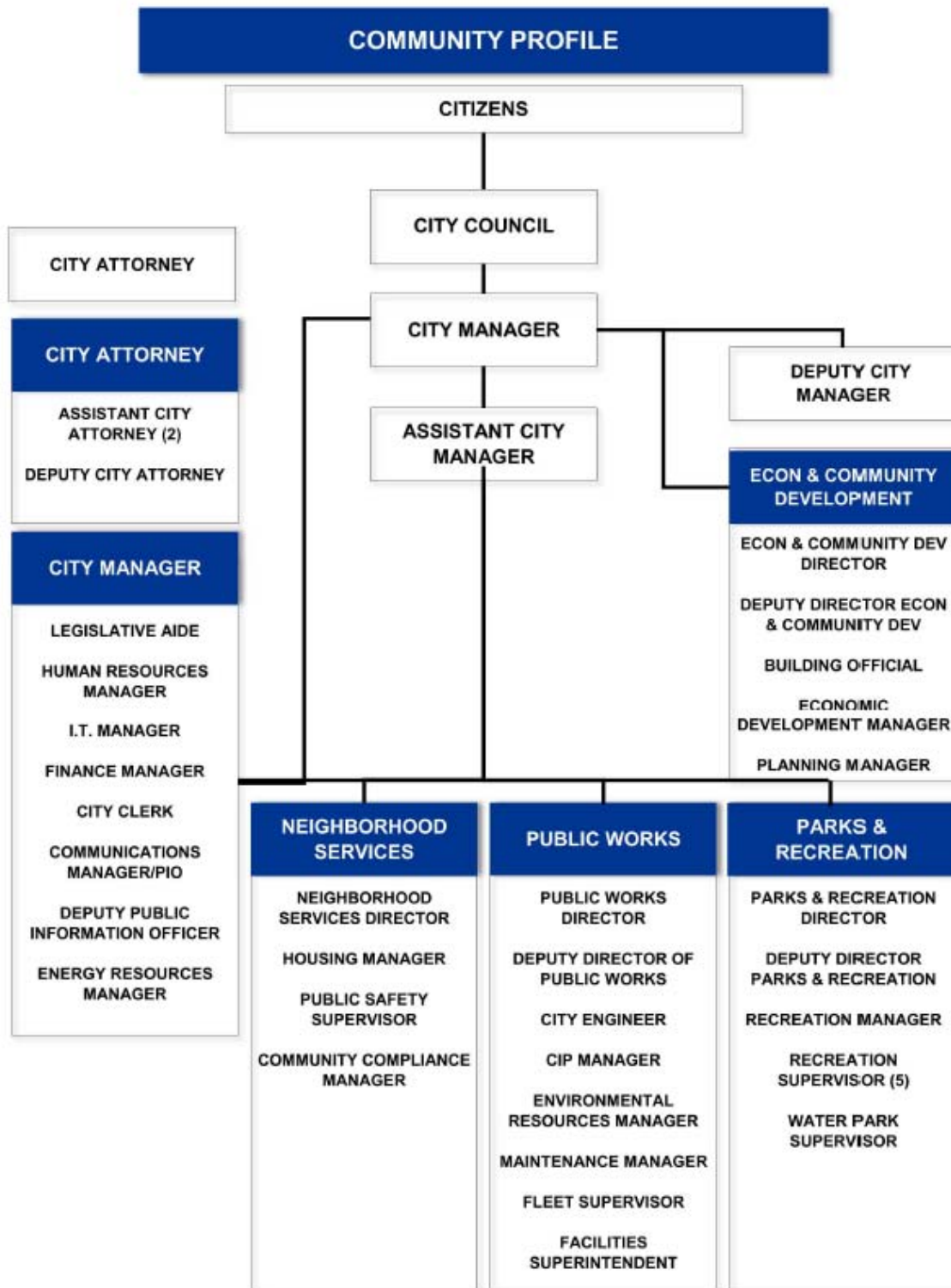
The City of Palmdale will comply with all applicable Federal statutes and regulations during the periods for which it receives federal grant funding.

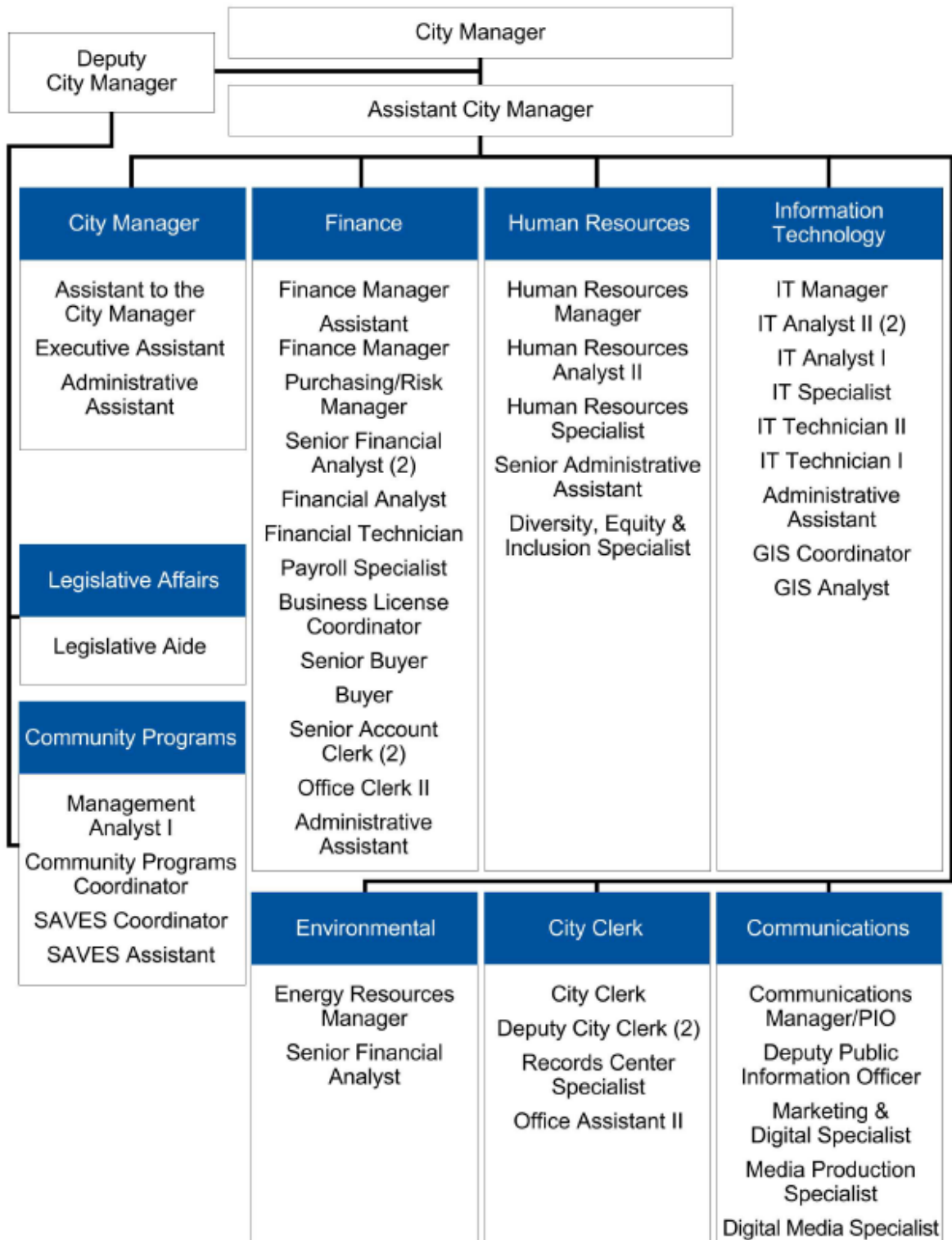
In addition, the City will amend this LHMP, and/or the implementation strategies for this LHMP, to reflect new or revised Federal (and State) regulations or statutes, policy, or government operations. Any such amendments will be added to the LHMP as they are developed. They will be incorporated upon formal updating of the LHMP and submitted to FEMA.

