

City of Los Angeles 2017 Local Hazard Mitigation Plan

PART 3—MITIGATION STRATEGY

21. GOALS AND OBJECTIVES

Hazard mitigation plans must identify goals for reducing long-term vulnerabilities to identified hazards (44 CFR Section 201.6(c)(3)(i)). The Steering Committee established a mission statement, a set of goals and measurable objectives for this plan, based on data from the preliminary risk assessment and the results of the public involvement strategy. The mission statement, goals, objectives and actions in this plan all support each other. Goals were selected to support the mission statement. Objectives were selected that meet multiple goals. Actions were prioritized based on ability to accomplish multiple objectives.

21.1 MISSION STATEMENT

To reduce risk and increase resilience, the mission of the City of Los Angeles Local Hazard Mitigation Plan is to establish and promote a comprehensive mitigation policy and program to protect City residents, their property, public facilities, infrastructure and the environment from natural and manmade hazards.

21.2 GOALS

Of five goals in the 2011 hazard mitigation plan, two were unchanged for this update and three were modified; one new goal was added, resulting in the following set of goals:

1. Protect life, property, and cultural resources.
2. Increase public awareness.
3. Coordinate with other programs that can support or enhance hazard mitigation.
4. Increase emergency services effectiveness.
5. Pursue cost-effective and environmentally sound mitigation measures.
6. Strive to increase adaptive capacity to reduce risk from hazard impacts based on future conditions.

21.3 OBJECTIVES

Individual Steering Committee members identified 50 plan objectives, of which the following were selected by 50 percent or more of the participants:

1. Reduce repetitive property losses due to flood, fire and earthquake by updating land use, design, and construction policies.
2. Identify natural and manmade hazards that threaten life and property in the City.
3. Use hazard data while reviewing proposed development opportunities.
4. Encourage the incorporation of mitigation measures into repairs, major alterations, new development, and redevelopment practices, especially in areas subject to substantial hazard risk.
5. Encourage and support leadership within the private sector, non-profit agencies and community-based organizations to promote and implement local hazard mitigation activities.
6. Incorporate risk reduction considerations in new and updated infrastructure and development plans to reduce the impacts of hazards.

7. Continue providing City emergency services with training and equipment to address all identified hazards.
8. Develop and provide updated information about threats, hazards, vulnerabilities, and mitigation strategies to state, regional, and local agencies, as well as private sector groups.
9. Establish and maintain partnerships among all levels of government, private sector, community groups, and institutions of higher learning that improve and implement methods to protect life and property.
10. Create financial and regulatory incentives to motivate stakeholders such as homeowners, private sector businesses, and nonprofit community organizations to mitigate hazards and risk.
11. Continue developing and strengthening inter-jurisdictional coordination and cooperation in the area of emergency services.
12. Support the protection of vital records, and strengthening or replacement of buildings, infrastructure, and lifelines to minimize post-disaster disruption and facilitate short-term and long-term recovery.
13. Coordinate state and local efforts to reduce greenhouse gas emissions and implement climate adaptation strategies through hazard mitigation plans and actions.
14. Implement mitigation programs and projects that protect not only life and property, but the environment as well.
15. Promote and implement hazard mitigation plans and projects that are consistent with state, regional and local climate action and adaptation goals, policies, and programs.
16. Advance community resilience through preparation, adoption, and implementation of state, regional and local multi-hazard mitigation plans and projects.

22. MITIGATION ALTERNATIVES

Catalogs of hazard mitigation alternatives were developed that present a broad range of alternatives to be considered for use in the planning area, in compliance with 44 CFR (Section 201.6(c)(3)(ii)). One catalog was developed for each natural hazard of concern evaluated in this plan. The catalogs present alternatives that are categorized in two ways:

- By who would have responsibility for implementation:
 - Individuals (personal scale)
 - Businesses (corporate scale)
 - Government (government scale).
- By what the alternative would do:
 - Manipulate the flooding hazard
 - Reduce exposure to the flooding hazard
 - Reduce vulnerability to the flooding hazard
 - Increase the ability to respond to or be prepared for the flooding hazard.

Hazard mitigation actions recommended in this plan were selected from among the alternatives presented in the catalogs. The catalogs provide a baseline of mitigation alternatives that are backed by a planning process, are consistent with the established goals and objectives, and are within the capabilities of the City of Los Angeles to implement. Some of these actions may not be feasible based on the selection criteria identified for this plan. The purpose of the catalog was to provide a list of what could be considered to reduce risk of the flood hazard within the planning area. Actions in the catalog that are not included in the action plan were not selected for one or more of the following reasons:

- The action is not feasible.
- The action is already being implemented.
- There is an apparently more cost-effective alternative.
- The action does not have public or political support.