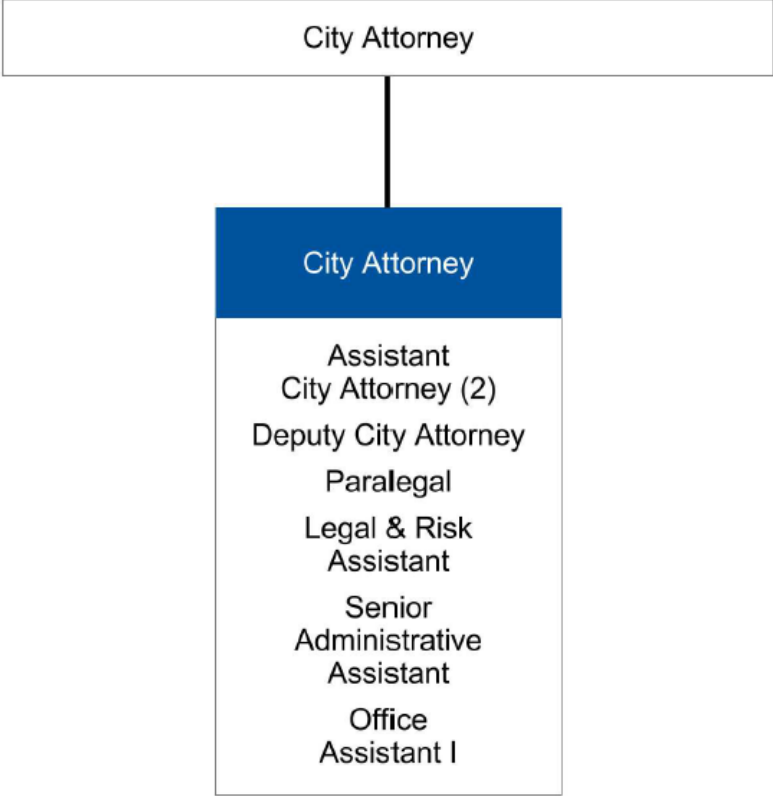
APPENDIX

A

CITY ORGANIZATION CHARTS

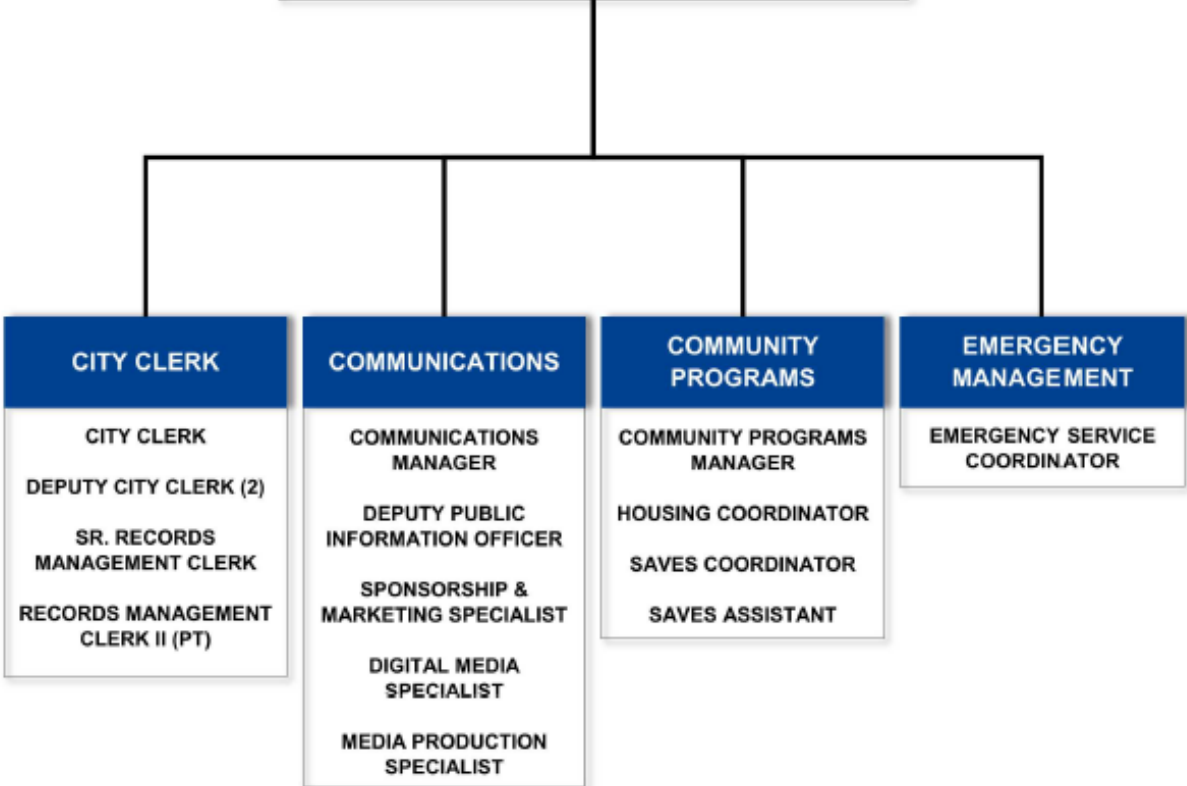


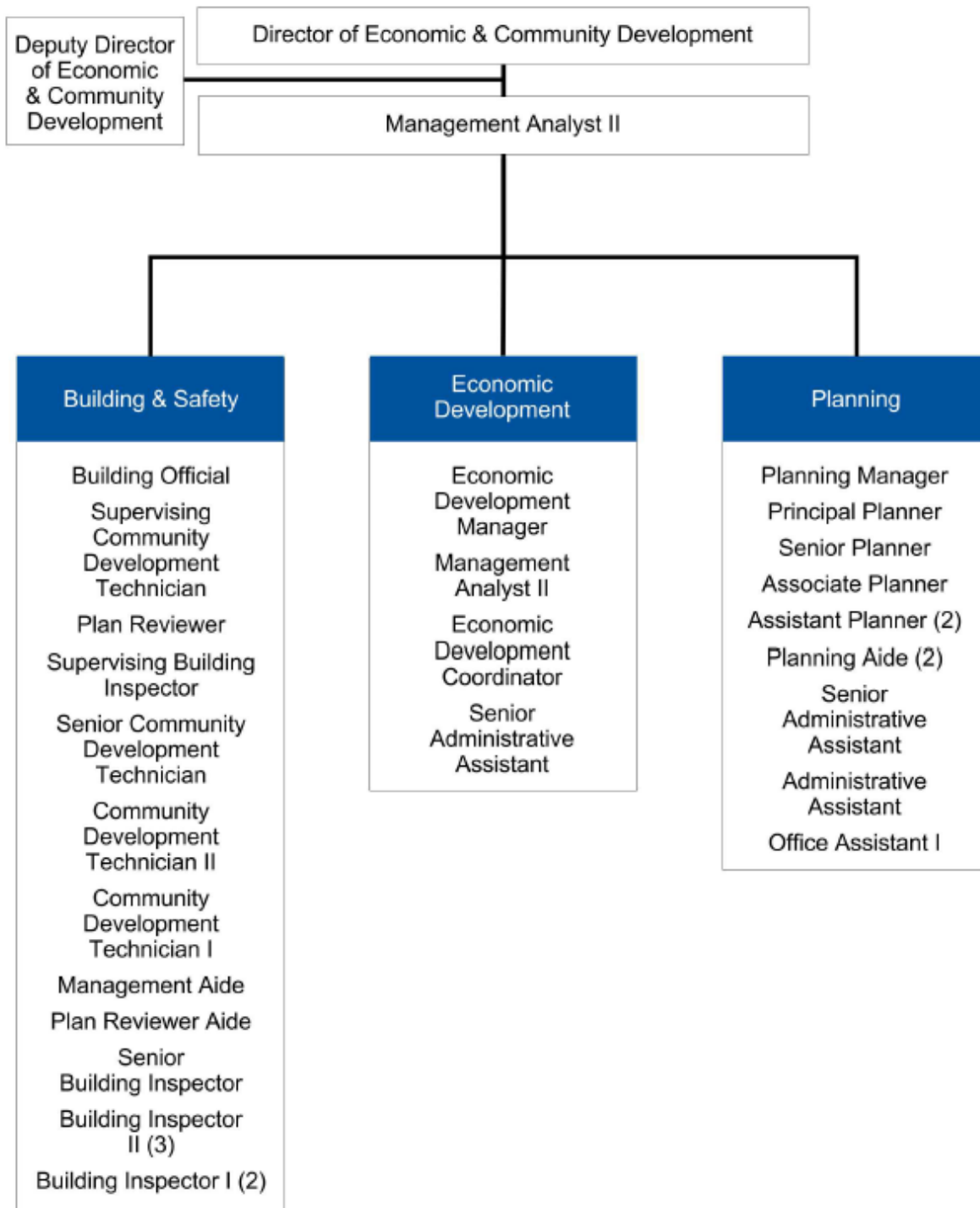


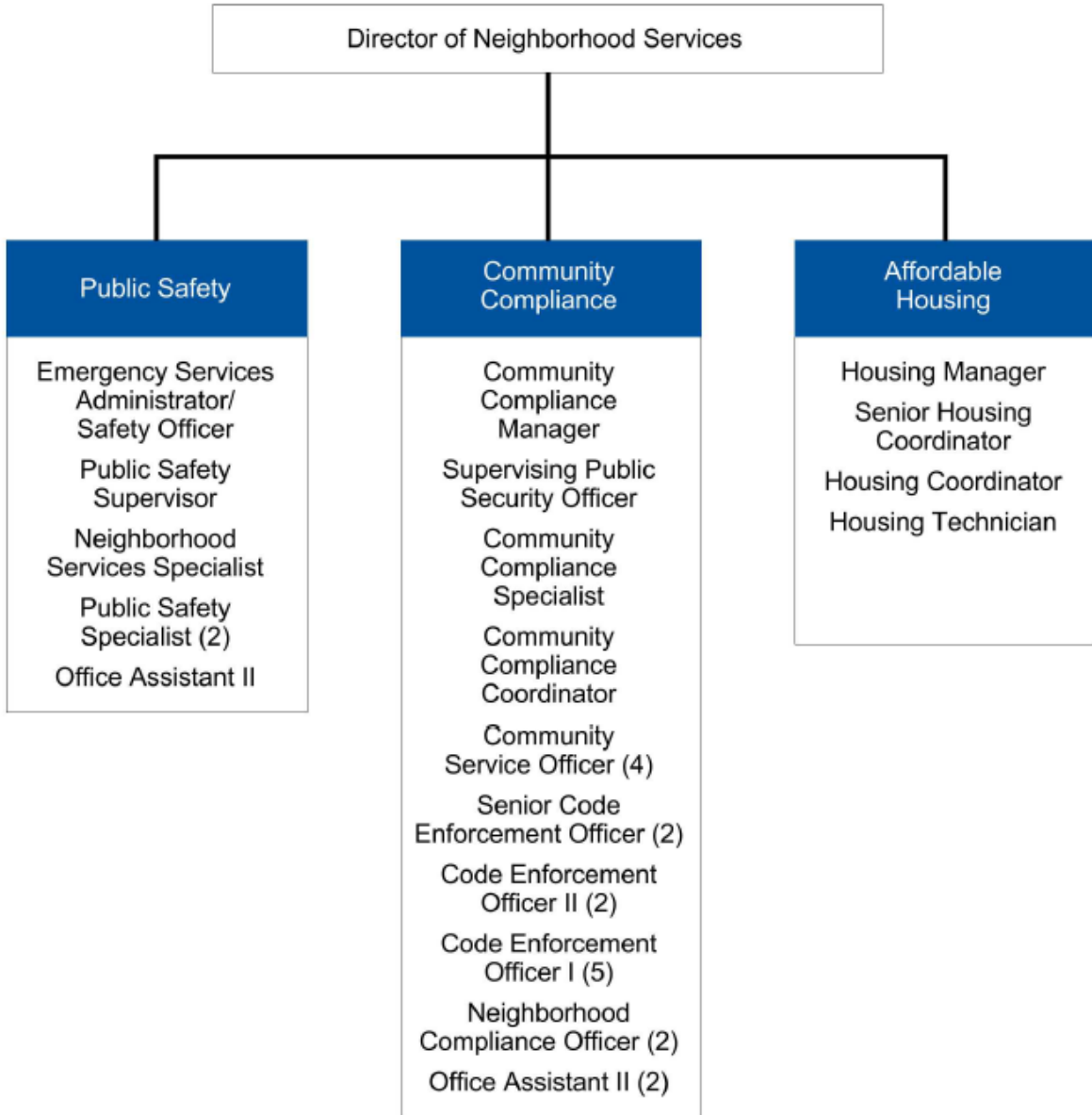


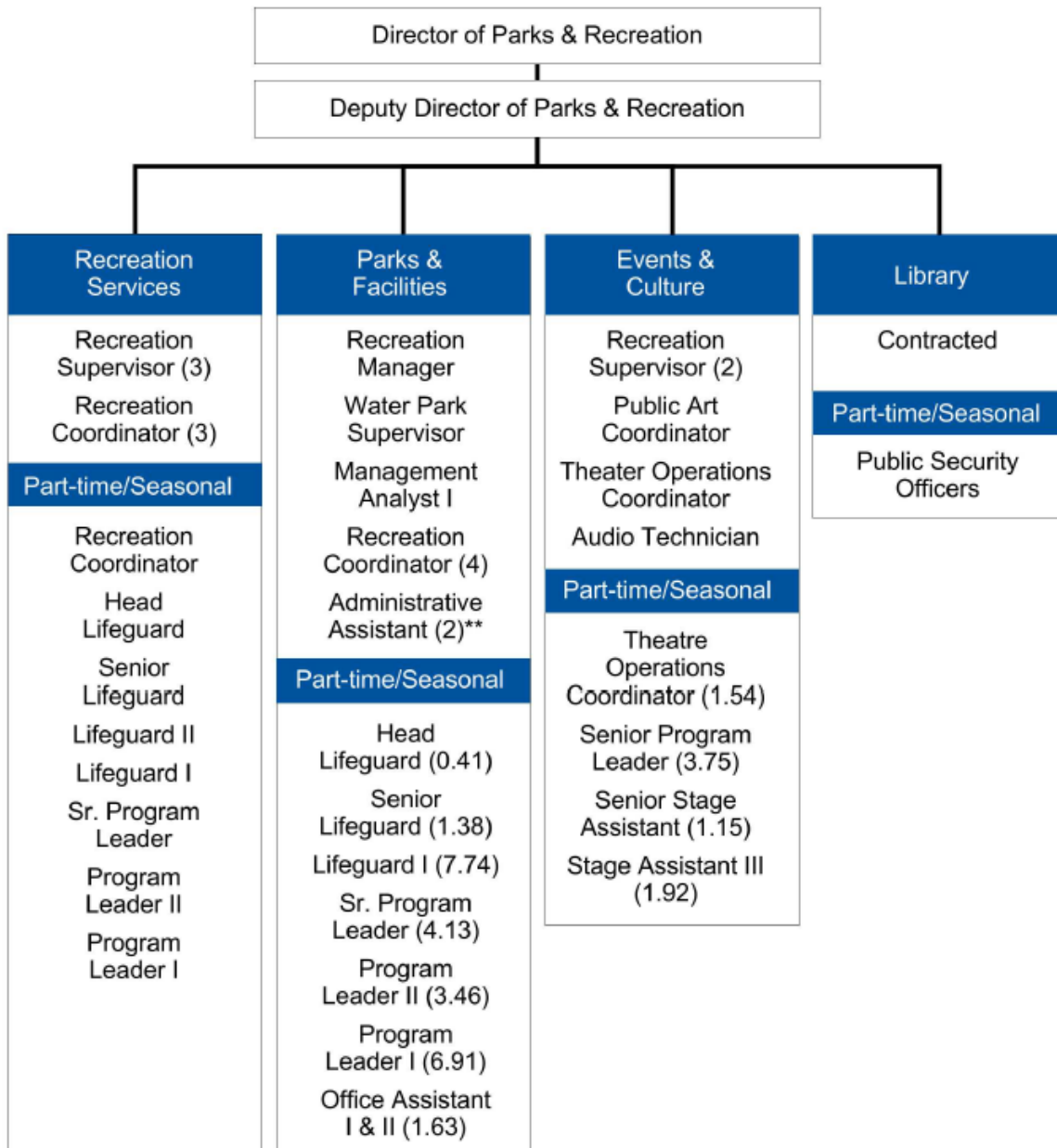
ADMINISTRATIVE SERVICES

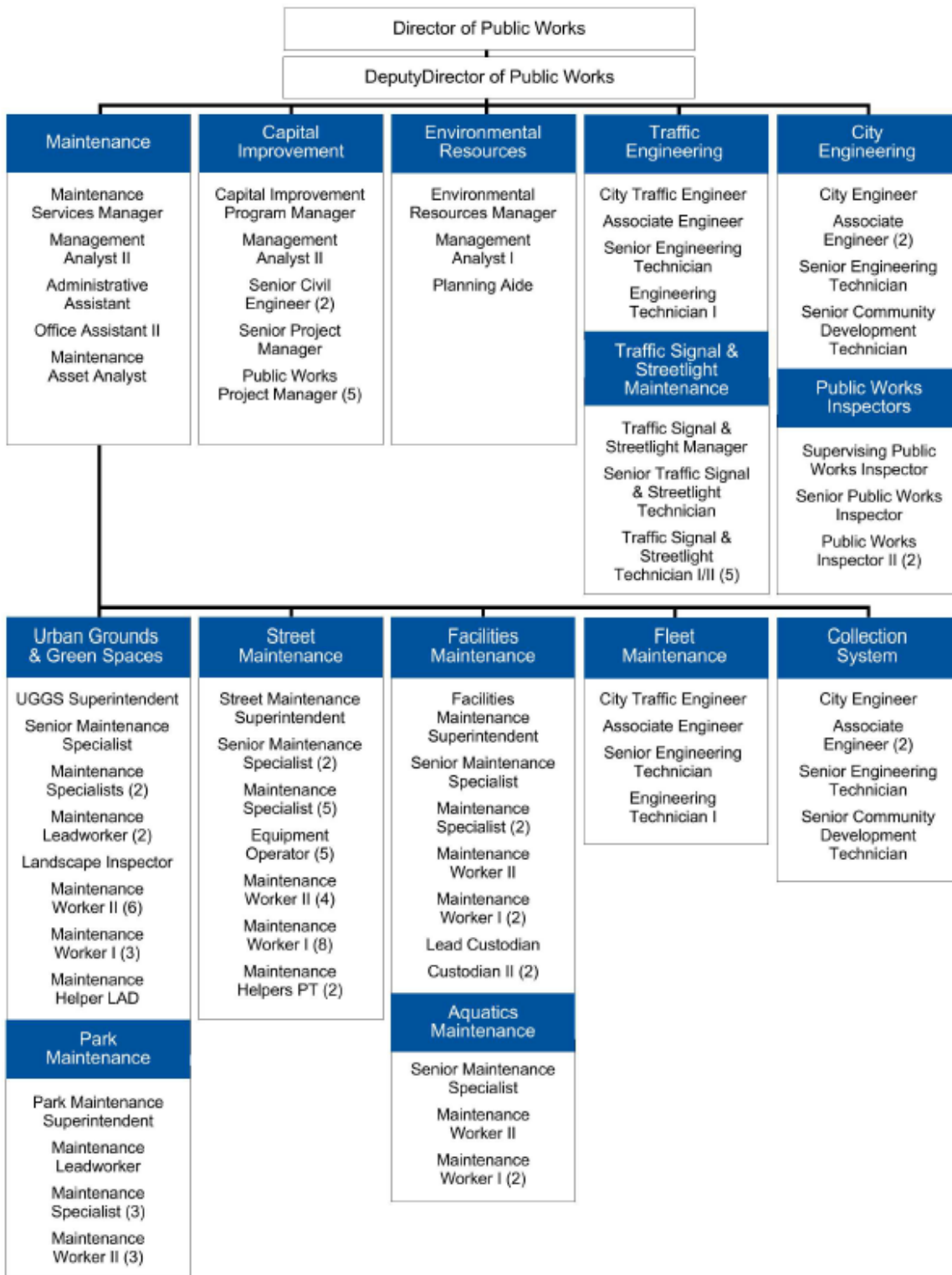
DIRECTOR OF ADMINISTRATIVE SERVICES











APPENDIX

B

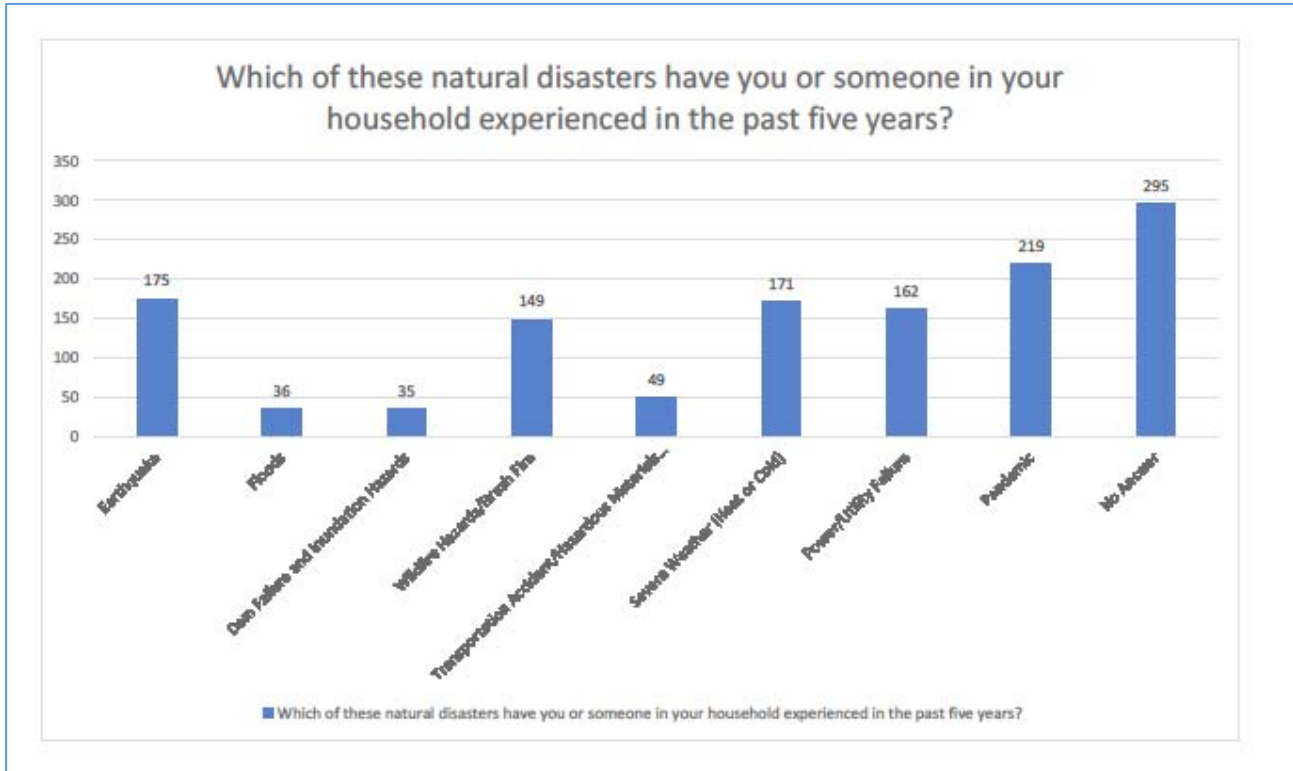
SAMPLE PLANNING SURVEYS, PLANNING MEETINGS, and AGENDAS

CITY OF PALMDALE
Local Hazard Mitigation Planning Assessment Survey



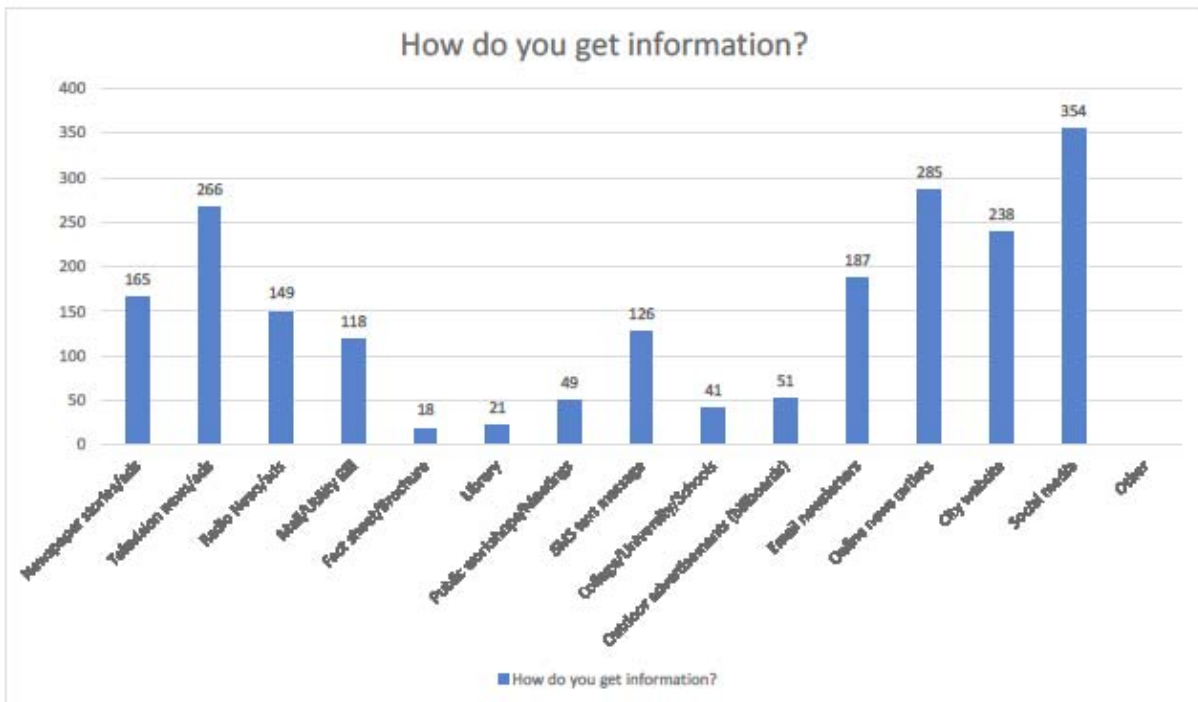
2021 Palmdale Local Hazard Mitigation Plan Update Survey

1. Your Zip Code _____ and Community Name or Location _____
2. Do you: Live or Work in Palmdale?
3. If you live in Palmdale, do you: Own or Rent?
4. If you live in Palmdale, how many years? _____
5. If you have lived in Palmdale for 5 years or more, have you or someone in your household directly experienced a natural disaster such as an earthquake, severe windstorm, flood, wildfire, or other type of natural disaster while in Palmdale?
 Yes No (**IF NO, skip to question 7**)
6. **If “YES”**, which of these natural disasters have you or someone in your household experienced in the past five years? (**Please check all that apply**)
 - Earthquake
 - Floods, Dam Failure and Inundation Hazards
 - Wildfire Hazards/Brush Fire
 - Transportation Accident/Hazardous Materials Spill
 - Drought
 - Severe Weather (Heat or Cold)
 - Power/Utility Failure
 - Pandemic



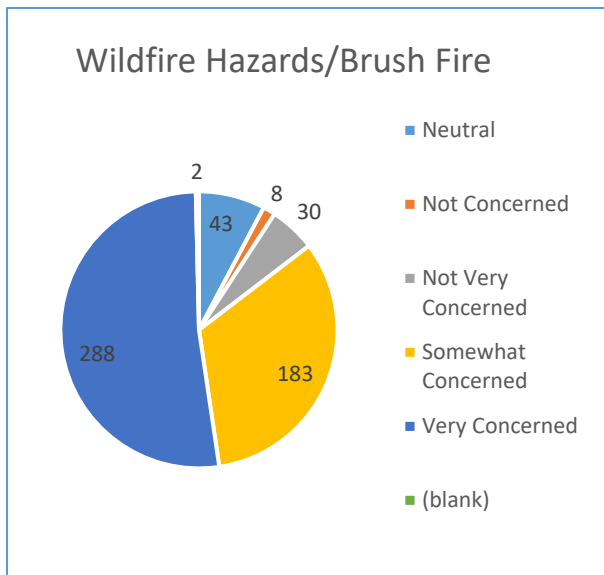
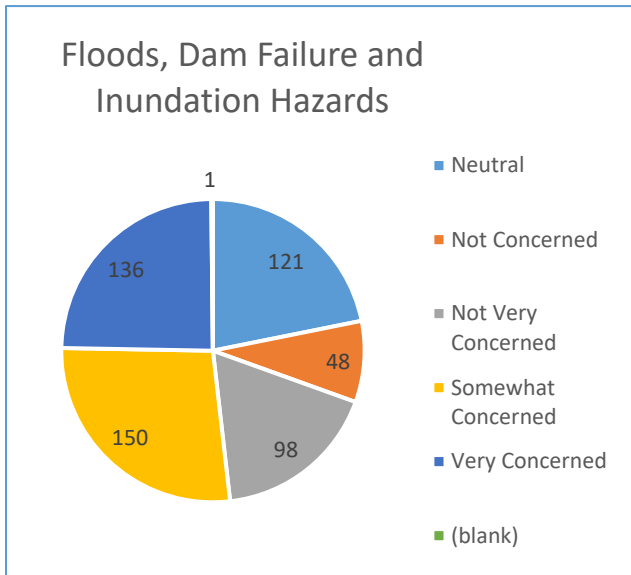
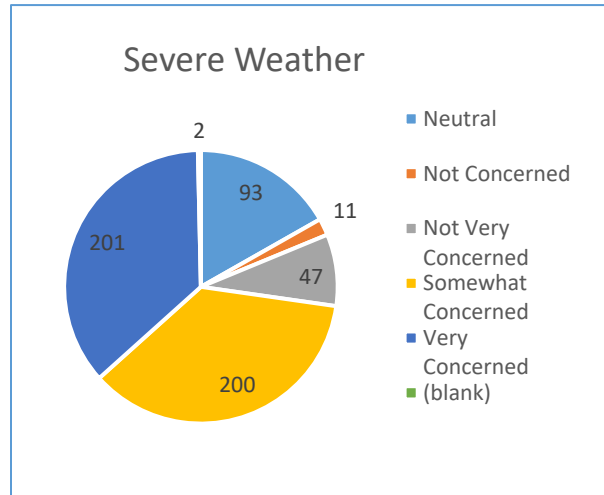
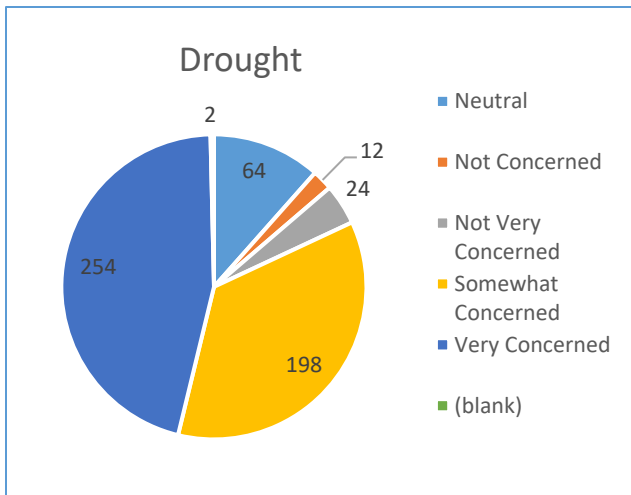
7. How do you get information? **(Please check up to three)**

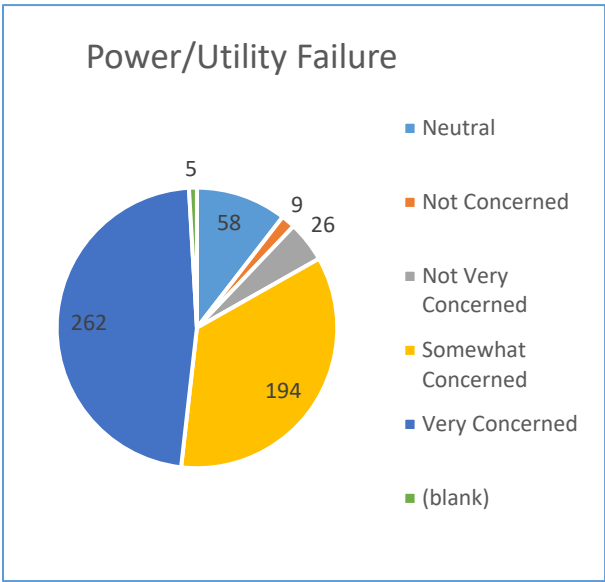
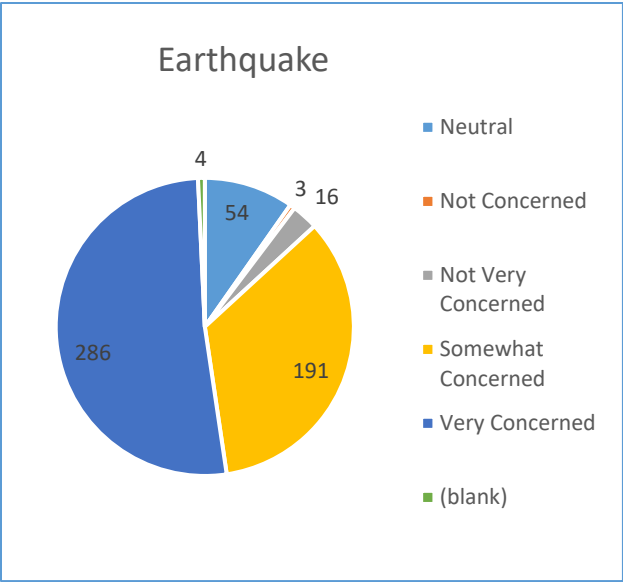
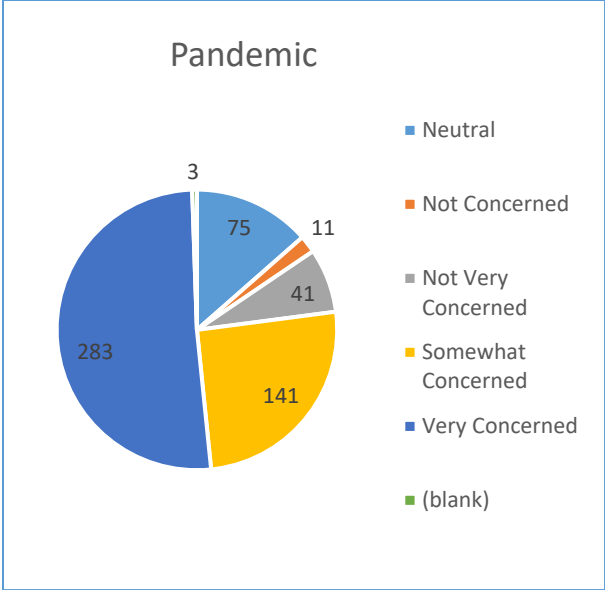
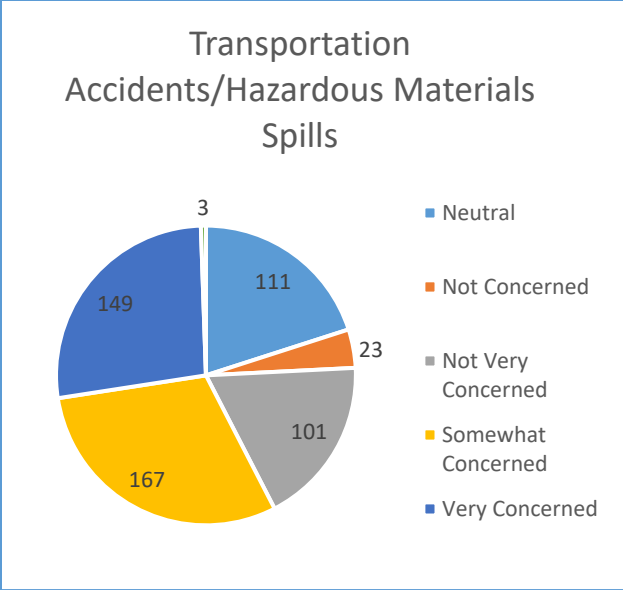
- | | |
|---|--|
| <input type="checkbox"/> Newspaper stories/ads | <input type="checkbox"/> Mail/Utility Bill |
| <input type="checkbox"/> Television news/ads | <input type="checkbox"/> Fire Department |
| <input type="checkbox"/> Radio News/ads | <input type="checkbox"/> Fact sheet/Brochure |
| Internet: | <input type="checkbox"/> Library |
| <input type="checkbox"/> Email newsletters | <input type="checkbox"/> Public workshops/Meetings |
| <input type="checkbox"/> Online news outlets | <input type="checkbox"/> SMS text message |
| <input type="checkbox"/> City web site | <input type="checkbox"/> College/University/Schools |
| <input type="checkbox"/> Social media (e.g. Facebook, Twitter, Instagram, etc.) | <input type="checkbox"/> Outdoor advertisements (billboards) |
| | <input type="checkbox"/> Other: _____ |



8. How concerned are you about the following hazards?

Natural Disaster	Very Concerned	Somewhat Concerned	Neutral	Not Very Concerned	Not Concerned
Drought	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Severe Weather	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Flood, Dam Failure and Inundation Hazards	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wildfire Hazards/Brush Fire	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Transportation Accident/Hazardous Materials Spill	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pandemic	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Earthquake	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Power/Utility Failure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