The catalogs for each hazard are presented in Table 22-1 through Table 22-8.

Table 22-1. Alternatives to Mitigate the Adverse Weather Hazard

Personal-Scale	Corporate-Scale	Government-Scale
<ul style="list-style-type: none"> • Manipulate the hazard: <ul style="list-style-type: none"> ❖ None • Reduce exposure to the hazard: <ul style="list-style-type: none"> ❖ None • Reduce vulnerability to the hazard: <ul style="list-style-type: none"> ❖ Insulate house ❖ Provide redundant heat and power ❖ Insulate structure ❖ Plant appropriate trees near home and power lines (“Right tree, right place” National Arbor Day Foundation Program) • Increase the ability to respond to or be prepared for the hazard: <ul style="list-style-type: none"> ❖ Trim or remove trees that could affect power lines ❖ Promote 72-hour self-sufficiency ❖ Obtain a NOAA weather radio. ❖ Obtain an emergency generator. 	<ul style="list-style-type: none"> • Manipulate the hazard: <ul style="list-style-type: none"> ❖ None • Reduce exposure to the hazard: <ul style="list-style-type: none"> ❖ None • Reduce vulnerability to the hazard: <ul style="list-style-type: none"> ❖ Relocate critical infrastructure (such as power lines) underground ❖ Reinforce or relocate critical infrastructure such as power lines to meet performance expectations ❖ Install tree wire • Increase the ability to respond to or be prepared for the hazard: <ul style="list-style-type: none"> ❖ Trim or remove trees that could affect power lines ❖ Create redundancy ❖ Equip facilities with a NOAA weather radio ❖ Equip vital facilities with emergency power sources. 	<ul style="list-style-type: none"> • Manipulate the hazard: <ul style="list-style-type: none"> ❖ None • Reduce exposure to the hazard: <ul style="list-style-type: none"> ❖ None • Reduce vulnerability to the hazard: <ul style="list-style-type: none"> ❖ Harden infrastructure such as locating utilities underground ❖ Trim trees back from power lines ❖ Consider “cool roofs” and “green roofs” • Increase the ability to respond to or be prepared for the hazard: <ul style="list-style-type: none"> ❖ Support programs such as “Tree Watch” that proactively manage problem areas through use of selective removal of hazardous trees, tree replacement, etc. ❖ Establish and enforce building codes that require all roofs to withstand snow loads ❖ Increase communication alternatives ❖ Modify land use and environmental regulations to support vegetation management activities that improve reliability in utility corridors. ❖ Modify landscape and other ordinances to encourage appropriate planting near overhead power, cable, and phone lines ❖ Provide NOAA weather radios to the public

Table 22-2. Alternatives to Mitigate the Dam Failure Hazard

Personal-Scale	Corporate-Scale	Government-Scale
<ul style="list-style-type: none"> • Manipulate the hazard: <ul style="list-style-type: none"> ❖ None • Reduce exposure to the hazard: <ul style="list-style-type: none"> ❖ Relocate out of dam failure inundation areas. • Reduce vulnerability to the hazard: <ul style="list-style-type: none"> ❖ Elevate home to appropriate levels. • Increase the ability to respond to or be prepared for the hazard: <ul style="list-style-type: none"> ❖ Learn about risk reduction for the dam failure hazard. ❖ Learn the evacuation routes for a dam failure event. ❖ Educate yourself on early warning systems and the dissemination of warnings. 	<ul style="list-style-type: none"> • Manipulate the hazard: <ul style="list-style-type: none"> ❖ Remove dams. ❖ Remove levees. ❖ Harden dams. • Reduce exposure to the hazard: <ul style="list-style-type: none"> ❖ Replace earthen dams with hardened structures. • Reduce vulnerability to the hazard: <ul style="list-style-type: none"> ❖ Flood-proof facilities within dam failure inundation areas. • Increase the ability to respond to or be prepared for the hazard: <ul style="list-style-type: none"> ❖ Educate employees on the probable impacts of a dam failure. ❖ Develop a continuity of operations plan. 	<ul style="list-style-type: none"> • Manipulate the hazard: <ul style="list-style-type: none"> ❖ Remove dams. ❖ Remove levees. ❖ Harden dams. • Reduce exposure to the hazard: <ul style="list-style-type: none"> ❖ Replace earthen dams with hardened structures ❖ Relocate critical facilities out of dam failure inundation areas. ❖ Consider open space land use in designated dam failure inundation areas. • Reduce vulnerability to the hazard: <ul style="list-style-type: none"> ❖ Adopt higher floodplain standards in mapped dam failure inundation areas. ❖ Retrofit critical facilities within dam failure inundation areas. • Increase the ability to respond to or be prepared for the hazard: <ul style="list-style-type: none"> ❖ Map dam failure inundation areas. ❖ Enhance emergency operations plan to include a dam failure component. ❖ Institute monthly communications checks with dam operators. ❖ Inform the public on risk reduction techniques ❖ Adopt real-estate disclosure requirements for the re-sale of property located within dam failure inundation areas. ❖ Consider the probable impacts of climate in assessing the risk associated with the dam failure hazard. ❖ Establish early warning capability downstream of listed high hazard dams. ❖ Consider the residual risk associated with protection provided by dams in future land use decisions.