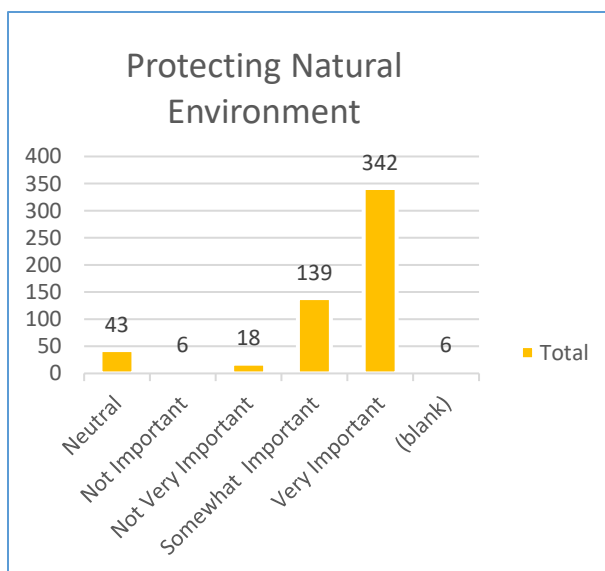
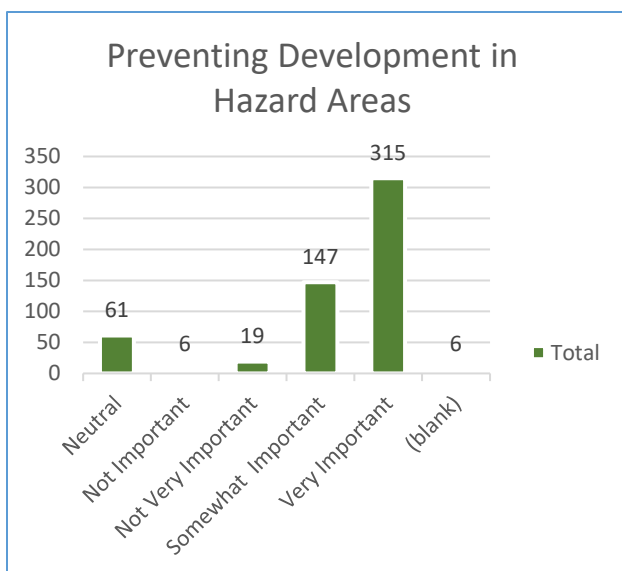
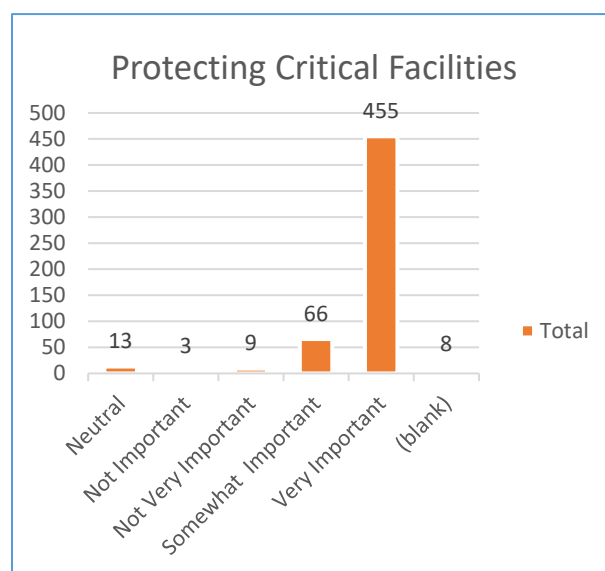
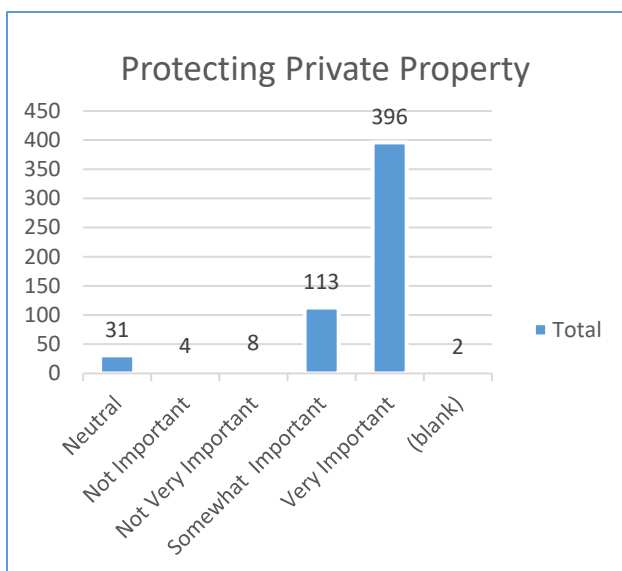


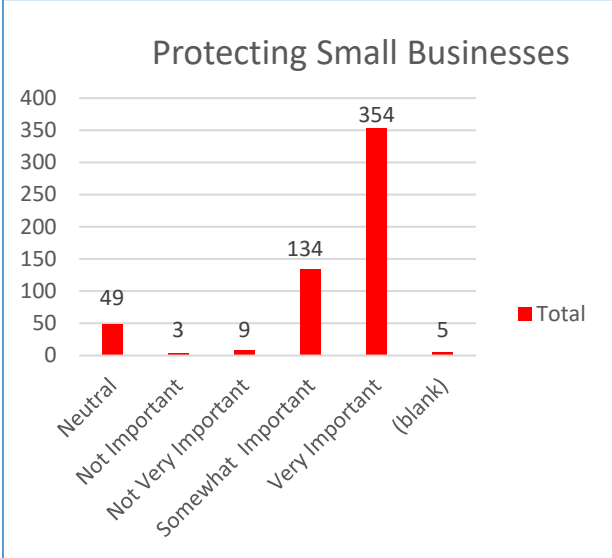
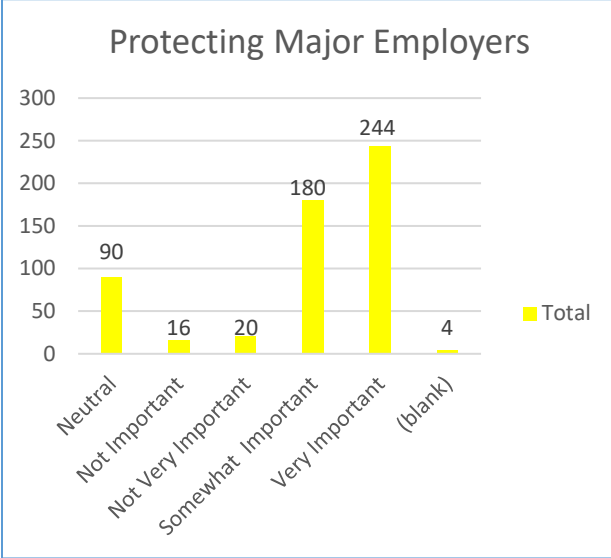
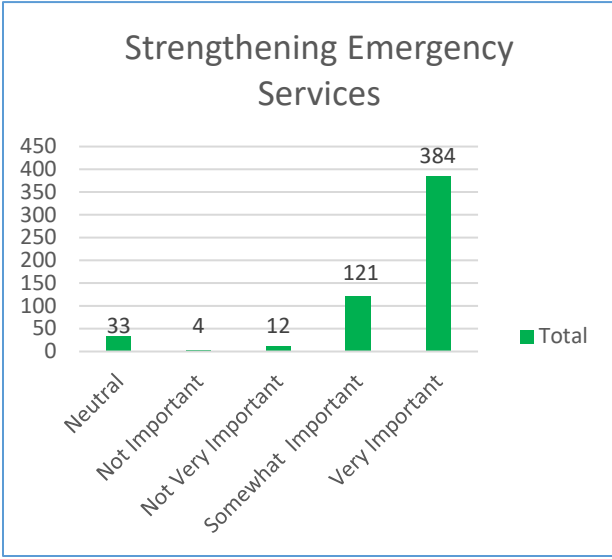
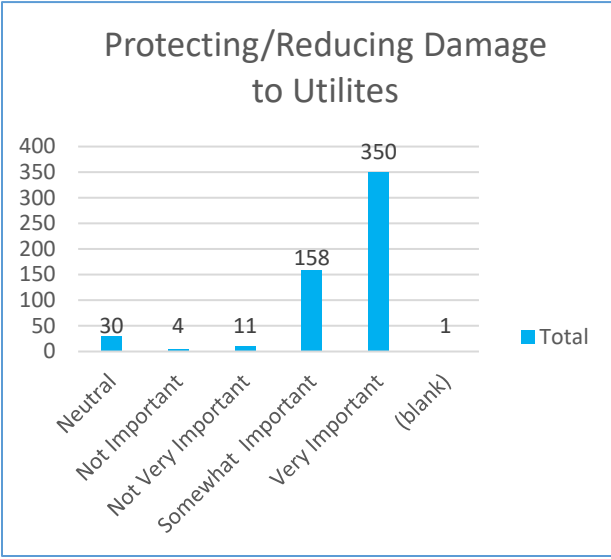
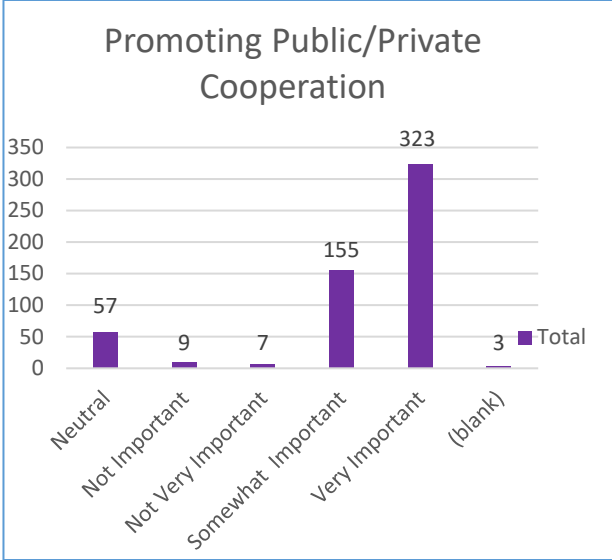
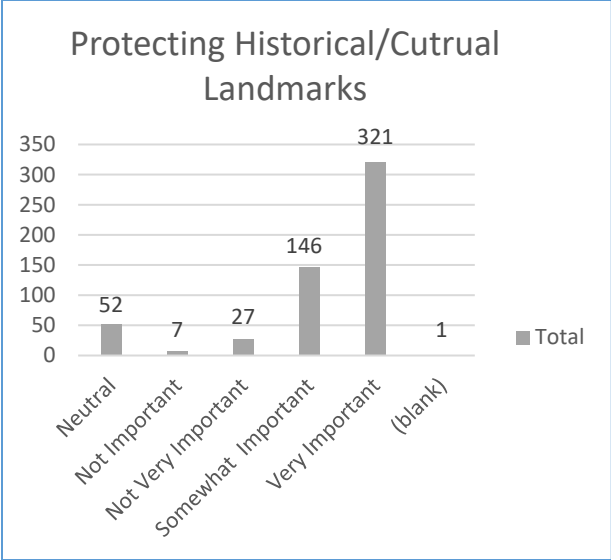


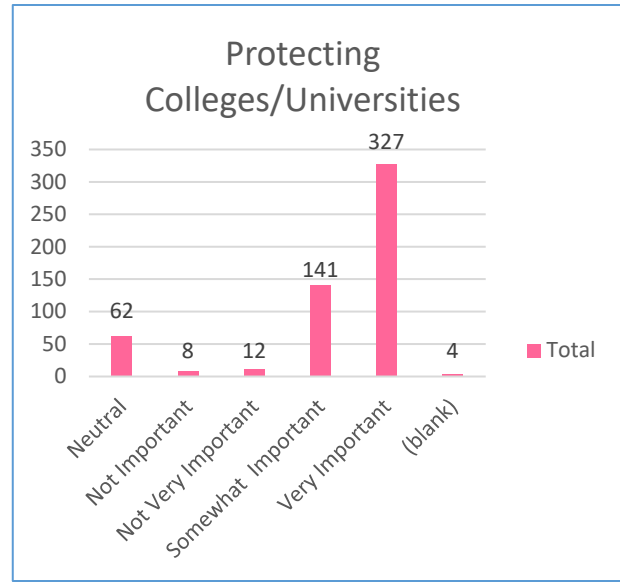
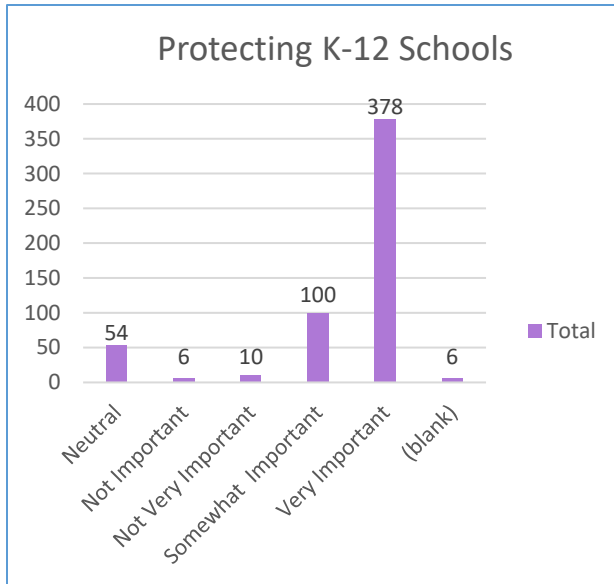
9. Planning ahead for responding to disasters can help lessen their impact. To help the City prioritize its disaster preparedness efforts, please tell us how important each of the following goals is to you.

Goal	Very Important	Somewhat Important	Neutral	Not Very Important	Not Important
Protecting private property	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Protecting critical facilities (hospitals, fire stations, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Preventing development in hazard areas	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Protecting the natural environment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Protecting historical/cultural landmarks, museums, etc.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Promoting cooperation among public and private organizations and citizens	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Protecting and reducing damage to utilities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Strengthening emergency services (police, fire, ambulance)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Protecting major employers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Protecting small businesses	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Protecting K-12 schools	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Protecting Colleges/Universities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

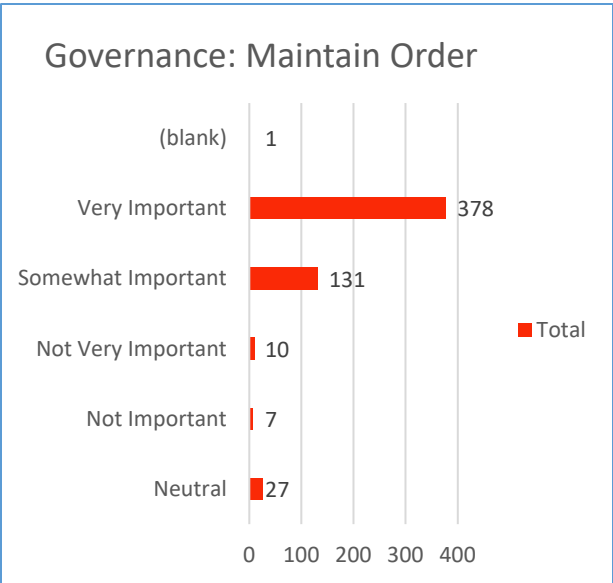
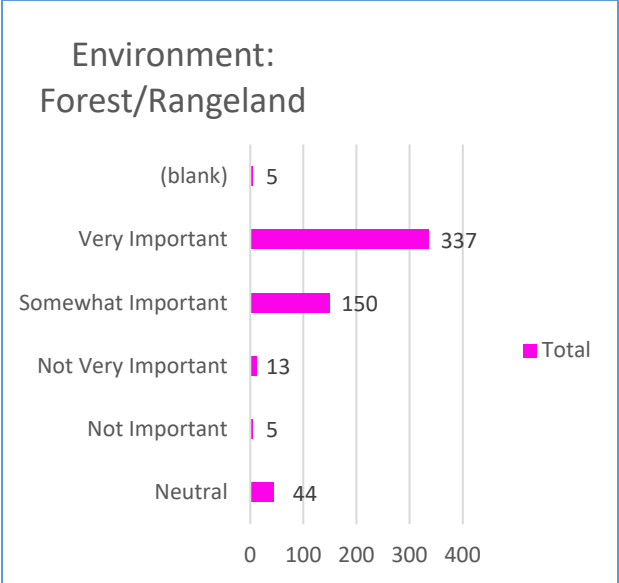
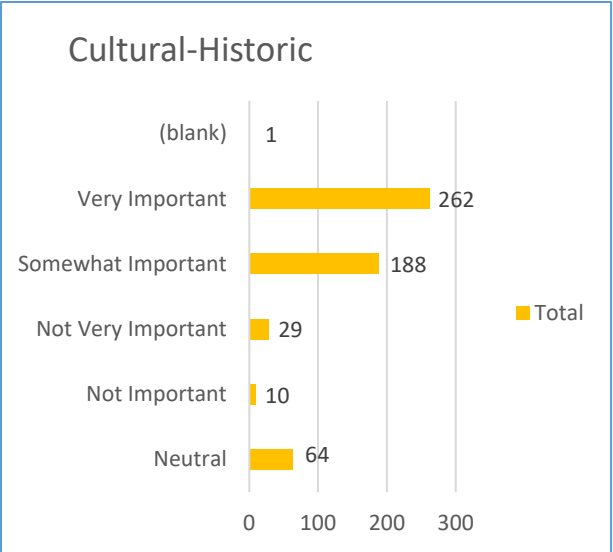
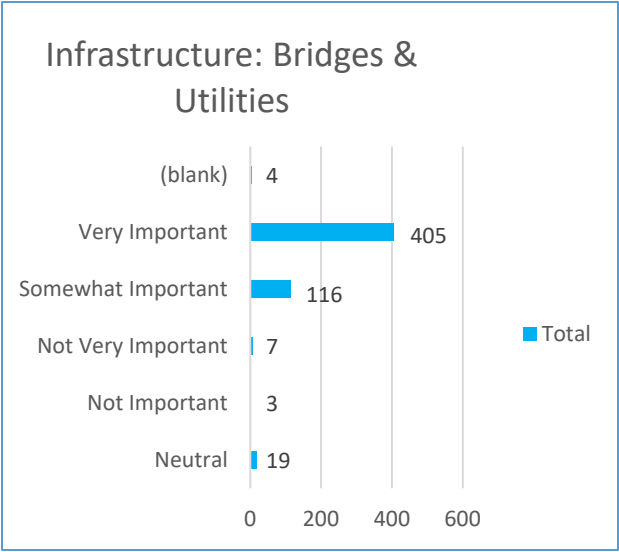
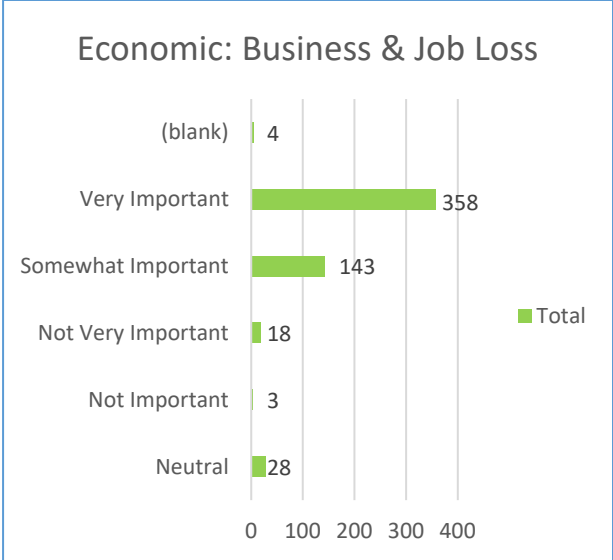
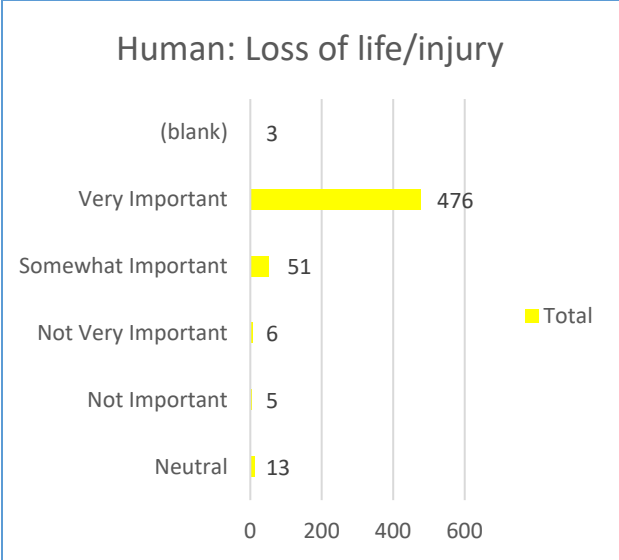






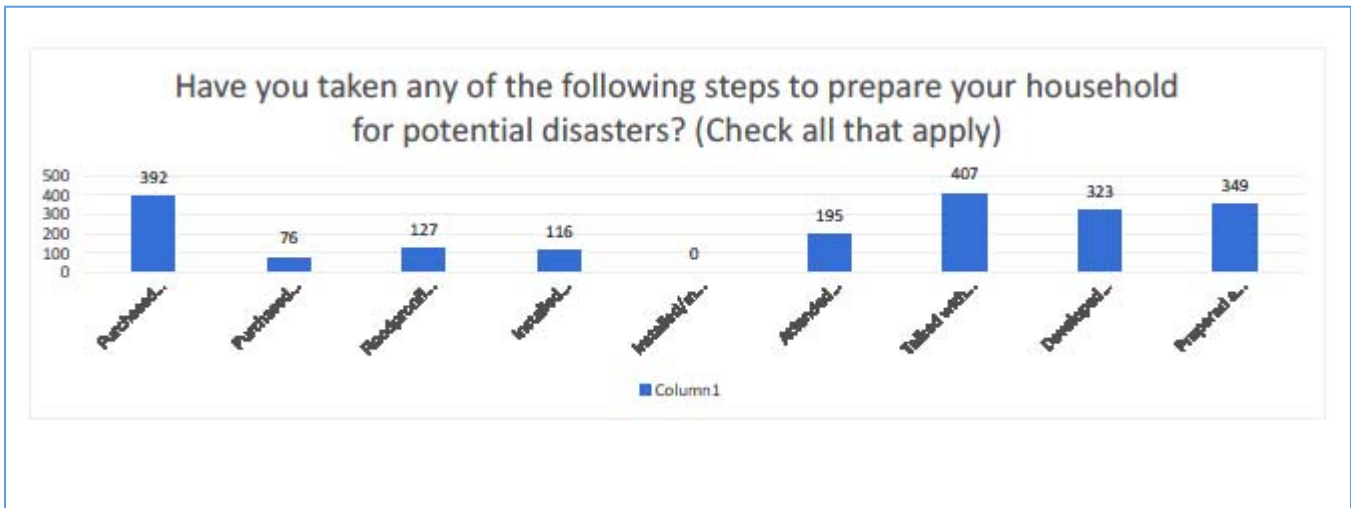
10. Community assets are features, characteristics, or resources that either make a community unique or allow the community to function. Please rank the importance of protecting the following community assets:

Community Assets: Potential Disaster Impact	Very Important	Somewhat Important	Neutral	Not Very Important	Not Important
Human: Loss of life and/or injuries	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Economic: Business closures and/or job losses	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Infrastructure: Damage or loss of bridges, utilities, schools, etc.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cultural Historic: Damage or loss of libraries, museums, fairgrounds, etc.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Environmental: Damage or loss of forests, rangeland, waterways, etc.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Governance: Ability to maintain order and/or provide public amenities and services	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



11. Have you taken any of the following steps to prepare for your household for potential disasters? Check all that apply.