Table 22-3. Alternatives to Mitigate the Drought Hazard

Personal-Scale	Corporate-Scale	Government-Scale
<ul style="list-style-type: none"> • Manipulate the hazard: <ul style="list-style-type: none"> ❖ None • Reduce exposure to the hazard: <ul style="list-style-type: none"> ❖ None • Reduce vulnerability to the hazard: <ul style="list-style-type: none"> ❖ Drought-resistant landscapes ❖ Reduce water system losses ❖ Modify plumbing systems (through water saving kits) • Increase the ability to respond to or be prepared for the hazard: <ul style="list-style-type: none"> ❖ Practice active water conservation 	<ul style="list-style-type: none"> • Manipulate the hazard: <ul style="list-style-type: none"> ❖ None • Reduce exposure to the hazard: <ul style="list-style-type: none"> ❖ None • Reduce vulnerability to the hazard: <ul style="list-style-type: none"> ❖ Drought-resistant landscapes ❖ Reduce private water system losses • Increase the ability to respond to or be prepared for the hazard: <ul style="list-style-type: none"> ❖ Practice active water conservation 	<ul style="list-style-type: none"> • Manipulate the hazard: <ul style="list-style-type: none"> ❖ Groundwater recharge through stormwater management • Reduce exposure to the hazard: <ul style="list-style-type: none"> ❖ Identify and create groundwater backup sources • Reduce vulnerability to the hazard: <ul style="list-style-type: none"> ❖ Water use conflict regulations ❖ Reduce water system losses ❖ Distribute water saving kits • Increase the ability to respond to or be prepared for the hazard: <ul style="list-style-type: none"> ❖ Public education on drought resistance ❖ Encourage recycling ❖ Identify alternative water supplies for times of drought; mutual aid agreements with alternative suppliers ❖ Develop drought contingency plan ❖ Develop criteria “triggers” for drought-related actions ❖ Improve accuracy of water supply forecasts ❖ Modify rate structure to influence active water conservation techniques

Table 22-4. Alternatives to Mitigate the Earthquake Hazard

Personal-Scale	Corporate-Scale	Government-Scale
<ul style="list-style-type: none"> • Manipulate the hazard: <ul style="list-style-type: none"> ❖ None • Reduce exposure to the hazard: <ul style="list-style-type: none"> ❖ Locate outside of hazard area (off soft soils) • Reduce vulnerability to the hazard: <ul style="list-style-type: none"> ❖ Retrofit structure (anchor house structure to foundation) ❖ Secure household items that can cause injury or damage (such as water heaters, bookcases, and other appliances) ❖ Build to higher design • Increase the ability to respond to or be prepared for the hazard: <ul style="list-style-type: none"> ❖ Practice “drop, cover, and hold” ❖ Develop household mitigation plan, such as creating a retrofit savings account, communication capability with outside, 72-hour self-sufficiency during an event ❖ Keep cash reserves for reconstruction ❖ Become informed on the hazard and risk reduction alternatives available. ❖ Develop a post-disaster action plan for your household 	<ul style="list-style-type: none"> • Manipulate the hazard: <ul style="list-style-type: none"> ❖ None • Reduce exposure to the hazard: <ul style="list-style-type: none"> ❖ Locate or relocate mission-critical functions outside hazard area where possible • Reduce vulnerability to the hazard: <ul style="list-style-type: none"> ❖ Build redundancy for critical functions and facilities ❖ Retrofit critical buildings and areas housing mission-critical functions • Increase the ability to respond to or be prepared for the hazard: <ul style="list-style-type: none"> ❖ Adopt higher standard for new construction; consider “performance-based design” when building new structures ❖ Keep cash reserves for reconstruction ❖ Inform your employees on the possible impacts of earthquake and how to deal with them at your work facility. ❖ Develop a continuity of operations plan 	<ul style="list-style-type: none"> • Manipulate the hazard: <ul style="list-style-type: none"> ❖ None • Reduce exposure to the hazard: <ul style="list-style-type: none"> ❖ Locate critical facilities or functions outside hazard area where possible • Reduce vulnerability to the hazard: <ul style="list-style-type: none"> ❖ Harden infrastructure ❖ Provide redundancy for critical functions ❖ Adopt higher regulatory standards • Increase the ability to respond to or be prepared for the hazard: <ul style="list-style-type: none"> ❖ Provide better hazard maps ❖ Provide technical information and guidance ❖ Enact tools to help manage development in hazard areas (e.g., tax incentives, information) ❖ Include retrofitting and replacement of critical system elements in capital improvement plan ❖ Develop strategy to take advantage of post-disaster opportunities ❖ Warehouse critical infrastructure components such as pipe, power line, and road repair materials ❖ Develop and adopt a continuity of operations plan ❖ Initiate triggers guiding improvements (such as <50% substantial damage or improvements) ❖ Further enhance seismic risk assessment to target high hazard buildings for mitigation opportunities. ❖ Develop a post-disaster action plan that includes grant funding and debris removal components.

Table 22-5. Alternatives to Mitigate the Flood Hazard

Personal-Scale	Corporate-Scale	Government-Scale
<ul style="list-style-type: none"> • Manipulate the hazard: <ul style="list-style-type: none"> ❖ Clear storm drains and culverts ❖ Use low-impact development techniques • Reduce exposure to the hazard: <ul style="list-style-type: none"> ❖ Locate outside of hazard area ❖ Elevate utilities above base flood elevation ❖ Use low-impact development techniques • Reduce vulnerability to the hazard: <ul style="list-style-type: none"> ❖ Raise structures above base flood elevation ❖ Elevate items within house above base flood elevation ❖ Build new homes above base flood elevation ❖ Flood-proof structures • Increase the ability to respond to or be prepared for the hazard: <ul style="list-style-type: none"> ❖ Buy flood insurance ❖ Develop household plan, such as retrofit savings, communication with outside, 72-hour self-sufficiency during and after an event 	<ul style="list-style-type: none"> • Manipulate the hazard: <ul style="list-style-type: none"> ❖ Clear storm drains and culverts ❖ Use low-impact development techniques • Reduce exposure to the hazard: <ul style="list-style-type: none"> ❖ Locate critical facilities or functions outside hazard area ❖ Use low-impact development techniques • Reduce vulnerability to the hazard: <ul style="list-style-type: none"> ❖ Build redundancy for critical functions or retrofit critical buildings ❖ Provide flood-proofing when new critical infrastructure must be located in floodplains • Increase the ability to respond to or be prepared for the hazard: <ul style="list-style-type: none"> ❖ Keep cash reserves for reconstruction ❖ Support and implement hazard disclosure for sale of property in risk zones. ❖ Solicit cost-sharing through partnerships with others on projects with multiple benefits. 	<ul style="list-style-type: none"> • Manipulate the hazard: <ul style="list-style-type: none"> ❖ Maintain drainage system ❖ Institute low-impact development techniques on property ❖ Dredging, levee construction, and providing regional retention areas ❖ Structural flood control, levees, channelization, or revetments. ❖ Stormwater management regulations and master planning ❖ Acquire vacant land or promote open space uses in developing watersheds to control increases in runoff • Reduce exposure to the hazard: <ul style="list-style-type: none"> ❖ Locate or relocate critical facilities outside of hazard area ❖ Acquire or relocate identified repetitive loss properties ❖ Promote open space uses in identified high hazard areas via techniques such as: planned unit developments, easements, setbacks, greenways, sensitive area tracks. ❖ Adopt land development criteria such as planned unit developments, density transfers, clustering ❖ Institute low impact development techniques on property ❖ Acquire vacant land or promote open space uses in developing watersheds to control increases in runoff • Reduce vulnerability to the hazard: <ul style="list-style-type: none"> ❖ Harden infrastructure, bridge replacement program ❖ Provide redundancy for critical functions and infrastructure ❖ Adopt regulatory standards such as freeboard standards, cumulative substantial improvement or damage, lower substantial damage threshold; compensatory storage, non-conversion deed restrictions. ❖ Stormwater management regulations and master planning. ❖ Adopt "no-adverse impact" floodplain management policies that strive to not increase the flood risk on downstream communities. • Increase the ability to respond to or be prepared for the hazard: <ul style="list-style-type: none"> ❖ Produce better hazard maps ❖ Provide technical information and guidance ❖ Enact tools to help manage development in hazard areas (stronger controls, tax incentives, and information) ❖ Incorporate retrofitting or replacement of critical system elements in capital improvement plan ❖ Develop strategy to take advantage of post-disaster opportunities ❖ Warehouse critical infrastructure components ❖ Develop and adopt a continuity of operations plan ❖ Consider participation in the Community Rating System ❖ Maintain and collect data to define risks and vulnerability ❖ Train emergency responders ❖ Create an elevation inventory of structures in the floodplain ❖ Develop and implement a public information strategy ❖ Charge a hazard mitigation fee ❖ Integrate floodplain management policies into other planning mechanisms within the planning area. ❖ Consider the probable impacts of climate change on the risk associated with the flood hazard ❖ Consider the residual risk associated with structural flood control in future land use decisions ❖ Enforce National Flood Insurance Program ❖ Adopt a Stormwater Management Master Plan