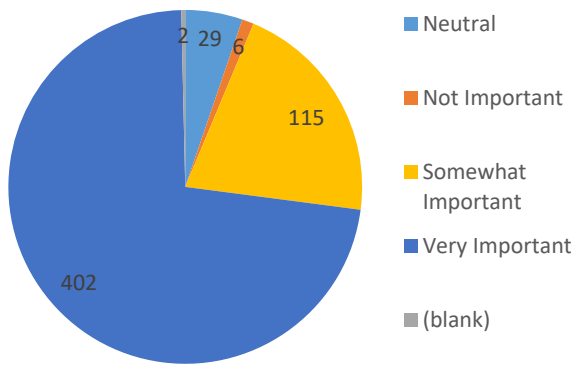
- Purchased homeowners/renters insurance
- Purchased flood insurance
- Floodproofing (elevating furnace, water heaters, electric panels)
- Installed retrofits such as high impact windows or doors to withstand high winds; fire resistant siding roofing or window screens, etc.
- Installed/maintained firebreaks around the Home
- Attended meetings or received written information on natural disasters or emergency preparedness
- Talked with family members about what to do in case of a disaster or emergency
- Developed a "Household/Family Emergency Plan" in order to decide what everyone would do in the event of a disaster
- Prepared a "Disaster Supply Kit" (extra food, water, batteries, medications, first aid, etc.)



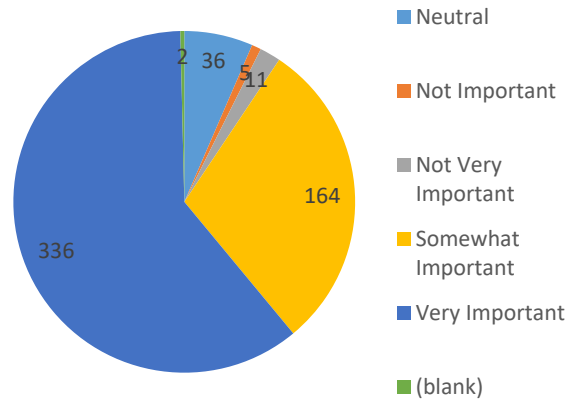
12. How would you rank the following strategies to address pre- and post-disaster damage?

Strategy	Very Important	Somewhat Important	Neutral	Not Very Important	Not Important
Retrofit and strengthen essential facilities such as police, fire, emergency medical services, hospitals, schools, etc.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Replace inadequate or vulnerable bridges and causeways	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Install or improve protective structures, such as floodwalls or levees	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Government buys flood-prone properties and returns them to a natural condition	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Assist property owners with securing funding to mitigate impacts to their property caused by disasters	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Work on improving the damage resistance of utilities (electricity, communications, water/wastewater facilities, etc.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Strengthen City codes, ordinances, and plans to require high risk management standards	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Provide better information about hazard risk and high-hazard areas	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Inform property owners of ways they can prevent damage to their properties	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

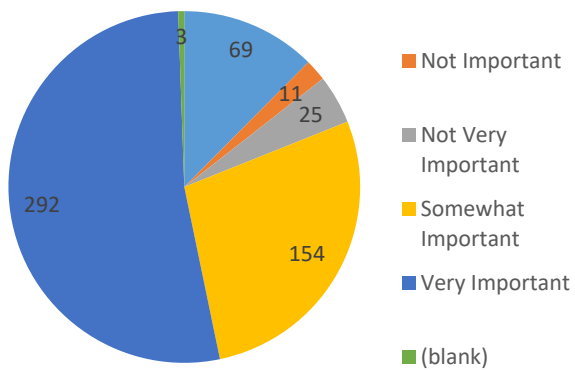
Strengthen Essential Facilities



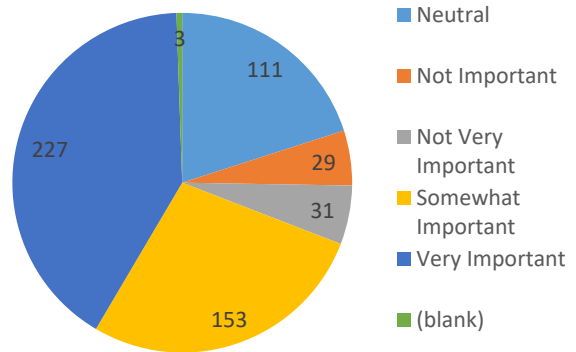
Replace Vulnerable Bridges



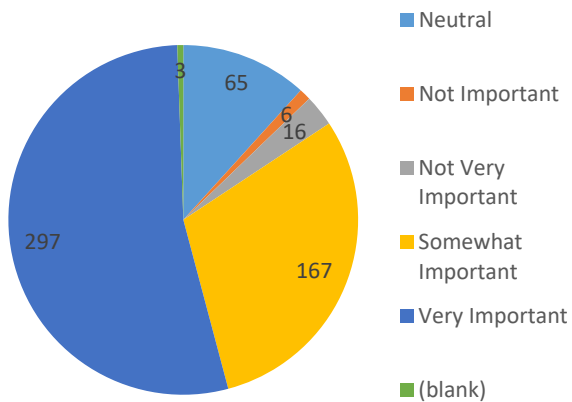
Improve Protective Structures



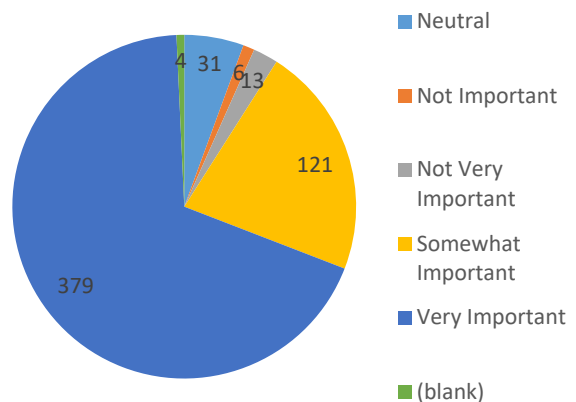
Govt. Buys Flood Prone Property

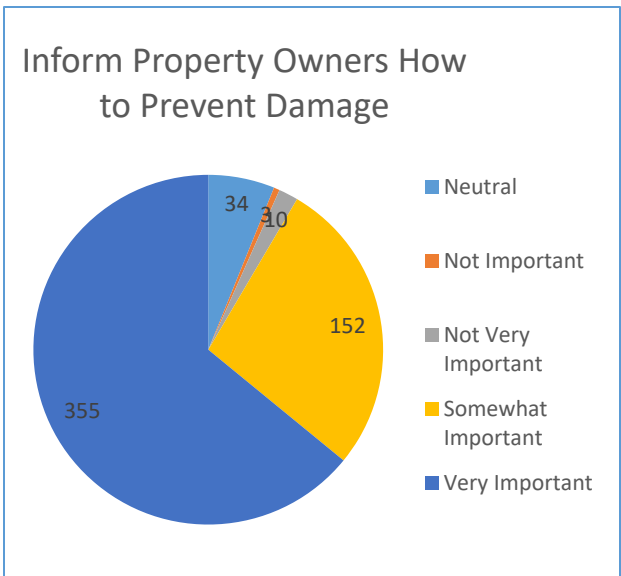
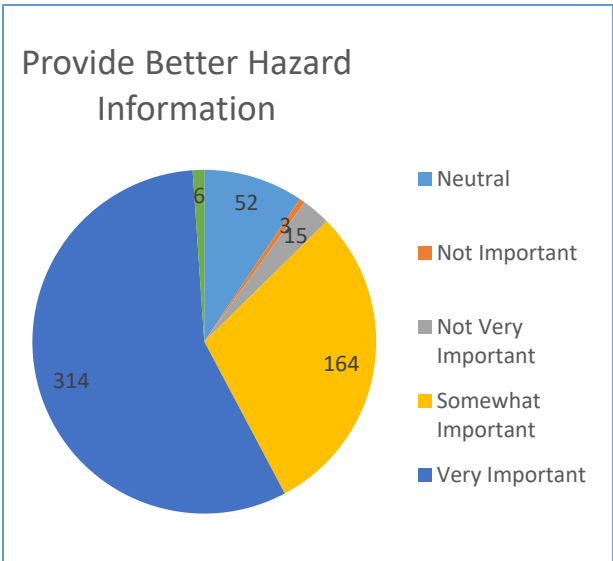
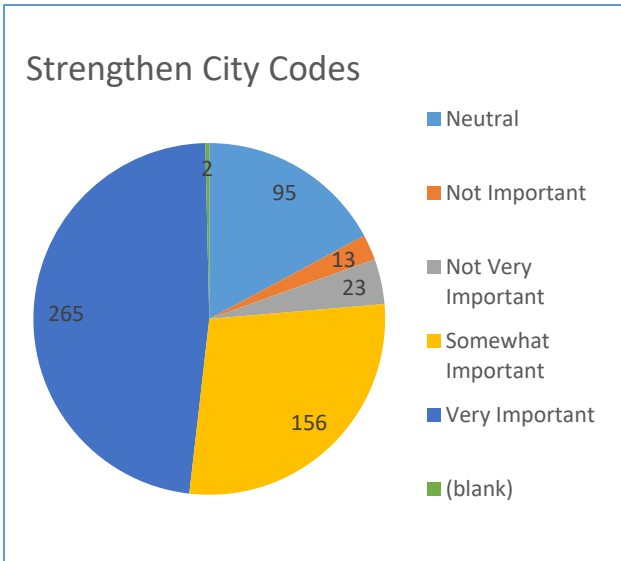


Assist Property Owners



Improve Utility Damage Resistance





13. Please feel free to provide any additional comments:

CITY OF PALMDALE
LHMP Assessment Survey Press Release Number 1

FOR IMMEDIATE RELEASE

CITY OF PALMDALE
NEWS RELEASE

CONTACT: John Mlynar
PHONE: 661/267-5115
DATE: March 26, 2021

Take Palmdale’s Hazard Plan Survey and Be Eligible to Win Gift Card

PALMDALE – The City of Palmdale is asking residents, business owners, and stakeholders to take a survey to help update the existing Local Hazard Mitigation Plan (LHMP).

The survey is available at www.CityofPalmdale.org/hazardplan . It is open to Palmdale residents, business owners and stakeholders. Gift cards will be given away randomly throughout the duration of the survey.

The City’s current LHMP was adopted in 2015 and is due to be updated this year for another five-year period. Working with partner agencies (schools, police, fire, military, medical, etc.), the City will ensure that potential hazards are properly identified, and that appropriate measures to protect the public are included in the plan.

“The LHMP covers a wide range of hazards affecting Palmdale, including earthquakes; floods, dam failure and inundation; wildfires and brush fires; transportation accidents and hazardous material spills; drought; severe weather; and power/utility failure,” said Palmdale Mayor Steve Hofbauer. “It’s important that our residents weigh in and provide feedback to ensure that the new plan has us prepared for a potential disaster.”

“Having an LHMP in place helps direct City resources appropriately and qualifies the City for federal disaster relief,” said Mayor Pro Tem Laura Bettencourt. “Updated plans are critical as Living in Southern California makes us vulnerable to a variety of potential disasters.”

Funding for updating the LHMP was provided in part by a \$50,000 Southern California Gas (SoCalGas) Climate Adaptation and Resiliency Planning Grant.

“We look forward to hearing from the public as our staff prepares to update our existing plan,” said Palmdale City Manager J.J. Murphy. “Gauging the priorities of our community is a priority in the process, and people can win a gift card just for taking the survey.”

For more information, please visit www.CityofPalmdale.org/hazardplan.

Communications Divison • 38300 Sierra Highway • Palmdale, CA 93550
www.CityofPalmdale.org

CITY OF PALMDALE
LHMP Assessment Survey Press Release Number 2

FOR IMMEDIATE RELEASE



NEWS RELEASE

CONTACT: John Mlynar
PHONE: 661/267-5115
DATE: May 26, 2021

Last Chance to Take Palmdale’s Hazard Plan Survey and Be Eligible to Win Gift Card

PALMDALE – The deadline to take the City of Palmdale’s Local Hazard Mitigation Plan (LHMP) survey and win a \$100 gift card has been extended to Monday, May 31.

Resident, business owners, and stakeholders are encouraged to take the survey at www.CityofPalmdale.org/hazardplan to help update the existing LHMP. A winner will be randomly selected at the conclusion of the survey.

The City’s current LHMP was adopted in 2015 and is due to be updated this year for another five-year period. Working with partner agencies (schools, police, fire, military, medical, etc.), the City will ensure that potential hazards are properly identified, and that appropriate measures to protect the public are included in the plan.

“The LHMP covers a wide range of hazards affecting Palmdale, including earthquakes; floods, dam failure and inundation; wildfires and brush fires; transportation accidents and hazardous material spills; drought; severe weather; and power/utility failure,” said Palmdale Mayor Steve Hofbauer. “It’s important that our residents weigh in and provide feedback to ensure that the new plan has us prepared for a potential disaster.”

“Having an LHMP in place helps direct City resources appropriately and qualifies the City for federal disaster relief,” said Mayor Pro Tem Laura Bettencourt. “Updated plans are critical as Living in Southern California makes us vulnerable to a variety of potential disasters.”

Funding for updating the LHMP was provided in part by a \$50,000 Southern California Gas (SoCalGas) Climate Adaptation and Resiliency Planning Grant.

“We look forward to hearing from the public as our staff prepares to update our existing plan,” said Palmdale City Manager J.J. Murphy. “Gauging the priorities of our community is a priority in the process, and someone will win a \$100 gift card just for taking the survey.”

For more information, please visit www.CityofPalmdale.org/hazardplan.

Communications • 38300 Sierra Highway • Palmdale, CA 93550
www.CityofPalmdale.org

History of the Updated LHMP Participation/Development Process

Area B Meeting
Local Hazard Mitigation Plan Quarterly Mtg.
4/21/16

Anne Ambrose, City of Palmdale

Dana Kuyss, City of Santa Clarita

Kenn Kyn CITY OF BROWNS HILLS

Debra Pasca City of Calabasas

Barry City of MAUN

Jim Jordan city of Calabasas

JOHN WALLACE VALENCIA WATER CO.

THIRYSSA DAWSON S.T. LANCASTER - SIMMER'S STATION

Steve & Michele Webb AUDRN

ALLAN THOMPSON CITY OF LANCASTER

ANDREW NOGA CITY OF LANCASTER

Dineshia West City of Palmdale

Dessie Parrish



DISASTER MANAGEMENT AREA B HAZMIT PLAN (LHMP) Meeting
QUARTERLY MEETING 7/21/2016
 City of Santa Clara
 The Centre

	Print Name (Clearly)	Agency/Title	Email	Phone
1	Dea Ferrero	Ave B - DMAC	Dea.Ferrero@AveB-LACO.org	310 457 7787
2	ANDREW ALSON	LAWCASTER	AUDREY@CITYOFSANJOSE.CA.GOV	415 376 4639
3	ALAN THOMAS	LAWCASTER	ALANTHOMAS@CITYOFSANJOSE.CA.GOV	415 376 4639
4	Gregory Callman	WV	Gregory@wv.gov	766-1413
5	Maria Garcia	LACO PD	Maria.Garcia@AveB-LACO.org	310-457-7787
6	Melissa Adams	Ave B	Melissa.Adams@AveB-LACO.org	310-457-7787
7	LARRY BOYLE	LAWCASTER DMAC	LARRYBOYLE@AveB-LACO.org	415-723-9500
8	Debbie Larson	Lawcast	DLARSON@CITYOFSANJOSE.CA.GOV	510 204 1620
9	Anna Aymeroy	Palmdale	anna.aymeroy@palmdale.ca.gov	310 367 5707
10	BEVERA ALVAREZ	Santa Clara	BEVERA@SANTACLARA.CA.GOV	408-286-4093
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Area B - LHMP Quarterly Meeting Jan 19, 2017 9am-10am Attendees

GoToMeeting

Summary

Meeting Date: January 19, 2017 8:25 AM PST
 Meeting Duration: 94 minutes
 Number of Attendees: 25
 Meeting ID: 7 209-816-877

Details

Name	Email Address	Join Time	Leave Time	Time in Session (minutes)
Lisa Soghor		8:58 AM	9:59 AM	61
Debbie Pedrazzoli	areab@earthlink.net	8:25 AM	9:59 AM	94
Donna Nuzzi		9:00 AM	9:59 AM	58
Jim Jordan		8:58 AM	9:48 AM	49
Kevin Ryan	eoc@hiddenhillscity.org	8:52 AM	9:59 AM	66
Louis Celaya	lcelaya@ci.agoura-hills.ca.us	9:02 AM	9:59 AM	57
Noga, Andrew		8:58 AM	9:59 AM	61



DISASTER MANAGEMENT AREA B HAZMIT PLAN (LHMP) Meeting
 QUARTERLY MEETING 4/20/2017
 City of Palmdale

Print Name (clearly)	Agency/Title	Email	Phone
1 Debra Anderson	City of Palmdale	Debra.A@ci.pa.ca.us	818-708-1613
2 Philomena Eskander	City of Palmdale	Philomena.Eskander@ci.pa.ca.us	818-708-1613
3 Donna Nuzzi	City of Palmdale	Donna.Nuzzi@ci.pa.ca.us	818-708-1613
4 Andrew Nuzzi	City of Palmdale	Andrew.Nuzzi@ci.pa.ca.us	818-708-1613
5 Debbie Pedrazzoli	Earthlink	debbie@earthlink.net	818-254-1620
6 Jim Jordan	City of Palmdale	Jim.Jordan@ci.pa.ca.us	818-708-1613
7 JT Treibshier	Agoura Hills	jt@agourahills.com	805-597-7305
8 Glenn Andrews	Palmdale	glenn@palmdale.gov	818-708-1613
9 Anna Anderson	Palmdale	anna@palmdale.gov	818-708-1613
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----- Area B Quarterly LHM P -----

DISASTER MANAGEMENT AREA B MONTHLY MEETINGS
 January 18, 2018
 City of Agoura Hills - City Hall

Print Name (Clearly)	Agency and Title	Email	Phone
1 Debra Franklin	Don A. B. Donor	Debra Franklin	310 409 0333
2 Prima Nuzzi	Sarah Cloutier	Prima Nuzzi	461 986-4093
3 Phillip Escander	Weslake Village	Phillip Escander	818 726 1413
4 Kevin Ryan	HIDDEN HILLS	FOC@HIDDENHILLSCTA.ORG	818-431-7077
5 JT TRICKER	AGOURA HILLS	STREIDNER@CI.AGOURAHILLS.CA.US	818-507-7309
6 Debbie Johnson	Calabasas	STREIDNER@CI.AGOURAHILLS.CA.US	818-241-1210
7 Jim Madala	Calabasas	STREIDNER@CI.AGOURAHILLS.CA.US	818-241-1210
8 Kevin Johnson	Banham RFD CROSS	STREIDNER@CI.AGOURAHILLS.CA.US	818-241-1210
9	Twinning, I (for phone)	STREIDNER@CI.AGOURAHILLS.CA.US	818-241-1210
10	Weslake @ - go live	STREIDNER@CI.AGOURAHILLS.CA.US	818-241-1210
11	mass sent	STREIDNER@CI.AGOURAHILLS.CA.US	818-241-1210
12 MAURITIA LIND	UPHOURS SPT 132	MAURITIA LIND	818-241-1210
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14 MARIE BLAND	CLASS	MARIE BLAND	818-878-1828
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**Disaster Management Area B
Local Hazard Mitigation Plan (LHMP) Quarterly Meeting
January 18, 2018
City of Agoura Hills**

Agenda

I. Call to Order

- A. Attendance sign-in sheet.
- B. Welcome and Introductions.

II. Topic/Discussion

- A. Review of the FEMA "Local Mitigation Plan Review Guide" dated Oct 1, 2011. Continue reviewing the five elements (A through E) and their requirements.
 - 1. **Section 4.3- Element C: Mitigation Strategy (page 23).**
 - a) Element – C2 (One of six requirements for element C).
 - a. Does the Plan address each jurisdiction's participation in the National Flood Insurance Program (NFIP) and continued compliance with NFIP requirements, as appropriate? 44CFR 201.6(c)(3)(ii)
 - i. Intent
 - 1. To demonstrate flood hazard mitigation efforts by the community through NFIP activities.
 - a. Where FEMA is the official administrating Federal agency of the NFIP, participation in the program is a basic community capability and resource for flood hazard mitigation activities.
 - ii. Requirement
 - 1. The plan must describe each jurisdiction's participation in the NFIP and describe their floodplain management program for continued compliance.
 - a. Simply stating "The community will continue to comply with NFIP", will NOT meet this requirement.
 - b. The description could include, but is not limited to:
 - i. Adoption and enforcement of floodplain management requirements, including regulating new construction in Special Flood Hazard Areas (SFHAs);
 - ii. Floodplain identification and mapping, including any local requests for map updates;
 - iii. Description of community assistance and monitoring activities.
 - c. Jurisdictions that are currently not participating in the NFIP and where an Flood Hazard Boundary Map (FHBM) or Flood Insurance Rate Map (FIRM) has been issued may meet this requirement by describing the reasons why the community does not participate.
 - i. **Flood Hazard Boundary Map (FHBM)**. Official map of a community issued by FEMA, where the boundaries of the flood, mudflow and related erosion areas having special hazards have been designated.
 - ii. **Flood Insurance Rate Map (FIRM)**. Official map of a community on which FEMA has delineated the Special Flood Hazard Areas (SFHAs), the Base Flood Elevations (BFEs) and the risk premium zones applicable to the community.

iii.

Page 1 of 2

<p>C2. Does the Plan address each jurisdiction's participation in the NFIP and continued compliance with NFIP requirements, as appropriate? 44 CFR 201.6(c)(3)(ii)</p> <p><i>Intent: To demonstrate flood hazard mitigation efforts by the community through NFIP activities. Where FEMA is the official administering Federal agency of the NFIP, participation in the program is a basic community capability and resource for flood hazard mitigation activities.</i></p>	<p>a. The plan must describe each jurisdiction's participation in the NFIP and describe their floodplain management program for continued compliance. Simply stating "The community will continue to comply with NFIP," will <u>not</u> meet this requirement. The description could include, but is not limited to:</p> <ul style="list-style-type: none"> • Adoption and enforcement of floodplain management requirements, including regulating new construction in Special Flood Hazard Areas (SFHAs); • Floodplain identification and mapping, including any local requests for map updates; or • Description of community assistance and monitoring activities. <p>Jurisdictions that are currently not participating in the NFIP and where an FHBM or FIRM has been issued may meet this requirement by describing the reasons why the community does not participate.</p>
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DISASTER MANAGEMENT AREA B MONTHLY MEETINGS
 April 19, 2018
 Area B Quarterly LHMP Meeting
 Palmdale - Chimbole Cultural Center

Print Name (Clearly)	Agency and Title	Email	Phone
1 Debra Ramirez	OMA - B OMC	DEP@AEB-1400.org	310 459 0333
2 Mirvia Perez	Palmdale I.T.		
3 May Dickinson	Palmdale / BB	Nick.Dickinson@CityofPalmdale.org	
4 Andrew Noga	CITY OF LAUNCESTER EM	AUG@CITYOFLAUNCESTER.CA.GOV	661 725 6886
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**Disaster Management Area B
Local Hazard Mitigation Plan (LHMP) Quarterly Meeting
April 19, 2018
Palmdale – Chimbole Cultural Center**

Agenda

I. Call to Order

- A. Attendance sign-in sheet.
- B. Welcome and Introductions.

II. Topic/Discussion

- A. Review of the FEMA "Local Mitigation Plan Review Guide" dated Oct 1, 2011. Continue reviewing the five elements (A through E) and their requirements.
 - 1. **Section 4.3- Element C: Mitigation Strategy (page 24).**
 - a) Element – C3 (One of six requirements for element C).
 - a. Does the Plan include **goals** to reduce/avoid long-term vulnerabilities to the identified hazards? 44CFR 201.6(c)(3)(i)
 - i. Intent
 - 1. To guide the development and implementation of hazard mitigation actions for the community(ies).
 - a. Goals are statements of the community's visions for the future.
 - ii. Requirement
 - 1. The plan **must** include general hazard mitigation goals that represent what the jurisdiction(s) seeks to accomplish through mitigation plan implementation.
 - a. **GOALS are** broad policy statements that explain what is to be achieved.
 - b. Goals **MUST** be consistent with the hazards identified in the plan.

III. Notes

<u>ELEMENT</u>	<u>REQUIREMENTS</u>
<p>C3. Does the Plan include goals to reduce/avoid long-term vulnerabilities to the identified hazards? 44 CFR 201.6(c)(3)(i)</p> <p><i>Intent: To guide the development and implementation of hazard mitigation actions for the community(ies). Goals are statements of the community's visions for the future.</i></p>	<ul style="list-style-type: none"> a. The plan must include general hazard mitigation goals that represent what the jurisdiction(s) seeks to accomplish through mitigation plan implementation. <p><i>Goals are broad policy statements that explain what is to be achieved.</i></p> <ul style="list-style-type: none"> b. The goals must be consistent with the hazards identified in the plan.



**Disaster Management Area B
Local Hazard Mitigation Plan (LHMP) Quarterly Meeting
Oct 11, 2018
Lancaster – City Hall
44933 Fern Ave. Lancaster, CA 93534**

Agenda

I. Call to Order

- A. Attendance sign-in sheet.
- B. Welcome and Introductions.

II. Topic/Discussion

- A. Review of the FEMA "Local Mitigation Plan Review Guide" dated Oct 1, 2011. Continue reviewing the five elements (A through E) and their requirements.

1. **Section 4.3- Element C: Mitigation Strategy (page 24).**

- a) Element – C4 (One of six requirements for element C).

- a. Does the Plan identify and analyze a comprehensive range of specific mitigation actions and projects for each jurisdiction being considered to reduce the effects of hazards with emphasis on new and existing buildings and infrastructure? 44 CFR 201.6(c)(3)(ii) and 44 CFR 201.6(c)(3)(iv)

i. Intent

- 1. To ensure the hazard mitigation actions are based on the identified hazard vulnerabilities, are within the capability of each jurisdiction, and reduce or avoid future losses. This is the heart of the mitigation plan, and is essential to leading communities to reduce their risk. Communities, not FEMA, "own" the hazard mitigation actions in the strategy.

ii. Requirements (1-3)

- 1. The plan **must** include a mitigation strategy that
 - a. Analyzes actions and/projects that the jurisdiction considered to reduce the impacts of hazards identified in the risk assessment
 - b. Identifies the actions and/or projects that the jurisdiction intends to implement.

Mitigation actions and projects means a hazard mitigation action, activity or process (ex. adopting a building code) or it can be a physical project (ex. elevating structures or retrofitting critical infrastructure) *designed to reduce or eliminate the long-term risks from hazards*. This sub-element can be met with either actions or projects, or a combo.

The mitigation plan may include non-mitigation actions (ex. emergency response or operational preparedness). These will **NOT** be accepted as hazard mitigation actions but neither will FEMA require these to be removed from the plan prior to approval.

A comprehensive range consists of different hazard mitigation alternatives that address the vulnerabilities to the hazards that the jurisdiction(s) determine are most important.

2. Each jurisdiction participating in the plan **must** have mitigation actions specific to that jurisdiction that are based on the community's risk and vulnerabilities, as well as community priorities.
3. The action plan **must** reduce risk to existing buildings and infrastructure as well as limit any risk to new development and redevelopment. **With emphasis on new and existing building and infrastructure** means that the action plan includes a consideration of actions that address the built environment.

III. Notes

IV. Handouts

- A. None

V. Other Helpful Resources

- A. Cal OES Hazard Mitigation Grants Branch – Main number 916-845-8150
- B. Cal OES Hazard Mitigation Planning Division – Main number 916-845-8177
- C. FEMA Planning – <http://www.fema.gov/multi-hazard-mitigation-planning>
- D. FEMA Assistance – <http://www.fema.gov/hazard-mitigation-assistance>
- E. FEMA IS-318 Hazard Mitigation Planning for Local and Tribal Communities
 1. <http://training.fema.gov/is/courseoverview.aspx?code=IS-318>
- F. FEMA IS-393 Introduction for Hazard Mitigation
 1. <https://training.fema.gov/is/courseoverview.aspx?code=is-393.a>
- G. FEMA / CSTI G-393 Mitigation
- H. FEMA State and Local Mitigation Planning How-To Series/Guides #1-#9
 1. <https://www.fema.gov/media-library/resources-documents/collections/6>
 2. FEMA 386-1 "Getting Started – building Support for Mitigation Planning"
 3. FEMA 386-2 "Understanding Your Risks – identifying hazards and estimating losses"
 4. FEMA 386-3 "Developing the Mitigation Plan – identifying actions and implementing strategies"
 5. FEMA 386-4 "Bringing the Plan to Life – implementing the hazard mitigation plan"
- I. FEMA "Local Mitigation Planning Handbook"
 1. http://www.fema.gov/media-library-data/20130726-1910-25045-9160/fema_local_mitigation_handbook.pdf
- J. FEMA "Local Mitigation Plan Review Guide" (Oct 1, 2011)
 1. http://www.fema.gov/media-library-data/20130726-1809-25045-7498/plan_review_guide_final_9_30_11.pdf
- K. FEMA "Integrating Hazard Mitigation into Local Planning"
 1. http://www.fema.gov/media-library-data/20130726-1908-25045-0016/integrating_hazmit.pdf
- L. FEMA "Mitigation Ideas"
 1. http://www.fema.gov/media-library-data/20130726-1904-25045-0188/fema_mitigation_ideas_final508.pdf
- M. CFR Title 44 – Emergency Management & Assistance §201.6, Local Mitigation Plans

VI. Wrap up

- A. Next Area B LHMP Quarterly Meeting
 1. Jan 17, 2019 Host: City of Agoura Hills

VII. Adjournment

<p>C4. Does the Plan identify and analyze a comprehensive range of specific mitigation actions and projects for each jurisdiction being considered to reduce the effects of hazards, with emphasis on new and existing buildings and infrastructure? 44 CFR 201.6(c)(3)(ii) and 44 CFR 201.6(c)(3)(iv)</p> <p><i>Intent: To ensure the hazard mitigation actions are based on the identified hazard vulnerabilities, are within the capability of each jurisdiction, and reduce or avoid future losses. This is the heart of the mitigation plan, and is essential to leading communities to reduce their risk. Communities, not FEMA, "own" the hazard mitigation actions in the strategy.</i></p>	<p>a. The plan must include a mitigation strategy that 1) analyzes actions and/or projects that the jurisdiction considered to reduce the impacts of hazards identified in the risk assessment, and 2) identifies the actions and/or projects that the jurisdiction intends to implement.</p> <p><i>Mitigation actions and projects means a hazard mitigation action, activity or process (for example, adopting a building code) or it can be a physical project (for example, elevating structures or retrofitting critical infrastructure) designed to reduce or eliminate the long term risks from hazards. This sub-element can be met with either actions or projects, or a combination of actions and projects.</i></p> <p>The mitigation plan may include non-mitigation actions, such as actions that are emergency response or operational preparedness in nature. These will not be accepted as hazard mitigation actions, but neither will FEMA require these to be removed from the plan prior to approval.</p> <p><i>A comprehensive range consists of different hazard mitigation alternatives that address the vulnerabilities to the hazards that the jurisdiction(s) determine are most important.</i></p> <p>b. Each jurisdiction participating in the plan must have mitigation actions specific to that jurisdiction that are based on the community's risk and vulnerabilities, as well as community priorities.</p> <p>c. The action plan must reduce risk to existing buildings and infrastructure as well as limit any risk to new development and redevelopment. <i>With emphasis on new and existing building and infrastructure means that the action plan includes a consideration of actions that address the built environment.</i></p>
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Area B Board Only - Go To Meeting 1-17-19 9am Attendees Summary

Meeting Date	Meeting Duration	Number of Attendees	Meeting ID
January 17, 2019 8:43 AM PST	81 minutes	5	571-800-677

Board Meeting 9-10am followed by LHMP Planning Meeting

Details

Name	Email Address	Join Time	Leave Time	Time in Session (minutes)
Andrew Noga	anoga@cityoflancafterca.org	8:58 AM	10:04 AM	66
Deb Pedrazzoli	areab@earthlink.net	8:43 AM	10:04 AM	81
Donna Nuzzi	dnuzzi@santa-clarita.com	8:49 AM	10:04 AM	74
Jim & Debbie	jjordan@cityofcalabasas.com	9:19 AM	10:04 AM	45
Susan Duenas	sduenas@malibucity.org	9:02 AM	10:04 AM	61

Dial In:
Mike Woodard - Hidden Hills
Nazy C - Palmdale
Philippe E - Westlake Village



**Disaster Management Area B
Local Hazard Mitigation Plan (LHMP) Quarterly Meeting
Jan 17, 2019
Board Only Go-To Meeting**

Agenda

I. Call to Order

- A. Attendance sign-in sheet.
- B. Welcome and Introductions.

II. Topic/Discussion

- A. Review of the FEMA "Local Mitigation Plan Review Guide" dated Oct 1, 2011. Continue reviewing the five elements (A through E) and their requirements.
 - 1. **Section 4.3- Element C: Mitigation Strategy (page 25).**
 - a) Element – C5 (One of six requirements for element C).
 - a. Does the Plan contain an *action plan* that describes how the actions identified will be **prioritized** (including cost benefit review), **implemented**, and **administered** by each jurisdiction? 44 CFR 201.6(c)(3)(iii) and 44 CFR 201.6(c)(3)(iv)
 - i. Intent
 - 1. To identify *how the plan will directly lead to implementation of the hazard mitigation actions*. As opportunities arise for actions or projects to be implemented, the responsible entity will be able to take action towards completion of the activities.
 - ii. Requirements (1-4)
 - 1. The plan **must** describe the **criteria used for prioritizing** implementation of the actions.
 - 2. The plan **must** demonstrate when prioritizing hazard mitigation actions that the local jurisdictions considered the benefits that would result from the hazard mitigation actions versus the cost of those actions.

The requirement is met as long as the economic considerations are summarized in the plan as part of the community's analysis. A complete benefit-cost analysis is not required. Qualitative benefits (for example, quality of life, natural and beneficial values, or other "benefits") can also be included in how actions will be prioritized.
 - 3. The plan **must** identify the position, office, department, or agency responsible for implementing and administering the action (for each jurisdiction), and identify potential funding sources and expected timeframes for completion.

IV. Handouts

- A. None

V. Other Helpful Resources

- A. Cal OES Hazard Mitigation Grants Branch – Main number 916-845-8150
- B. Cal OES Hazard Mitigation Planning Division – Main number 916-845-8177
- C. FEMA Planning – <http://www.fema.gov/multi-hazard-mitigation-planning>
- D. FEMA Assistance – <http://www.fema.gov/hazard-mitigation-assistance>
- E. FEMA IS-318 Hazard Mitigation Planning for Local and Tribal Communities
 - 1. <http://training.fema.gov/is/courseoverview.aspx?code=IS-318>
- F. FEMA IS-393 Introduction for Hazard Mitigation
 - 1. https://training.fema.gov/is/courseoverview.aspx?code=is-393_a
- G. FEMA / CSTI G-393 Mitigation
- H. FEMA State and Local Mitigation Planning How-To Series/Guides #1-#9
 - 1. <https://www.fema.gov/media-library/resources-documents/collections/6>
 - 2. FEMA 386-1 "Getting Started – building Support for Mitigation Planning"
 - 3. FEMA 386-2 "Understanding Your Risks – identifying hazards and estimating losses"
 - 4. FEMA 386-3 "Developing the Mitigation Plan – identifying actions and implementing strategies"
 - 5. FEMA 386-4 "Bringing the Plan to Life – implementing the hazard mitigation plan"
- I. FEMA "Local Mitigation Planning Handbook"
 - 1. http://www.fema.gov/media-library-data/20130726-1910-25045-9160/fema_local_mitigation_handbook.pdf
- J. FEMA "Local Mitigation Plan Review Guide" (Oct 1, 2011)
 - 1. http://www.fema.gov/media-library-data/20130726-1809-25045-7498/plan_review_guide_final_9_30_11.pdf
- K. FEMA "Integrating Hazard Mitigation into Local Planning"
 - 1. http://www.fema.gov/media-library-data/20130726-1908-25045-0016/integrating_hazmit.pdf
- L. FEMA "Mitigation Ideas"
 - 1. http://www.fema.gov/media-library-data/20130726-1904-25045-0186/fema_mitigation_ideas_final508.pdf
- M. CFR Title 44 – Emergency Management & Assistance §201.6, Local Mitigation Plans

VI. Wrap up

- A. Next Area B LHMP Quarterly Meeting
 - 1. Apr 18, 2019 Host: City of Palmdale

VII. Adjournment

ELEMENT	REQUIREMENTS
<p>C5. Does the Plan contain an action plan that describes how the actions identified will be prioritized (including cost benefit review), implemented, and administered by each jurisdiction? 44 CFR 201.6(c)(3)(iii) and 44 CFR (c)(3)(iv)</p> <p><i>Intent: To identify how the plan will directly lead to implementation of the hazard mitigation actions. As opportunities arise for actions or projects to be implemented, the responsible entity will be able to take action towards completion of the activities.</i></p>	<ul style="list-style-type: none"> a. The plan must describe the criteria used for prioritizing implementation of the actions. b. The plan must demonstrate when prioritizing hazard mitigation actions that the local jurisdictions considered the benefits that would result from the hazard mitigation actions versus the cost of those actions. The requirement is met as long as the economic considerations are summarized in the plan as part of the community's analysis. A complete benefit-cost analysis is not required. Qualitative benefits (<i>for example</i>, quality of life, natural and beneficial values, or other "benefits") can also be included in how actions will be prioritized. c. The plan must identify the position, office, department, or agency responsible for implementing and administering the action (for each jurisdiction), and identify potential funding sources and expected timeframes for completion.



DISASTER MANAGEMENT AREA B HAZMIT PLAN (LHMP) Meeting
 QUARTERLY MEETING 4/18/2019
 City of Palmdale

Print Name (Clearly)	Agency/Title	Email	Phone
1 Debra Ferris	OMA-B DMC	Debra@OMA-B-LACs.org	310 421 0333
2 Donna Nuzzi	City of Santa Clarita	dnuzzi@cityofscclark.com	661-286-4093
3 Andrew Nofa	CITY OF LANCASTER	ANDREW@CITYOFLANCASTERCA.ORG	661-723-6056
4 Aileen Thompson	CITY OF DUNDALK	athompson@cityofdundalk.org	661-456890
5 MARIANNE AMMERSON	Ammeron Road Class	Marianne@ammeron.org	661-267-3015
6 Helen Lenech	Ammeron Road Class	Helen.Lenech@rdclass.org	494-833-4998
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**Disaster Management Area B
Local Hazard Mitigation Plan (LHMP) Quarterly Meeting
Apr 18, 2019
City of Palmdale**

Agenda

I. Call to Order

- A. Attendance sign-in sheet.
- B. Welcome and Introductions.

II. Topic/Discussion

- A. Review of the FEMA "Local Mitigation Plan Review Guide" dated Oct 1, 2011. Continue reviewing the five elements (A through E) and their requirements.

1. Section 4.3- Element C: Mitigation Strategy (page 25).

- a) Element – C6 (One of six requirements for element C).

- a. Does the Plan describe a process by which local governments will integrate the requirements of the mitigation plan into other planning mechanisms, such as comprehensive or capital improvement plans, when appropriate? 44 CFR 201.6(c)(4)(ii)

i. Intent

- 1. To assist communities in capitalizing on all available mechanisms that they have at their disposal to accomplish hazard mitigation and reduce risk.

ii. Requirements (1-5)

- 1. The plan **must** describe the community's process to integrate the data, information, and hazard mitigation goals and actions into other planning mechanisms.
- 2. The plan **must** identify the local planning mechanisms where hazard mitigation information and/or actions may be incorporated.

Planning mechanisms means governance structures that are used to manage local land use development and community decision-making, such as comprehensive plans, capital improvement plans, or other long-range plans.

- 3. A multi-jurisdictional plan **must** describe each participating jurisdiction's individual process for integrating hazard mitigation actions applicable to their community into other planning mechanisms.
- 4. The updated plan **must** explain how the jurisdiction(s) incorporated the mitigation plan, when appropriate, into other planning mechanisms as a demonstration of progress in local hazard mitigation efforts.

IV. Handouts

- A. None

V. Other Helpful Resources

- A. Cal OES Hazard Mitigation Grants Branch – Main number 916-845-8150
- B. Cal OES Hazard Mitigation Planning Division – Main number 916-845-8177
- C. FEMA Planning – <http://www.fema.gov/multi-hazard-mitigation-planning>
- D. FEMA Assistance – <http://www.fema.gov/hazard-mitigation-assistance>
- E. FEMA IS-318 Hazard Mitigation Planning for Local and Tribal Communities
 - 1. <http://training.fema.gov/is/courseoverview.aspx?code=IS-318>
- F. FEMA IS-393 Introduction for Hazard Mitigation
 - 1. https://training.fema.gov/is/courseoverview.aspx?code=IS-393_a
- G. FEMA / CSTI G-393 Mitigation
- H. FEMA State and Local Mitigation Planning How-To Series/Guides #1-#9
 - 1. <https://www.fema.gov/media-library/resources-documents/collections/6>
 - 2. FEMA 386-1 "Getting Started – building Support for Mitigation Planning"
 - 3. FEMA 386-2 "Understanding Your Risks – identifying hazards and estimating losses"
 - 4. FEMA 386-3 "Developing the Mitigation Plan – identifying actions and implementing strategies"
 - 5. FEMA 386-4 "Bringing the Plan to Life – implementing the hazard mitigation plan"
- I. FEMA "Local Mitigation Planning Handbook"
 - 1. http://www.fema.gov/media-library-data/20130726-1910-25045-9160/fema_local_mitigation_handbook.pdf
- J. FEMA "Local Mitigation Plan Review Guide" (Oct 1, 2011)
 - 1. http://www.fema.gov/media-library-data/20130726-1809-25045-7498/plan_review_guide_final_9_30_11.pdf
- K. FEMA "Integrating Hazard Mitigation into Local Planning"
 - 1. http://www.fema.gov/media-library-data/20130726-1908-25045-0016/integrating_hazmit.pdf
- L. FEMA "Mitigation Ideas"
 - 1. http://www.fema.gov/media-library-data/20130726-1904-25045-0186/fema_mitigation_ideas_final508.pdf
- M. CFR Title 44 – Emergency Management & Assistance §201.6, Local Mitigation Plans

VI. Wrap up

- A. Next Area B LHMP Quarterly Meeting
 - 1. Oct 11, 2019 Host: City of Lancaster

VII. Adjournment

ELEMENT	REQUIREMENTS
<p>C6. Does the Plan describe a process by which local governments will integrate the requirements of the mitigation plan into other planning mechanisms, such as comprehensive or capital improvement plans, when appropriate? 44 CFR 201.6(c)(4)(ii)</p> <p><i>Intent: To assist communities in capitalizing on all available mechanisms that they have at their disposal to accomplish hazard mitigation and reduce risk.</i></p>	<ul style="list-style-type: none"> a. The plan must describe the community's process to integrate the data, information, and hazard mitigation goals and actions into other planning mechanisms. b. The plan must identify the local planning mechanisms where hazard mitigation information and/or actions may be incorporated. <p><i>Planning mechanisms means governance structures that are used to manage local land use development and community decision-making, such as comprehensive plans, capital improvement plans, or other long-range plans.</i></p> c. A multi-jurisdictional plan must describe each participating jurisdiction's individual process for integrating hazard mitigation actions applicable to their community into other planning mechanisms. d. The updated plan must explain how the jurisdiction(s) incorporated the mitigation plan, when appropriate, into other planning mechanisms as a demonstration of progress in local hazard mitigation efforts. e. The updated plan must continue to describe how the mitigation strategy, including the goals and hazard mitigation actions will be incorporated into other planning mechanisms.

APPENDIX

C

HAZUS REPORT & MAPS



Hazus: Earthquake Global Risk Report

Region Name: PalmdaleStudyV2

Earthquake Scenario: Palmdale Scenario 1

Print Date: May 21, 2021

Disclaimer:

This version of Hazus utilizes 2010 Census Data.

Totals only reflect data for those census tracts/blocks included in the user's study region.

The estimates of social and economic impacts contained in this report were produced using Hazus loss estimation methodology software which is based on current scientific and engineering knowledge. There are uncertainties inherent in any loss estimation technique. Therefore, there may be significant differences between the modeled results contained in this report and the actual social and economic losses following a specific earthquake. These results can be improved by using enhanced inventory, geotechnical, and observed ground motion data.



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General Description of the Region

Hazus-MH is a regional earthquake loss estimation model that was developed by the Federal Emergency Management Agency (FEMA) and the National Institute of Building Sciences. The primary purpose of Hazus is to provide a methodology and software application to develop multi-hazard losses at a regional scale. These loss estimates would be used primarily by local, state and regional officials to plan and stimulate efforts to reduce risks from multi-hazards and to prepare for emergency response and recovery.

The earthquake loss estimates provided in this report was based on a region that includes 1 county(ies) from the following state(s):

California

Note:

Appendix A contains a complete listing of the counties contained in the region.

The geographical size of the region is 110.85 square miles and contains 33 census tracts. There are over 46 thousand households in the region which has a total population of 180,533 people (2010 Census Bureau data). The distribution of population by Total Region and County is provided in Appendix B.

There are an estimated 44 thousand buildings in the region with a total building replacement value (excluding contents) of 14,478 (millions of dollars). Approximately 96.00 % of the buildings (and 91.00% of the building value) are associated with residential housing.

The replacement value of the transportation and utility lifeline systems is estimated to be 3,149 and 305 (millions of dollars) , respectively.



Building and Lifeline Inventory

Building Inventory

Hazus estimates that there are 44 thousand buildings in the region which have an aggregate total replacement value of 14,478 (millions of dollars) . Appendix B provides a general distribution of the building value by Total Region and County.

In terms of building construction types found in the region, wood frame construction makes up 91% of the building inventory. The remaining percentage is distributed between the other general building types.

Critical Facility Inventory

Hazus breaks critical facilities into two (2) groups: essential facilities and high potential loss facilities (HPL). Essential facilities include hospitals, medical clinics, schools, fire stations, police stations and emergency operations facilities. High potential loss facilities include dams, levees, military installations, nuclear power plants and hazardous material sites.

For essential facilities, there are 1 hospitals in the region with a total bed capacity of 157 beds. There are 51 schools, 6 fire stations, 1 police stations and 0 emergency operation facilities. With respect to high potential loss facilities (HPL), there are no dams identified within the inventory. The inventory also includes 1 hazardous material sites, no military installations and no nuclear power plants.

Transportation and Utility Lifeline Inventory

Within Hazus, the lifeline inventory is divided between transportation and utility lifeline systems. There are seven (7) transportation systems that include highways, railways, light rail, bus, ports, ferry and airports. There are six (6) utility systems that include potable water, wastewater, natural gas, crude & refined oil, electric power and communications. The lifeline inventory data are provided in Tables 1 and 2.

The total value of the lifeline inventory is over 3,454.00 (millions of dollars). This inventory includes over 226.18 miles of highways, 34 bridges, 1,788.93 miles of pipes.

Table 1: Transportation System Lifeline Inventory

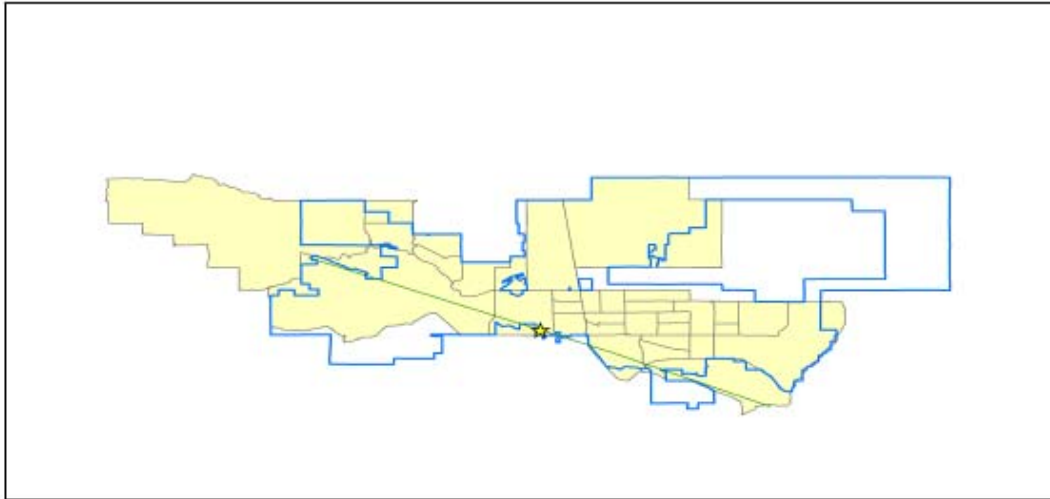
System	Component	# Locations/ # Segments	Replacement value (millions of dollars)
Highway	Bridges	34	98.2216
	Segments	79	2364.6559
	Tunnels	0	0.0000
	Subtotal		2462.8775
Railways	Bridges	7	40.0448
	Facilities	0	0.0000
	Segments	33	132.3697
	Tunnels	0	0.0000
	Subtotal		172.4145
Light Rail	Bridges	0	0.0000
	Facilities	0	0.0000
	Segments	1	41.5904
	Tunnels	0	0.0000
	Subtotal		41.5904
Bus	Facilities	1	1.8306
	Subtotal		1.8306
Ferry	Facilities	0	0.0000
	Subtotal		0.0000
Port	Facilities	0	0.0000
	Subtotal		0.0000
Airport	Facilities	1	14.4161
	Runways	2	456.5705
	Subtotal		470.9866
		Total	3,149.70

Table 2: Utility System Lifeline Inventory

System	Component	# Locations / Segments	Replacement value (millions of dollars)
Potable Water	Distribution Lines	NA	35.4311
	Facilities	0	0.0000
	Pipelines	0	0.0000
	Subtotal		35.4311
Waste Water	Distribution Lines	NA	21.2586
	Facilities	0	0.0000
	Pipelines	0	0.0000
	Subtotal		21.2586
Natural Gas	Distribution Lines	NA	14.1724
	Facilities	0	0.0000
	Pipelines	1	35.0997
	Subtotal		49.2721
Oil Systems	Facilities	0	0.0000
	Pipelines	0	0.0000
	Subtotal		0.0000
Electrical Power	Facilities	1	199.0800
	Subtotal		199.0800
Communication	Facilities	0	0.0000
	Subtotal		0.0000
		Total	305.00

Earthquake Scenario

Hazus uses the following set of information to define the earthquake parameters used for the earthquake loss estimate provided in this report.



Scenario Name	Palmdale Scenario 1
Type of Earthquake	Source
Fault Name	Mojave
Historical Epicenter ID #	9
Probabilistic Return Period	NA
Longitude of Epicenter	-118.14
Latitude of Epicenter	34.56
Earthquake Magnitude	6.70
Depth (km)	0.00
Rupture Length (Km)	25.59
Rupture Orientation (degrees)	0.00
Attenuation Function	West US, Extensional 2008 - Strike Slip

Direct Earthquake Damage

Building Damage

Hazus estimates that about 12,380 buildings will be at least moderately damaged. This is over 28.00 % of the buildings in the region. There are an estimated 931 buildings that will be damaged beyond repair. The definition of the 'damage states' is provided in Volume 1: Chapter 5 of the Hazus technical manual. Table 3 below summarizes the expected damage by general occupancy for the buildings in the region. Table 4 below summarizes the expected damage by general building type.

Damage Categories by General Occupancy Type

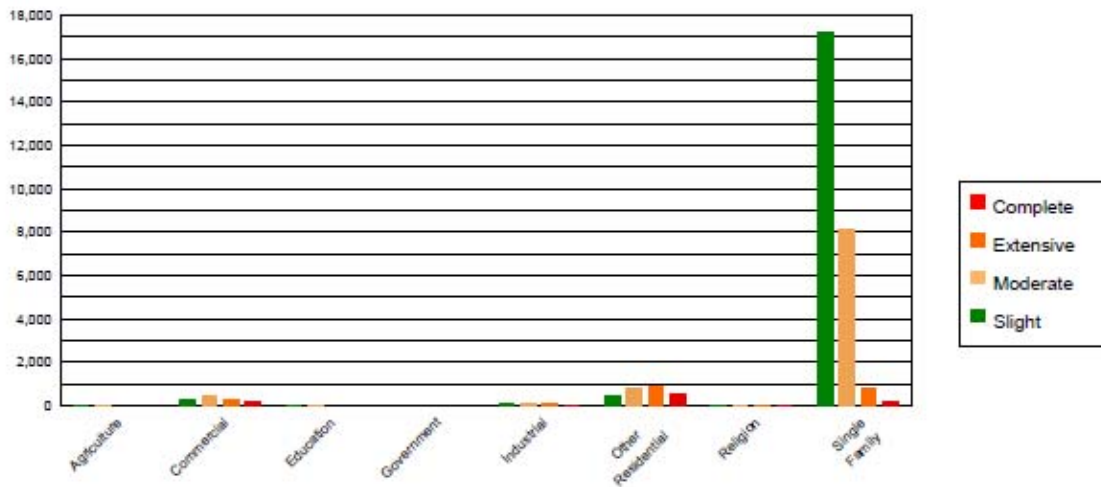


Table 3: Expected Building Damage by Occupancy

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	8.87	0.06	10.29	0.06	9.93	0.11	5.05	0.25	2.86	0.31
Commercial	242.10	1.67	294.00	1.63	407.74	4.32	255.08	12.73	131.08	14.08
Education	13.22	0.09	14.02	0.08	12.92	0.14	6.16	0.31	2.67	0.29
Government	3.02	0.02	3.04	0.02	3.58	0.04	2.24	0.11	1.12	0.12
Industrial	41.07	0.28	54.88	0.30	83.38	0.88	56.01	2.80	31.86	3.42
Other Residential	293.53	2.02	477.46	2.64	777.81	8.24	893.35	44.59	551.86	59.26
Religion	20.35	0.14	23.36	0.13	25.51	0.27	15.66	0.78	8.13	0.87
Single Family	13894.20	95.71	17211.74	95.15	8124.29	86.02	770.07	38.43	201.71	21.66
Total	14,516		18,089		9,445		2,004		931	

Table 4: Expected Building Damage by Building Type (All Design Levels)

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Wood	14104.74	97.16	17560.10	97.08	8251.96	87.37	757.22	37.79	215.18	23.11
Steel	37.61	0.26	52.50	0.29	119.10	1.26	103.48	5.16	53.73	5.77
Concrete	66.71	0.46	86.80	0.48	97.95	1.04	66.01	3.29	36.66	3.96
Precast	49.47	0.34	65.49	0.36	114.82	1.22	70.77	3.53	33.23	3.57
RM	226.09	1.56	174.87	0.97	254.46	2.69	143.02	7.14	39.94	4.29
URM	10.70	0.07	17.67	0.10	31.90	0.34	24.85	1.24	25.37	2.72
MH	21.03	0.14	131.16	0.73	574.95	6.09	838.27	41.84	526.97	56.59
Total	14,516		18,089		9,445		2,004		931	

*Note:
 RM Reinforced Masonry
 URM Unreinforced Masonry
 MH Manufactured Housing



Essential Facility Damage

Before the earthquake, the region had 157 hospital beds available for use. On the day of the earthquake, the model estimates that only 61 hospital beds (39.00%) are available for use by patients already in the hospital and those injured by the earthquake. After one week, 70.00% of the beds will be back in service. By 30 days, 96.00% will be operational.

Table 5: Expected Damage to Essential Facilities

Classification	Total	# Facilities		
		At Least Moderate Damage > 50%	Complete Damage > 50%	With Functionality > 50% on day 1
Hospitals	1	0	0	0
Schools	51	7	0	0
EOCs	0	0	0	0
PoliceStations	1	0	0	0
FireStations	6	0	0	1

Transportation Lifeline Damage

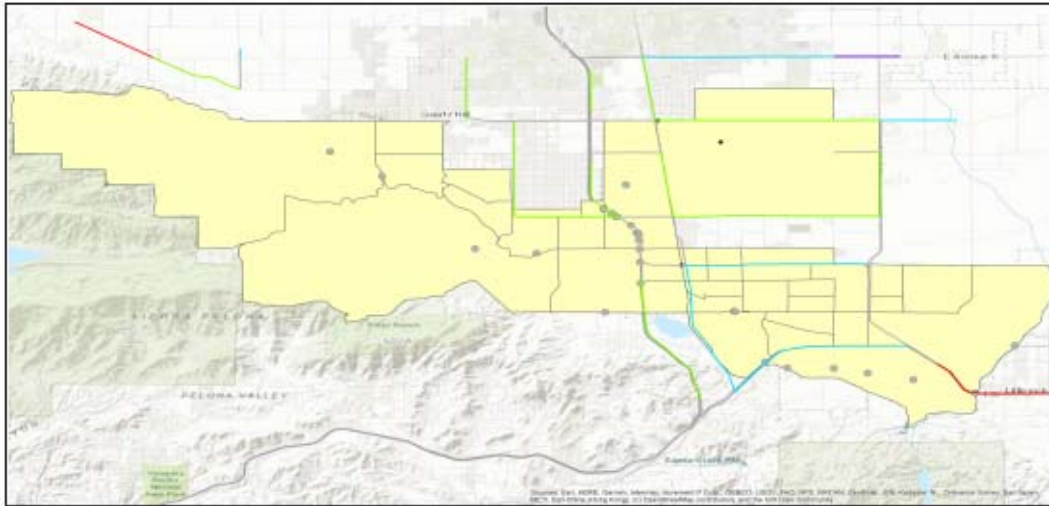


Table 6: Expected Damage to the Transportation Systems

System	Component	Locations/ Segments	Number of Locations			
			With at Least Mod. Damage	With Complete Damage	With Functionality > 50 %	
					After Day 1	After Day 7
Highway	Segments	79	0	0	77	77
	Bridges	34	2	0	32	34
	Tunnels	0	0	0	0	0
Railways	Segments	33	0	0	33	33
	Bridges	7	0	0	7	7
	Tunnels	0	0	0	0	0
	Facilities	0	0	0	0	0
Light Rail	Segments	1	0	0	1	1
	Bridges	0	0	0	0	0
	Tunnels	0	0	0	0	0
	Facilities	0	0	0	0	0
Bus	Facilities	1	1	0	1	1
Ferry	Facilities	0	0	0	0	0
Port	Facilities	0	0	0	0	0
Airport	Facilities	1	0	0	1	1
	Runways	2	0	0	2	2

Table 6 provides damage estimates for the transportation system.

Note: Roadway segments, railroad tracks and light rail tracks are assumed to be damaged by ground failure only. If ground failure maps are not provided, damage estimates to these components will not be computed.

Tables 7-9 provide information on the damage to the utility lifeline systems. Table 7 provides damage to the utility system facilities. Table 8 provides estimates on the number of leaks and breaks by the pipelines of the utility systems. For electric power and potable water, Hazus performs a simplified system performance analysis. Table 9 provides a summary of the system performance information.

Table 7 : Expected Utility System Facility Damage

System	Total #	# of Locations			
		With at Least Moderate Damage	With Complete Damage	with Functionality > 50 %	
				After Day 1	After Day 7
Potable Water	0	0	0	0	0
Waste Water	0	0	0	0	0
Natural Gas	0	0	0	0	0
Oil Systems	0	0	0	0	0
Electrical Power	1	0	0	1	1
Communication	0	0	0	0	0

Table 8 : Expected Utility System Pipeline Damage (Site Specific)

System	Total Pipelines Length (miles)	Number of Leaks	Number of Breaks
Potable Water	1,101	829	207
Waste Water	660	417	104
Natural Gas	28	0	0
Oil	0	0	0

Table 9: Expected Potable Water and Electric Power System Performance

	Total # of Households	Number of Households without Service				
		At Day 1	At Day 3	At Day 7	At Day 30	At Day 90
Potable Water	48,077	23,657	16,848	1,047	0	0
Electric Power		32,519	19,632	7,768	1,443	46

Induced Earthquake Damage

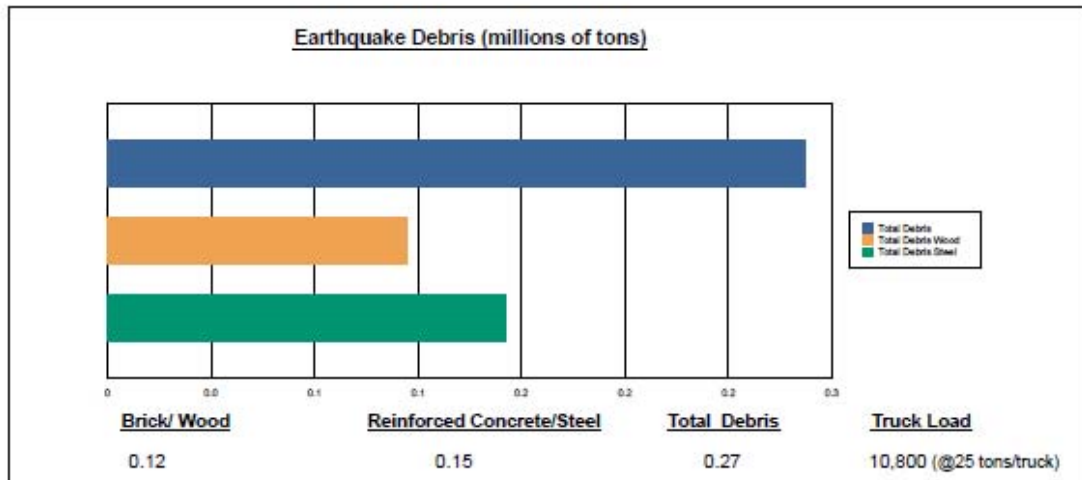
Fire Following Earthquake

Fires often occur after an earthquake. Because of the number of fires and the lack of water to fight the fires, they can often burn out of control. Hazus uses a Monte Carlo simulation model to estimate the number of ignitions and the amount of burnt area. For this scenario, the model estimates that there will be 0 ignitions that will burn about 0.00 sq. mi (0.00 % of the region's total area.) The model also estimates that the fires will displace about 0 people and burn about 0 (millions of dollars) of building value.

Debris Generation

Hazus estimates the amount of debris that will be generated by the earthquake. The model breaks the debris into two general categories: a) Brick/Wood and b) Reinforced Concrete/Steel. This distinction is made because of the different types of material handling equipment required to handle the debris.

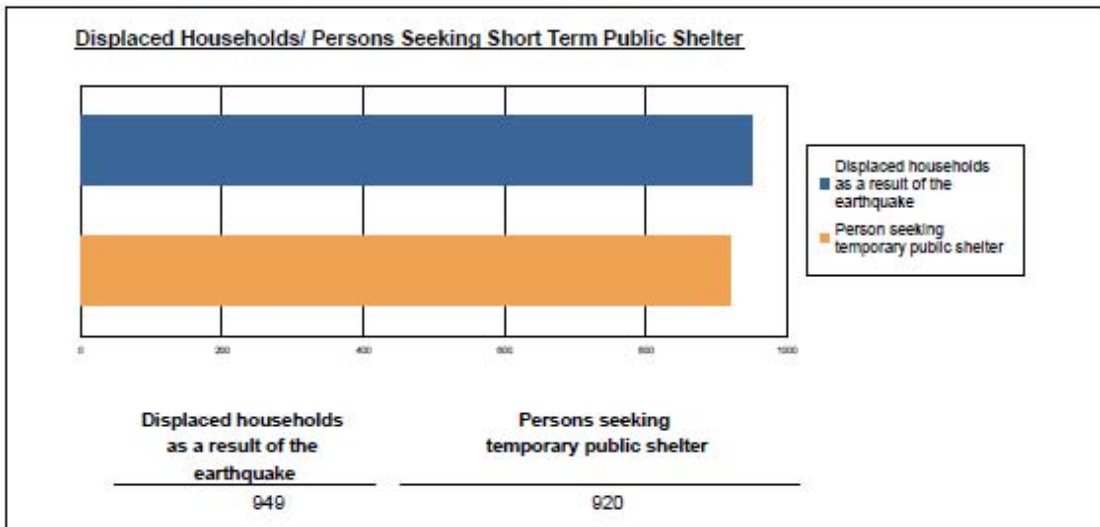
The model estimates that a total of 270,000 tons of debris will be generated. Of the total amount, Brick/Wood comprises 43.00% of the total, with the remainder being Reinforced Concrete/Steel. If the debris tonnage is converted to an estimated number of truckloads, it will require 10,800 truckloads (@25 tons/truck) to remove the debris generated by the earthquake.



Social Impact

Shelter Requirement

Hazus estimates the number of households that are expected to be displaced from their homes due to the earthquake and the number of displaced people that will require accommodations in temporary public shelters. The model estimates 949 households to be displaced due to the earthquake. Of these, 920 people (out of a total population of 160,533) will seek temporary shelter in public shelters.



Casualties

Hazus estimates the number of people that will be injured and killed by the earthquake. The casualties are broken down into four (4) severity levels that describe the extent of the injuries. The levels are described as follows:

- Severity Level 1: Injuries will require medical attention but hospitalization is not needed.
- Severity Level 2: Injuries will require hospitalization but are not considered life-threatening
- Severity Level 3: Injuries will require hospitalization and can become life threatening if not promptly treated.
- Severity Level 4: Victims are killed by the earthquake.

The casualty estimates are provided for three (3) times of day: 2:00 AM, 2:00 PM and 5:00 PM. These times represent the periods of the day that different sectors of the community are at their peak occupancy loads. The 2:00 AM estimate considers that the residential occupancy load is maximum, the 2:00 PM estimate considers that the educational, commercial and industrial sector loads are maximum and 5:00 PM represents peak commute time.

Table 10 provides a summary of the casualties estimated for this earthquake

Table 10: Casualty Estimates

		Level 1	Level 2	Level 3	Level 4
2 AM	Commercial	10.69	3.01	0.48	0.95
	Commuting	0.05	0.06	0.11	0.02
	Educational	0.00	0.00	0.00	0.00
	Hotels	0.00	0.00	0.00	0.00
	Industrial	17.38	4.72	0.69	1.35
	Other-Residential	148.96	35.53	3.56	6.59
	Single Family	159.80	22.16	1.06	1.89
	Total	337	65	6	11
2 PM	Commercial	644.98	181.36	28.96	56.83
	Commuting	0.44	0.58	0.99	0.19
	Educational	278.30	77.47	12.57	24.59
	Hotels	0.00	0.00	0.00	0.00
	Industrial	127.96	34.71	5.08	9.84
	Other-Residential	34.80	8.37	0.88	1.61
	Single Family	35.45	4.97	0.28	0.42
	Total	1,122	307	49	93
5 PM	Commercial	465.27	130.56	20.93	40.57
	Commuting	6.75	8.85	15.12	2.92
	Educational	22.41	6.24	1.01	1.98
	Hotels	0.00	0.00	0.00	0.00
	Industrial	79.98	21.70	3.18	6.15
	Other-Residential	54.95	13.18	1.37	2.49
	Single Family	61.64	8.66	0.49	0.73
	Total	691	189	42	55



Economic Loss

The total economic loss estimated for the earthquake is 1,828.81 (millions of dollars), which includes building and lifeline related losses based on the region's available inventory. The following three sections provide more detailed information about these losses.

Building-Related Losses

The building losses are broken into two categories: direct building losses and business interruption losses. The direct building losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the earthquake. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the earthquake.

The total building-related losses were 1,772.68 (millions of dollars); 13 % of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies which made up over 75 % of the total loss. Table 11 below provides a summary of the losses associated with the building damage.

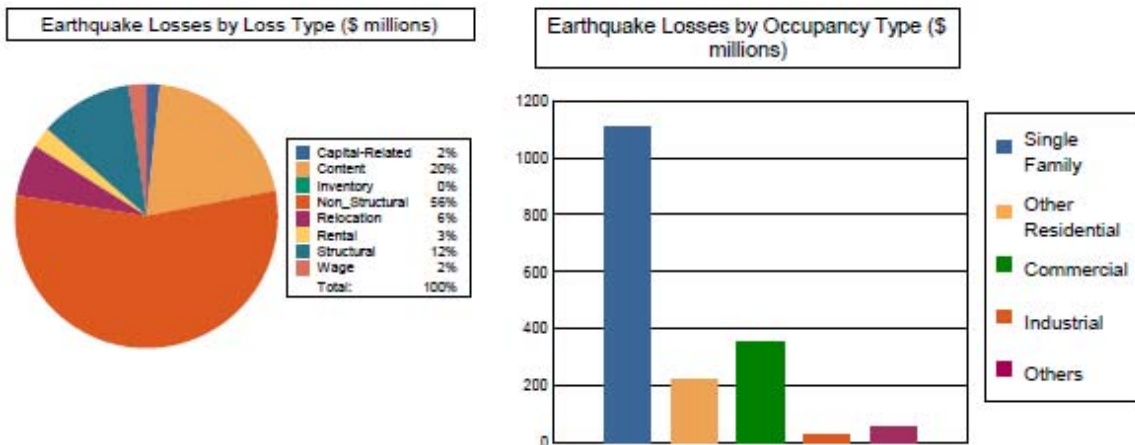


Table 11: Building-Related Economic Loss Estimates
(Millions of dollars)

Category	Area	Single Family	Other Residential	Commercial	Industrial	Others	Total
Income Losses							
	Wage	0.0000	1.4878	33.7369	0.5257	1.2732	37.0236
	Capital-Related	0.0000	0.6348	30.3480	0.3009	0.3860	31.6697
	Rental	18.8033	8.4719	16.5401	0.1566	0.6310	44.6029
	Relocation	68.3571	11.0591	23.9363	1.0218	5.9695	110.3438
	Subtotal	87.1604	21.6536	104.5613	2.0050	8.2597	223.6400
Capital Stock Losses							
	Structural	122.0324	27.4644	43.7616	3.9631	8.7495	205.9710
	Non_Structural	663.3415	140.4543	138.8491	14.6816	27.3220	984.6485
	Content	235.4067	33.2096	64.8364	8.7016	13.2932	355.4475
	Inventory	0.0000	0.0000	1.5343	1.2808	0.1549	2.9700
	Subtotal	1020.7806	201.1283	248.9814	28.6271	49.5196	1549.0370
	Total	1107.94	222.78	353.54	30.63	57.78	1772.68

Transportation and Utility Lifeline Losses

For the transportation and utility lifeline systems, Hazus computes the direct repair cost for each component only. There are no losses computed by Hazus for business interruption due to lifeline outages. Tables 12 & 13 provide a detailed breakdown in the expected lifeline losses.

Table 12: Transportation System Economic Losses
(Millions of dollars)

System	Component	Inventory Value	Economic Loss	Loss Ratio (%)
Highway	Segments	2364.6559	0.0000	0.00
	Bridges	98.2216	11.4822	11.69
	Tunnels	0.0000	0.0000	0.00
	Subtotal	2462.8775	11.4822	
Railways	Segments	132.3697	0.0000	0.00
	Bridges	40.0448	3.5553	8.88
	Tunnels	0.0000	0.0000	0.00
	Facilities	0.0000	0.0000	0.00
	Subtotal	172.4145	3.5553	
Light Rail	Segments	41.5904	0.0000	0.00
	Bridges	0.0000	0.0000	0.00
	Tunnels	0.0000	0.0000	0.00
	Facilities	0.0000	0.0000	0.00
	Subtotal	41.5904	0.0000	
Bus	Facilities	1.8306	0.7517	41.06
	Subtotal	1.8306	0.7517	
Ferry	Facilities	0.0000	0.0000	0.00
	Subtotal	0.0000	0.0000	
Port	Facilities	0.0000	0.0000	0.00
	Subtotal	0.0000	0.0000	
Airport	Facilities	14.4161	4.0880	28.36
	Runways	456.5705	0.0000	0.00
	Subtotal	470.9866	4.0880	
Total		3,149.70	19.88	

Table 13: Utility System Economic Losses
(Millions of dollars)

System	Component	Inventory Value	Economic Loss	Loss Ratio (%)
Potable Water	Pipelines	0.0000	0.0000	0.00
	Facilities	0.0000	0.0000	0.00
	Distribution Lines	35.4311	3.7314	10.53
	Subtotal	35.4311	3.7314	
Waste Water	Pipelines	0.0000	0.0000	0.00
	Facilities	0.0000	0.0000	0.00
	Distribution Lines	21.2586	1.8744	8.82
	Subtotal	21.2586	1.8744	
Natural Gas	Pipelines	35.0997	0.0000	0.00
	Facilities	0.0000	0.0000	0.00
	Distribution Lines	14.1724	0.6421	4.53
	Subtotal	49.2721	0.6421	
Oil Systems	Pipelines	0.0000	0.0000	0.00
	Facilities	0.0000	0.0000	0.00
	Subtotal	0.0000	0.0000	
Electrical Power	Facilities	199.0800	30.0043	15.07
	Subtotal	199.0800	30.0043	
Communication	Facilities	0.0000	0.0000	0.00
	Subtotal	0.0000	0.0000	
	Total	305.04	36.25	



Appendix A: County Listing for the Region

Los Angeles, CA



Appendix B: Regional Population and Building Value Data

State	County Name	Population	Building Value (millions of dollars)		
			Residential	Non-Residential	Total
California	Los Angeles	160,533	13,172	1,305	14,478
Total Region		160,533	13,172	1,305	14,478

APPENDIX

D

PLANNING RESOURCES DIRECTORY

Master Resource Directory

The Resource Directory provides contact information for Local, Regional, State, and Federal programs that are currently involved in hazard mitigation activities. The City of Palmdale Hazard Mitigation Steering Committee may look to the organizations on the following pages for resources and technical assistance. The Resource Directory provides a foundation for potential partners in action item implementation.

The City of Palmdale Hazard Mitigation Steering Committee will continue to add contact information for organizations currently engaged in hazard mitigation activities. This section may also be used by various community members interested in hazard mitigation information and projects.

American Public Works Association		
Level: National	Hazard: Multi	http://www.apwa.net
2345 Grand Boulevard		Suite 500
Kansas City, MO 64108-2641	Ph: 816-472-6100	Fx: 816-472-1610
Notes: The American Public Works Association is an international educational and professional association of public agencies, private sector companies, and individuals dedicated to providing high quality public works goods and services.		
Antelope Valley Air Quality Management District (AQMD)		
Level: Regional	Hazard: Multi	www.avaqmd.gov
43301 Division Street, Suite 206		
Lancaster, CA 93535	Ph: 661-723-8070	Fax:
Notes: AQMD is a regional government agency that seeks to achieve and maintain healthful air quality through a comprehensive program of research, regulations, enforcement, and communication. The AVAQMD District lies within the northern part of Los Angeles County. The District boundaries start on the south just outside of Acton, north to the Kern County line, east to the San Bernardino County line, and west to the Quail Lake area. The AVAQMD is located within the Mojave Desert air basin. An air basin is a geographical region to describe an area with a commonly shared air mass, since air pollution does not follow county, city, or political boundaries		
Association of State Floodplain Managers		
Level: Federal	Hazard: Flood	www.floods.org
575 D'Onofrio Drive, Suite 200		
Madison, WI 53719	Ph: 608-828-3000	Fax:

Notes: The Association of State Floodplain Managers is an organization of professionals involved in floodplain management, flood hazard mitigation, the National Flood Insurance Program, and flood preparedness, warning and recovery		
Building Seismic Safety Council (BSSC)		
Level: National	Hazard: Earthquake	www.bssconline.org
1090 Vermont Ave., NW		Suite 700
Washington, DC 20005	Ph: 202-289-7800	Fax: 202-289-109
Notes: The Building Seismic Safety Council (BSSC) develops and promotes building earthquake risk mitigation regulatory provisions for the nation.		

California Department of Transportation (Caltrans)		
Level: State	Hazard: Multi	http://www.dot.ca.gov/
120 S. Spring Street		
Los Angeles, CA 90012	Ph: 213-897-3656	Fax:
Notes: CalTrans is responsible for the design, construction, maintenance, and operation of the California State Highway System, as well as that portion of the Interstate Highway System within the state's boundaries. Alone and in partnership with Amtrak, Caltrans is also involved in the support of intercity passenger rail service in California.		
California Resources Agency		
Level: State	Hazard: Multi	http://resources.ca.gov/
1416 Ninth Street		Suite 1311
Sacramento, CA 95814	Ph: 916-653-5656	Fax:
Notes: The California Resources Agency restores, protects, and manages the state's natural, historical, and cultural resources for current and future generations using solutions based on science, collaboration, and respect for all the communities and interests involved.		
California Division of Forestry (CDF)		
Level: State	Hazard: Multi	http://www.fire.ca.gov/php/index.php
1234 East Shaw Avenue		
Fresno CA 93710	Ph: 559-223-3714	Fax:

Notes: The California Department of Forestry and Fire Protection protect over 31 million acres of California's privately-owned wildlands. CDF emphasizes the management and protection of California's natural resources.		
California Division of Mines and Geology (DMG)		
Level: State	Hazard: Multi	www.consrv.ca.gov/cgs/index.htm
801 K Street		MS 12-30
Sacramento, CA 95814		Ph: 916-445-1825 Fax: 916-445-5718
Notes: The California Geological Survey develops and disseminates technical information and advice on California's geology, geologic hazards, and mineral resources.		
California Environmental Resources Evaluation System (CERES)		
Level: State	Hazard: Multi	http://ceres.ca.gov/
1416 9 th Street		Suite 1311
Sacramento, Ca. 95814		Ph: 916-651-0770 Fax:
Notes: CERES is an excellent website for access to environmental information and websites.		
California Department of Water Resources (DWR)		
Level: State	Hazard: Flood	http://www.dwr.water.ca.gov
1416 9th Street		
Sacramento, CA 95814		Ph: 916-653-5791 Fax:
Notes: The Department of Water Resources manages the water resources of California in cooperation with other agencies, to benefit the State's people, and to protect, restore, and enhance the natural and human environments.		
California Department of Conservation		
Level: State	Hazard: Multi	www.consrv.ca.gov
801 K Street, MS 24-01		
Sacramento, CA 95814		Ph: 916-322-1080 Fax: 916-445-0732
Notes: The Department of Conservation provides services and information that promote environmental health, economic vitality, informed land-use decisions, and sound management of our state's natural resources.		
California Land Use Planning Information Network		

Level: State	Hazard: Multi	www.calpin.ca.gov	
1416 9 th Street		Suite 1311	
Sacramento, CA 95814		Ph: 916-651-1228	Fax:
Notes: The Governor's Office of Land Use Planning Information Network publishes basic information on local planning agencies, known as the California Planners' Book of Lists. This local planning information is available on-line with new search capabilities and up-to-the-minute updates.			
California Natural Resources Agency, Department of Water Resources, Division of Safety of Dams (DSOD)			
Level: State	Hazard: Flood	http://www.water.ca.gov	
2720 Gateway Oaks Drive		Suite 300	
Sacramento, CA 94236		916-296-0187	
EPA, Region 9			
Level: Regional	Hazard: Multi	http://www.epa.gov/region09	
75 Hawthorne Street			
San Francisco, CA 94105		Ph: 415-947-8000	Fax: 415-947-3553
Notes: The mission of the U.S. Environmental Protection Agency is to protect human health and to safeguard the natural environment through the themes of air and global climate change, water, land, communities and ecosystems, and compliance and environmental stewardship.			
Federal Emergency Management Agency, Region IX			
Level: Federal	Hazard: Multi	www.fema.gov	
1111 Broadway		Suite 1200	
Oakland, CA 94607		Ph: 510-627-7100	Fax: 510-627-7112
Notes: The Federal Emergency Management Agency is tasked with responding to, planning for, recovering from, and mitigating against disasters.			
Federal Emergency Management Agency, Mitigation Division			
Level: Federal	Hazard: Multi	www.fema.gov/fima/planhowto.shtm	
500 C Street, S.W.			
Washington, D.C. 20472		Ph: 202-566-1600	Fax:

Notes: The Mitigation Division manages the National Flood Insurance Program and oversees FEMA's mitigation programs. It has of a number of programs and activities of which provide citizens Protection, with flood insurance; Prevention, with mitigation measures and Partnerships, with communities throughout the country.		
Floodplain Management Association		
Level: Federal	Hazard: Flood	www.floodplain.org
P.O. Box 712080		
Santee, CA 92072	Ph: 916-231-2134	Fax:
Notes: The Floodplain Management Association is a nonprofit educational association. It was established in 1990 to promote the reduction of flood losses and to encourage the protection and enhancement of natural floodplain values. Members include representatives of federal, state, and local government agencies as well as private firms.		
Governor's Office of Emergency Services (OES)		
Level: State	Hazard: Multi	www.caloes.ca.gov
3650 Schriever Ave		
Mather, CA 95655	Ph: 916-854-8510	Fax: 916 845- 8511
Notes: The Governor's Office of Emergency Services coordinates overall state agency response to major disasters in support of local government. The office is responsible for assuring the state's readiness to respond to and recover from natural, manmade, and war-caused emergencies, and for assisting local governments in their emergency preparedness, response, and recovery efforts.		
Greater Antelope Valley Economic Alliance		
Level: Regional	Hazard: Multi	
1028 West Avenue L-12, Suite 101		
Lancaster, CA 93534	Ph: 661-945-2741	Fax: 661-945-7711
Notes: The Greater Antelope Valley Economic Alliance, (GA VEA) is a 501 (c)(6) nonprofit organization with a 501(c)(3) affiliated organization with the Antelope Valley Economic Research and Education Foundation. GA VEA is a public-private partnership of business, local governments, education, non-profit organizations, and health care organizations that was founded in 1999 with the goal of attracting good paying jobs to the Antelope Valley in order to build a sustainable economy.		
Landslide Hazards Program, USGS		
Level: Federal	Hazard: Landslide	http://landslides.usgs.gov/index.html
12201 Sunrise Valley Drive		MS 906

Reston, VA 20192		Ph: 703-648- 4460	Fax:
Notes: The NLIC website provides good information on the programs and resources regarding landslides. The page includes information on the National Landslide Hazards Program Information Center, a bibliography, publications, and current projects. USGS scientists are working to reduce long-term losses and casualties from landslide hazards through better understanding of the causes and mechanisms of ground failure both nationally and worldwide.			
Los Angeles County Economic Development Corporation			
Level: Regional	Hazard: Multi	www.laedc.org	
444 S. Flower Street		37th Floor	
Los Angeles, CA 90071		Ph: 213-622-4300	Fax: 213- 623-0281
Notes: The LAEDC is a private, non-profit 501 (c) 3 organization established in 1981 with the mission to attract, retain, and grow businesses and jobs in the Los Angeles region. The LAEDC is widely relied upon for its Southern California Economic Forecasts and Industry Trend Reports. Lead by the renowned Jack Kyser (Sr. Vice President, Chief Economist) his team of researchers produces numerous publications to help business, media, and government navigate the LA region's diverse economy.			
Los Angeles County Public Works Department			
Level: County	Hazard: Multi	http://ladpw.org	
900 S. Fremont Ave.			
Alhambra, CA 91803		Ph: 626-458-5100	Fax:
Notes: The Los Angeles County Department of Public Works protects property and promotes public safety through Flood Control, Water Conservation, Road Maintenance, Bridges, Buses and Bicycle Trails, Building and Safety, Land Development, Waterworks, Sewers, Engineering, Capital Projects and Airports			
National Wildland/Urban Interface Council			
Level: Federal	Hazard: Wildfire		
1418 Washburn Street			
Missoula, MT 59601		Ph: 406-531-8264	Fax:
Notes: Firewise maintains a Website designed for people who live in wildfire- prone areas, but it also can be of use to local planners and decision makers. The site offers online wildfire protection information and checklists, as well as listings of other publications, videos, and conferences.			
National Resources Conservation Service			

Level: Federal	Hazard: Multi	http://www.nrcs.usda.gov/	
14th and Independence Ave., SW		Room 5105-A	
Washington, DC 20250		Ph: 202-720-7246	Fax: 202-720-7690
Notes: NRCS assists owners of America's private land with conserving their soil, water, and other natural resources, by delivering technical assistance based on sound science and suited to a customer's specific needs. Cost shares and financial incentives are available in some cases.			
National Interagency Fire Center (NIFC)			
Level: Federal	Hazard: Wildfire	www.nifc.gov	
3833 S. Development Ave.			
Boise, Idaho 83705-5354		Ph: 208-387- 5512	Fax:
Notes: The NIFC in Boise, Idaho is the nation's support center for wildland firefighting. Seven federal agencies work together to coordinate and support wildland fire and disaster operations.			
National Fire Protection Association (NFPA)			
Level: National	Hazard: Wildfire	http://www.nfpa.org/catalog/home/index.asp	
1 Batterymarch Park			
Quincy, MA 02169-7471		Ph: 617-770-3000	Fx: 617 770-0700
Notes: The mission of the international nonprofit NFPA is to reduce the worldwide burden of fire and other hazards on the quality of life by providing and advocating scientifically-based consensus codes and standards, research, training and education			
National Floodplain Insurance Program (NFIP)			
Level: Federal	Hazard: Flood	www.fema.gov/nfip/	
PO Box 29138			
Shawnee Mission, KS 66201		Ph: 800-638-6620	Fx: 800-742-3148
Notes: The Mitigation Division manages the National Flood Insurance Program and oversees FEMA's mitigation programs. It has of a number of programs and activities of which provide citizens Protection, with flood insurance; Prevention, with mitigation measures and Partnerships, with communities throughout the country.			
National Oceanic /Atmospheric Administration			
Level: Federal	Hazard: Multi	www.noaa.gov	
1401 Constitution Avenue, NW		Rm 5128	
Washington, DC 20230		Ph: 301-713-1208	Fax

Notes: NOAA's historical role has been to predict environmental changes, protect life and property, provide decision makers with reliable scientific information, and foster global environmental stewardship.		
National Weather Service, Office of Hydrologic Development		
Level: Federal	Hazard: Flood	http://www.nws.noaa.gov/
1325 East West Highway		SSMC2
Silver Spring, MD 20910	Ph: 301-713-1658	Fx: 301-713-0963
Notes: The Office of Hydrologic Development (OHD) enhances National Weather Service products by: infusing new hydrologic science, developing hydrologic techniques for operational use, managing hydrologic development by NWS field office, providing advanced hydrologic products to meet needs identified by NWS customers		
National Weather Service		
Level: Federal	Hazard: Multi	http://www.nws.noaa.gov/
520 North Elevar Street		
Oxnard, CA 93030	Ph: 805-988- 6615	Fax:
Notes: The National Weather Service is responsible for providing weather service to the nation. It is charged with the responsibility of observing and reporting the weather and with issuing forecasts and warnings of weather and floods in the interest of national safety and economy. Briefly, the priorities for service to the nation are: 1. protection of life, 2. protection of property, and 3. promotion of the nation's welfare and economy.		
Palmdale Water District		
Level: Local	Hazard: Multi	https://www.palmdalewater.org/
2029 East Avenue Q		
Palmdale, CA 93534	Ph: 661-456-1023	
San Gabriel Valley Economic Partnership		
Level: Regional	Hazard: Multi	www.valleynet.org
4900 Rivergrade Road		Suite B130
Baldwin Park, CA 91706	Ph: 626-856-3400	Fax: 626-856-5115
Notes: The San Gabriel Valley Economic Partnership is a non-profit corporation representing both public and private sectors. The Partnership is the exclusive source for San Gabriel Valley-specific information, expertise, consulting, products, services, and events. It is the single organization in the Valley with the mission to sustain and build the regional economy for the		

mutual benefit of all thirty cities, chambers of commerce, academic institutions, businesses, and residents.

Sanitation Districts of Los Angeles County

Level: County	Hazard: Flood	http://www.lacsd.org/	
1955 Workman Mill Road			
Whittier, CA 90607		Ph:562-699-7411 x2301	Fax:
Notes: The Sanitation Districts provide wastewater and solid waste management for over half the population of Los Angeles County and turn waste products into resources such as reclaimed water, energy, and recyclable materials.			

Santa Monica Mountains Conservancy

Level: Regional	Hazard: Multi	http://smmc.ca.gov/	
600 N. San Fernando Rd			
Los Angeles, CA 90065		Ph: 323-221-8900	Fax:
Notes: The Santa Monica Mountains Conservancy helps to preserve over 55,000 acres of parkland in both wilderness and urban settings and has improved more than 114 public recreational facilities throughout Southern California.			

South Bay Economic Development Partnership

Level: Regional	Hazard: Multi		
3460 Torrance Blvd			
Torrance, CA 90503		Ph: 310-792-0323	Fax:
Notes: The South Bay Economic Development Partnership is a collaboration of business, labor, education, and government. Its primary goal is to plan and implement an economic development and marketing strategy designed to retain and create jobs and stimulate economic growth in the South Bay of Los Angeles County.			

Southern California Earthquake Center (SCEC)

Level: Regional	Hazard: Earthquake	www.scec.org	
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3651 Trousdale Parkway		Suite 169	
Los Angeles, CA 90089-0742		Ph: 213-740-5843	Fax: 213/740-0011
Notes: The Southern California Earthquake Center (SCEC) gathers new information about earthquakes in Southern California, integrates this information into a comprehensive and predictive understanding of earthquake phenomena, and communicates this understanding to end-users and the general public in order to increase earthquake awareness, reduce economic losses, and save lives.			
Southern California Edison			
Level: Regional		Hazard: Multi	
		https://www.sce.com/	
42060 10 th Street			
Lancaster, CA 93534		661-726-5612	
Southern California Gas			
Level: Regional		Hazard: Multi	
		https://www.socalgas.com/	
9400 Oakdale Avenue			
Chatsworth, CA		818-701-3335	
91311			
Southern California Association of Governments (SCAG)			
Level:	Hazard: Multi	www.scag.ca.gov	
Regional			
818 W. Seventh Street		12th Floor	
Los Angeles, CA 90017		Ph: 213-236-1800	Fax: 213-236-1825
Notes: The Southern California Association of Governments functions as the Metropolitan Planning Organization for six counties: Los Angeles, Orange, San Bernardino, Riverside, Ventura, and Imperial. As the designated Metropolitan Planning Organization, the Association of Governments is mandated by the federal government to research and draw up plans for transportation, growth management, hazardous waste management, and air quality.			
State Fire Marshal (SFM)			
Level: State	Hazard: Wildfire	http://osfm.fire.ca.gov	
1131 "S" Street			
Sacramento, CA 95814		Ph: 916-445-8200	Fax: 916-445-8509
Notes: The Office of the State Fire Marshal (SFM) supports the mission of the California Department of Forestry and Fire Protection (CDF) by focusing on fire prevention. SFM regulates buildings in which people live, controls substances which may, cause injuries, death,			

and destruction by fire; provides statewide direction for fire prevention within wildland areas; regulates hazardous liquid pipelines; reviews regulations and building standards; and trains and educates in fire protection methods and responsibilities.

United States Geological Survey

Level: Federal	Hazard: Multi	http://www.usgs.gov/
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345 Middlefield Road

Menlo Park, CA 94025	Ph: 650-853-8300	Fax:
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Notes: The USGS provides reliable scientific information to describe and understand the Earth; minimize loss of life and property from natural disasters; manage water, biological, energy, and mineral resources; and enhance and protect our quality of life.

US Army Corps of Engineers

Level: Federal	Hazard: Multi	http://www.usace.army.mil
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915 Wilshire Blvd.

Los Angeles CA 90017	Ph: 213-452-333	Fax:
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Notes: The United States Army Corps of Engineers work in engineering and environmental matters. A workforce of biologists, engineers, geologists, hydrologists, natural resource managers and other professionals provide engineering services to the nation including planning, designing, building, and operating water resources and other civil works projects.

USDA Forest Service

Level: Federal	Hazard: Wildfire	http://www.fs.fed.us
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1400 Independence Ave. SW

Washington, D.C. 20250-0002	Ph: 202-205-8333	Fax:
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Notes: The Forest Service is an agency of the U.S. Department of Agriculture. The Forest Service manages public lands in national forests and grasslands.

USGS Water Resources

Level: Federal	Hazard: Multi	www.water.usgs.gov
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6000 J Street	Placer Hall
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Sacramento, CA 95819-6129	Ph: 916-278-3100	Fax:
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Notes: The USGS Water Resources mission is to provide water information that benefits the Nation's citizens: publications, data, maps, and applications software.

Western States Seismic Policy Council (WSSPC)

Level: Regional	Hazard: Earthquake	www.wsspc.org
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801 K Street	Suite 1236
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Sacramento, CA 95814		Ph: 916-444-6816	Fax: 916-444-8077
Notes: WSSPC is a regional earthquake consortium funded mainly by FEMA. Its website is a great resource, with information clearly categorized - from policy to engineering to education.			
Westside Economic Collaborative			
Level: Regional	Hazard: Multi		
10736 Jefferson Blvd			
Culver City, CA 90230		Ph: 231-952-9373	Fax:
Notes: The Westside Economic Development Collaborative is the first Westside regional economic development corporation. The Westside EDC functions as an information gatherer and resource center, as well as a forum, through bringing business, government, and residents together to address issues affecting the region: Economic Diversity, Transportation, Housing, Workforce Training and Retraining, Lifelong Learning, Tourism, and Embracing Diversity.			

APPENDIX

E

FEDERAL ACRONYMS

Federal Acronyms

AASHTO	American Association of State Highway and Transportation Officials
ATC	Applied Technology Council b/ca benefit/cost analysis
BFE	Base Flood Elevation
BLM	Bureau of Land Management
BSSC	Building Seismic Safety Council
CDBG	Community Development Block Grant
CFR	Code of Federal Regulations CRS Community Rating System
EDA	Economic Development Administration EPA Environmental Protection Agency ER Emergency Relief
EWPP	Emergency Watershed Protection (NRCS Program)
FAS	Federal Aid System FEMA Federal Emergency Management Agency FIRM Flood Insurance Rate Map
FMA	Flood Mitigation Assistance (FEMA Program) FTE Full Time Equivalent GIS Geographic Information System
GNS	Institute of Geological and Nuclear Sciences (International) GSA General Services Administration
HAZUS	Hazards U.S.
HMGP	Hazard Mitigation Grant Program
HMST	Hazard Mitigation Survey Team HUD Housing and Urban Development (United States, Department of)
IBHS	Institute for Business and Home Safety
ICC	Increased Cost of Compliance
IHMT	Interagency Hazard Mitigation Team
NCDC	National Climate Data Center
NFIP	National Flood Insurance Program
NFPA	National Fire Protection Association
NHMP	Natural Hazard Mitigation Plan (also known as "409 Plan") NIBS National Institute of Building Sciences
NIFC	National Interagency Fire Center
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration NPS National Park Service
NRCS	Natural Resources Conservation Service
NWS	National Weather Service SBA Small Business Administration
SEAO	Structural Engineers Association of Oregon
SHMO	State Hazard Mitigation Officer
TOR	Transfer of Development Rights
UGB	Urban Growth Boundary
URM	Unreinforced Masonry
SACE	United States Army Corps of Engineers
SBR	United States Bureau of Reclamation
SDA	United States Department of Agriculture

SFA	United States Fire Administration
USFS	United States Forest Service
USGS	United States Geological Survey
WSSPC	Western States Seismic Policy Council

California Acronyms

A&W	Alert and Warning
AA	Administering Areas
AAR	After Action Report
ARC	American Red Cross
ARP	Accidental Risk Prevention
ATC20	Applied Technology Council 20
ATC21	Applied Technology Council 21
BCP	Budget Change Proposal
BSA	California Bureau of State Audits
CAER	Community Awareness & Emergency response
CalARP	California Accidental Release Prevention
CalBO	California Building Officials
CalEPA	California Environmental Protection Agency
CalREP	California Radiological Emergency Plan
CALSTARS	California State Accounting Reporting System
CalTRANS	California Department of Transportation
CBO	Community Based Organization
CD	Civil Defense
CDF	California Department of Forestry and Fire Protection
CDMG	California Division of Mines and Geology
CEC	California Energy Commission
CEPEC	California Earthquake Prediction Evaluation Council
CESRS	California Emergency Services Radio System
CHIP	California Hazardous Identification Program
CHMIRS	California Hazardous Materials Incident Reporting System
CHP	California Highway Patrol
CLETS	California Law Enforcement Telecommunications System
CSTI	California Specialized Training Institute
CUEA	California Utilities Emergency Association
CUPA	Certified Unified Program Agency
DAD	Disaster Assistance Division (of the state Office of Emergency Svcs)
DFO	Disaster Field Office
DGS	California Department of General Services
DHSRHB	California Department of Health Services, Radiological Health Branch
DO	Duty Officer
DOC	Department Operations Center
DOE	Department of Energy

DOF	California Department of Finance
DOJ	California Department of Justice
DPA	California Department of Personnel Administration
DPIG	Disaster Preparedness Improvement Grant
DR	Disaster Response
DSA	Division of the State Architect
DSR	Damage Survey Report
DSW	Disaster Service Worker
DWR	California Department of Water Resources
EAS	Emergency Alerting System
EDIS	Emergency Digital Information System
EERI	Earthquake Engineering Research Institute
IEMA	Emergency Management Assistance
EMI	Emergency Management Institute
EMMA	Emergency Managers Mutual Aid
EMS	Emergency Medical Services
EOC	Emergency Operations Center
EOP	Emergency Operations Plan
EPA	Environmental Protection Agency (U.S.)
EPEDAT	Early Post Earthquake Damage Assessment Tool
EPI	Emergency Public Information
EPIC	Emergency Public Information Counsel
ESC	Emergency Services Coordinator
FAY	Federal Award Year
FDAA	Federal Disaster Assistance Administration
FEAT	Governor's Flood Emergency Action Team
FEMA	Federal Emergency Management Agency
FFY	Federal Fiscal Year
FIR	Final Inspection Reports
FIRESCOPE	Firefighting Resources of So. Calif. Organized for Potential Emergencies
FMA	Flood Management Assistance
FSR	Feasibility Study Report
FY	Fiscal Year
GIS	Geographical Information System
HAZMAT	Hazardous Materials
HAZMIT	Hazardous Mitigation
HAZUS	Hazards United States (an earthquake damage assessment prediction tool)
HAD	Housing and Community Development
HEICS	Hospital Emergency Incident Command System
HEPG	Hospital Emergency Planning Guidance
HIA	Hazard Identification and Analysis Unit
HMEP	Hazardous Materials Emergency Preparedness
HMGP	Hazard Mitigation Grant Program
IDE	Initial Damage Estimate

IA	Individual Assistance
IFG	Individual & Family Grant (program)
IRG	Incident Response Geographic Information System
IPA	Information and Public Affairs (of state Office of Emergency Services)
LAN	Local Area Network
LEMMA	Law Enforcement Master Mutual Aid
LEPC	Local Emergency Planning Committee
MARAC	Mutual Aid Regional Advisory Council
MOU	Memorandum of Understanding
NBC	Nuclear, Biological, Chemical
NEMA	National Emergency Management Agency
NEMIS	National Emergency Management Information Assistance Program
NFIP	National Flood Insurance Program
NOAA	National Oceanic and Atmospheric Association
NPP	Nuclear Power Plant
NSF	National Science Foundation
NWS	National Weather Service
OA	Operational Area
OASI	Operational Area Satellite Information System
OCC	Operations Coordination Center
OCD	Office of Civil Defense
OEP	Office of Emergency Planning
OES	California Governor's Office of Emergency Services
OSHPD	Office of Statewide Health Planning and Development
OSPR	Oil Spill Prevention and Response
PA	Public Assistance
PC	Personal Computer
PDA	Preliminary Damage Assessment
PIO	Public Information Office
POST	Police Officer Standards and Training
PPA/CA	Performance Partnership Agreement/Cooperative Agreement (FEMA)
PSA	Public Service Announcement
PTAB	Planning and Technological Assistance Branch
PTR	Project Time Report
RA	Regional Administrator (OES)
RADEF	Radiological Defense Program
RAMP	Regional Assessment of Mitigation Priorities
RAPID	Railroad Accident Prevention & Immediate Deployment
RDO	Radiological Defense Officer
RDMHC	Regional Disaster Medical Health Coordinator
REOC	Regional Emergency Operations Center
REPI	Reserve Emergency Public Information
RES	Regional Emergency Staff
RIMS	Response Information Management System

RMP	Risk Management Plan
RPU	Radiological Preparedness Unit (OES)
RRT	Regional Response Team
SAM	State Administrative Manual
SARA	Superfund Amendments & Reauthorization Act
SAVP	Safety Assessment Volunteer Program
SBA	Small Business Administration
SCO	California State Controller's Office
SEMS	Standardized Emergency Management System
SEPIC	State Emergency Public Information Committee
SLA	State and Local Assistance
SONGS	San Onofre Nuclear Generating Station
SOP	Standard Operating Procedure
SWEP	Statewide Emergency Planning Committee
TEC	Travel Expense Claim
TRU	Transuranic
TTT	Train the Trainer
UPA	Unified Program Account
UPS	Uninterrupted Power Source
USAR	Urban Search and Rescue
USGS	United States Geological Survey
WC	California State Warning Center
WAN	Wide Area Network
WIPP	Waste Isolation Pilot Project

APPENDIX

F

GLOSSARY

Acceleration	The rate of change of velocity with respect to time. Acceleration due to gravity at the earth's surface is 9.8 meters per second squared. That means that every second that something falls toward the surface of earth its velocity increases by 9.8 meters per second.
Asset	Any manmade or natural feature that has value, including, but not limited to people; buildings; infrastructure like bridges, roads, and sewer and water systems; lifelines like electricity and communication resources; or environmental, cultural, or recreational features like parks, dunes, wetlands, or landmarks.
Base Flood	Flood that has a 1 percent probability of being equaled or exceeded in any given year. Also known as the 100-year flood.
Base Flood Elevation (BFE)	Elevation of the base flood in relation to a specified datum, such as the National Geodetic Vertical Datum of 1929. The Base Flood Elevation is used as the standard for the National Flood Insurance Program.
Bedrock	The solid rock that underlies loose material, such as soil, sand, clay, or gravel.
Building	A structure that is walled and roofed, principally above ground and permanently affixed to a site. The term includes a manufactured home on a permanent foundation on which the wheels and axles carry no weight.
Coastal High Hazard Area	Area, usually along an open coast, bay, or inlet that is subject to inundation by storm surge and in some instances, wave action caused by storms or seismic sources.
Coastal Zones	The area along the shore where the ocean meets the land as the surface of the land rises above the ocean. This land/water interface includes barrier islands, estuaries, beaches, coastal wetlands, and land areas having direct drainage to the ocean.
Community Rating System (CRS)	An NFIP program that provides incentives for NFIP communities to complete activities that reduce flood hazard risk. When the community completes specified activities, the insurance premiums of policyholders in these communities are reduced.
Computer-Aided Design and Drafting (CADD)	A computerized system enabling quick and accurate electronic 2-D and 3-D drawings, topographic mapping, site plans, and profile/cross section drawings.
Contour	A line of equal ground elevation on a topographic (contour) map.
	Facilities that are critical to the health and welfare of the population and that are especially important following hazard

Critical Facility	events. Critical facilities include, but are not limited to, shelters, police and fire stations, and hospitals.
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Debris	The scattered remains of assets broken or destroyed in a hazard event. Debris caused by a wind or water hazard event can cause additional damage to other assets.
Digitize	To convert electronically points, lines, and area boundaries shown on maps into x, y coordinates (e.g., latitude and longitude, universal transverse mercator (UTM), or table coordinates) for use in computer applications.
Displacement Time	The average time (in days) which the building's occupants typically must operate from a temporary location while repairs are made to the original building due to damages resulting from a hazard event.
Duration	How long a hazard event lasts.
Earthquake	A sudden motion or trembling that is caused by a release of strain accumulated within or along the edge of earth's tectonic plates.
Erosion	Wearing away of the land surface by detachment and movement of soil and rock fragments, during a flood or storm or over a period of years, through the action of wind, water, or other geologic processes.
Erosion Hazard Area	Area anticipated being lost to shoreline retreat over a given period of time. The projected inland extent of the area is measured by multiplying the average annual long-term recession rate by the number of years desired.
Essential Facility	Elements that are important to ensure a full recovery of a community or state following a hazard event. These would include: government functions, major employers, banks, schools, and certain commercial establishments, such as grocery stores, hardware stores, and gas stations.
Extent	The size of an area affected by a hazard or hazard event.
Extratropical Cyclone	Cyclonic storm events like Nor'easters and sever winter low-pressure systems. Both West and East coasts can experience these non-tropical storms that produce gale-force winds and precipitation in the form of heavy rain or snow. These cyclonic storms, commonly called Nor'easters on the East Coast because of the direction of the storm winds, can last for several days and can be very large – 1,000-mile-wide storms are not uncommon.
Fault	A fracture in the continuity of a rock formation caused by a shifting or dislodging of the earth's crust, in which adjacent

	surfaces are differentially displaced parallel to the plane of fracture.
Federal Emergency Management Agency (FEMA)	Independent agency created in 1978 to provide a single point of accountability for all Federal activities related to disaster mitigation and emergency preparedness, response, and recovery.

Fire Potential Index (FPI)	Developed by USGS and USFS to assess and map fire hazard potential over broad areas. Based on such geographic information, national policy makers and on-the-ground fire managers prevention activities in the defined area to reduce the risk of managed and wildfire ignition and spread. Prediction of fire hazard shortens the time between fire ignition and initial attack by enabling fire managers to pre-allocate and stage suppression forces to high fire risk areas.
Flash Flood	A flood event occurring where water levels rise with little or no warning at an extremely fast rate.
Flood	A general and temporary condition of partial or complete inundation of normally dry land areas from (1) the overflow of inland or tidal waters, (2) the unusual and rapid accumulation or runoff of surface waters from any source, or (3) mudflows or the sudden collapse of shoreline land.
Flood Depth	Height of the flood water surface above the ground surface.
Flood Elevation	Elevation of the water surface above an established datum, e.g. National Geodetic Vertical Datum of 1929, North American Vertical Datum of 1988, or Mean Sea Level.
Flood Hazard Area	The area shown to be inundated by a flood of a given magnitude on a map.
Flood Insurance Rate Map (FIRM)	Map of a community, prepared by the Federal Emergency Management Agency that shows both the special flood hazard areas and the risk premium zones applicable to the community.
Flood Insurance Study (FIS)	A study that provides an examination, evaluation, and determination of flood hazards and, if appropriate, corresponding water surface elevations in a community or communities.
Floodplain	Any land area, including watercourse, susceptible to partial or complete inundation by water from any source.
	A measure of how often events of a particular magnitude is expected to occur. Frequency describes how often a hazard of a specific magnitude, duration, and/or extent typically occurs,

Frequency	on average. Statistically, a hazard with a 100-year recurrence interval is expected to occur once every 100 years on average and would have a 1 percent chance – its probability – of happening every year. The reliability of this information varies depending on the kind of hazard being considered.
Fujita Scale of Tornado Intensity	Rates tornadoes with numeric values from F0 to F5 based on tornado wind speed and damage sustained. An F0 indicates minimal damage, such as broken tree limbs or signs, while an F5 indicates severe damage sustained.

Functional Downtime	The average time (in days) during which a function (business or service) is unable to provide its services due to a hazard event.
Geographic Area Impacted	The physical area in which the effects of the hazard are experienced.
Geographic Information Systems (GIS)	A computer software application that relates physical features on the earth to a database to be used for mapping and analysis.
Ground Motion	The vibration or shaking of the ground during an earthquake. When a fault ruptures, seismic waves radiate, causing the ground to vibrate. The severity of the vibration increases with the amount of energy released and decreases with distance from the causative fault or epicenter, but soft soils can further amplify ground motions.
Hazard	A source of potential danger or adverse condition. Hazards in this how-to series will include naturally occurring events, such as floods, earthquakes, tornadoes, tsunamis, coastal storms, landslides, and wildfires that strike populated areas. A natural event is a hazard when it has the potential to harm people or property.
Hazard Event	A specific occurrence of a particular type of hazard.
Hazard Identification	The process of identifying hazards that threaten an area.
Hazard Mitigation	Sustained actions taken to reduce or eliminate long-term risk from hazards and their effects.
Hazard Profile	A description of the physical characteristics of hazards and a determination of various descriptors including magnitude, duration, frequency, probability, and extent. In most cases, a community can most easily use these descriptors when they are recorded and displayed as maps.
HAZUS (Hazards U.S.)	A GIS-based nationally standardized earthquake loss estimation tool developed by FEMA.

Hurricane	An intense tropical cyclone, formed in the atmosphere over warm ocean areas, in which wind speeds reach 74-miles-per-hour or more and blow in a large spiral around a relatively calm center or "eye." Hurricanes develop over the north Atlantic Ocean, northeast Pacific Ocean, or the south Pacific Ocean east of 160°E longitude. Hurricane circulation is counterclockwise in the Northern Hemisphere and clockwise in the Southern Hemisphere.
Hydrology	The science of dealing with the waters of the earth. A flood discharge is developed by a hydrologic study.

Infrastructure	Refers to the public services of a community that have a direct impact on the quality of life. Infrastructure includes communication technology such as phone lines or Internet access, vital services such as public water supplies and sewer treatment facilities, and includes an area's transportation system such as airports, heliports; highways, bridges, tunnels, roadbeds, overpasses, railways, bridges, rail yards, depots; and waterways, canals, locks, seaports, ferries, harbors, dry-docks, piers and regional dams.
Intensity	A measure of the effects of a hazard event at a particular place.
Landslide	Downward movement of a slope and materials under the force of gravity.
Lateral Spreads	Develop on gentle slopes and entail the sidelong movement of large masses of soil as an underlying layer liquefies in a seismic event. The phenomenon that occurs when ground shaking causes loose soils to lose strength and act like viscous fluid. Liquefaction causes two types of ground failure: lateral spread and loss of bearing strength.
Liquefaction	Results when the soil supporting structures liquefies. This can cause structures to tip and topple
Lowest Floor	Under the NFIP, the lowest floor of the lowest enclosed area (including basement) of a structure.
Magnitude	A measure of the strength of a hazard event. The magnitude (also referred to as severity) of a given hazard event is usually determined using technical measures specific to the hazard.
Mitigation Plan	A systematic evaluation of the nature and extent of vulnerability to the effects of natural hazards typically present in the state and includes a description of actions to minimize future vulnerability to hazards.

National Flood Insurance Program (NFIP)	Federal program created by Congress in 1968 that makes flood insurance available in communities that enact minimum floodplain management regulations in 44 CFR §60.3.
National Geodetic Vertical Datum of 1929 (NGVD)	Datum established in 1929 and used in the NFIP as a basis for measuring flood, ground, and structural elevations, previously referred to as Sea Level Datum or Mean Sea Level. The Base Flood Elevations shown on most of the Flood Insurance Rate Maps issued by the Federal Emergency Management Agency are referenced to NGVD.
National Weather Service (NWS)	Prepares and issues flood, severe weather, and coastal storm warnings and can provide technical assistance to Federal and state entities preparing weather and flood warning plans.
Nor'easter	An extra-tropical cyclone producing gale-force winds and precipitation in the form of heavy snow or rain.

Outflow	Follows water inundation creating strong currents that rip at structures and pound them with debris and erode beaches and coastal structures.
Planimetric	Describes maps that indicate only man-made features like buildings.
Planning	The act or process of making or carrying out plans; the establishment of goals, policies, and procedures for a social or economic unit
Probability	A statistical measure of the likelihood that a hazard event will occur.
Recurrence Interval	The time between hazard events of similar size in a given location. It is based on the probability that the given event will be equaled or exceeded in any given year.
Repetitive Loss Property	A property that is currently insured for which two or more National Flood Insurance Program losses (occurring more than ten days apart) of at least \$1000 each have been paid within any 10-year period since 1978.
Replacement Value	The cost of rebuilding a structure. This is usually expressed in terms of cost per square foot and reflects the present-day cost of labor and materials to construct a building of a particular size, type, and quality.
Richter Scale	A numerical scale of earthquake magnitude devised by seismologist C.F. Richter in 1935.
Risk	The estimated impact that a hazard would have on people, services, facilities, and structures in a community; the likelihood of a hazard event resulting in an adverse condition that causes injury or damage. Risk is often expressed in relative terms such as a high, moderate, or low likelihood of

	sustaining damage above a particular threshold due to a specific type of hazard event. It also can be expressed in terms of potential monetary losses associated with the intensity of the hazard.
Riverine	Of or produced by a river.
Scale	A proportion used in determining a dimensional relationship; the ratio of the distance between two points on a map and the actual distance between the two points on the earth's surface.
Scarp	A steep slope.
Scour	Removal of soil or fill material by the flow of flood waters. The term is frequently used to describe storm-induced, localized conical erosion around pilings and other foundation supports where the obstruction of flow increases turbulence.
Seismicity	Describes the likelihood of an area being subject to earthquakes.
Special Flood Hazard Area (SFHA)	An area within a floodplain having a 1 percent or greater chance of flood occurrence in any given year (100-year floodplain); represented on Flood Insurance Rate Maps by darkly shaded areas with zone designations that include the letter A or V.
Stafford Act	The Robert T. Stafford Disaster Relief and Emergency Assistance Act, PL 100-107 was signed into law November 23, 1988 and amended the Disaster Relief Act of 1974, PL 93-288. The Stafford Act is the statutory authority for most Federal disaster response activities, especially as they pertain to FEMA and its programs.
State Hazard Mitigation Officer (SHMO)	The representative of state government who is the primary point of contact with FEMA, other state and Federal agencies, and local units of government in the planning and implementation of pre- and post-disaster mitigation activities.
Storm Surge	Rise in the water surface above normal water level on the open coast due to the action of wind stress and atmospheric pressure on the water surface.
Structure	Something constructed. (See also Building)
Substantial Damage	Damage of any origin sustained by a structure in a Special Flood Hazard Area whereby the cost of restoring the structure to its before-damaged condition would equal or exceed 50 percent of the market value of the structure before the damage.
Super Typhoon	A typhoon with maximum sustained winds of 150 mph or more.
Surface Faulting	The differential movement of two sides of a fracture – in other words, the location where the ground breaks apart. The

	length, width, and displacement of the ground characterize surface faults.
Tectonic Plate	Torsionally rigid, thin segments of the earth's lithosphere that may be assumed to move horizontally and adjoin other plates. It is the friction between plate boundaries that cause seismic activity.
Topographic	Characterizes maps that show natural features and indicate the physical shape of the land using contour lines. These maps may also include manmade features.
Tornado	A violently rotating column of air extending from a thunderstorm to the ground.
Tropical Cyclone	A generic term for a cyclonic, low-pressure system over tropical or subtropical waters.
Tropical Depression	A tropical cyclone with maximum sustained winds of less than 39 mph.
Tropical Storm	A tropical cyclone with maximum sustained winds greater than 39 mph and less than 74 mph.

Tsunami	Great sea wave produced by submarine earth movement or volcanic eruption.
Typhoon	A special category of tropical cyclone peculiar to the western North Pacific Basin, frequently affecting areas in the vicinity of Guam and North Mariana Islands. Typhoons whose maximum sustained winds attain or exceed 150 mph are called super typhoons.
Vulnerability	Describes how exposed or susceptible to damage an asset is. Vulnerability depends on an asset's construction, contents, and the economic value of its functions. Like indirect damages, the vulnerability of one element of the community is often related to the vulnerability of another. For example, many businesses depend on uninterrupted electrical power – if an electric substation is flooded, it will affect not only the substation itself, but a number of businesses as well. Often, indirect effects can be much more widespread and damaging than direct ones.
Vulnerability Assessment	The extent of injury and damage that may result from a hazard event of a given intensity in a given area. The vulnerability assessment should address impacts of hazard events on the existing and future built environment.
Water Displacement	When a large mass of earth on the ocean bottom sinks or uplifts, the column of water directly above it is displaced, forming the tsunami wave. The rate of displacement, motion of the ocean floor at the epicenter, the amount of

	displacement of the rupture zone, and the depth of water above the rupture zone all contribute to the intensity of the tsunami.
Wave Run-up	The height that the wave extends up to on steep shorelines, measured above a reference level (the normal height of the sea, corrected to the state of the tide at the time of wave arrival).
Wildfire	An uncontrolled fire spreading through vegetative fuels, exposing and possibly consuming structures.
Zone	A geographical area shown on a Flood Insurance Rate Map (FIRM) that reflects the severity or type of flooding in the area.