Table 22-6. Alternatives to Mitigate the Landslide Hazard

Personal-Scale	Corporate-Scale	Government-Scale
<ul style="list-style-type: none"> • Manipulate the hazard: <ul style="list-style-type: none"> ❖ Stabilize slope (dewater, armor toe) ❖ Reduce weight on top of slope ❖ Minimize vegetation removal and the addition of impervious surfaces. • Reduce exposure to the hazard: <ul style="list-style-type: none"> ❖ Locate structures outside of hazard area (off unstable land and away from slide-run out area) • Reduce vulnerability to the hazard: <ul style="list-style-type: none"> ❖ Retrofit home • Increase the ability to respond to or be prepared for the hazard: <ul style="list-style-type: none"> ❖ Institute warning system, and develop evacuation plan ❖ Keep cash reserves for reconstruction ❖ Educate yourself on risk reduction techniques for landslide hazards 	<ul style="list-style-type: none"> • Manipulate the hazard: <ul style="list-style-type: none"> ❖ Stabilize slope (dewater, armor toe) ❖ Reduce weight on top of slope • Reduce exposure to the hazard: <ul style="list-style-type: none"> ❖ Locate structures outside of hazard area (off unstable land and away from slide-run out area) • Reduce vulnerability to the hazard: <ul style="list-style-type: none"> ❖ Retrofit at-risk facilities • Increase the ability to respond to or be prepared for the hazard: <ul style="list-style-type: none"> ❖ Institute warning system, and develop evacuation plan ❖ Keep cash reserves for reconstruction ❖ Develop a continuity of operations plan ❖ Educate employees on the potential exposure to landslide hazards and emergency response protocol. 	<ul style="list-style-type: none"> • Manipulate the hazard: <ul style="list-style-type: none"> ❖ Stabilize slope (dewater, armor toe) ❖ Reduce weight on top of slope • Reduce exposure to the hazard: <ul style="list-style-type: none"> ❖ Acquire properties in high-risk landslide areas. ❖ Adopt land use policies that prohibit the placement of habitable structures in high-risk landslide areas. • Reduce vulnerability to the hazard: <ul style="list-style-type: none"> ❖ Adopt higher regulatory standards for new development within unstable slope areas. ❖ Armor/retrofit critical infrastructure against the impact of landslides. • Increase the ability to respond to or be prepared for the hazard: <ul style="list-style-type: none"> ❖ Produce better hazard maps ❖ Provide technical information and guidance ❖ Enact tools to help manage development in hazard areas: better land controls, tax incentives, information ❖ Develop strategy to take advantage of post-disaster opportunities ❖ Warehouse critical infrastructure components ❖ Develop and adopt a continuity of operations plan ❖ Educate the public on the landslide hazard and appropriate risk reduction alternatives.

Table 22-7. Alternatives to Mitigate the Tsunami Hazard

Personal-Scale	Corporate-Scale	Government-Scale
<ul style="list-style-type: none"> • Manipulate the hazard: <ul style="list-style-type: none"> ❖ None • Reduce exposure to the hazard: <ul style="list-style-type: none"> ❖ Locate outside of hazard area • Reduce vulnerability to the hazard: <ul style="list-style-type: none"> ❖ Apply personal property mitigation techniques to your home such as anchoring your foundation and foundation openings to allow flow through • Increase the ability to respond to or be prepared for the hazard: <ul style="list-style-type: none"> ❖ Develop and practice a household evacuation plan. ❖ Support/participate in the Redwood Coast Tsunami Working Group. ❖ Educate yourself on the risk exposure from the tsunami hazard and ways to minimize that risk. 	<ul style="list-style-type: none"> • Manipulate the hazard: <ul style="list-style-type: none"> ❖ None • Reduce exposure to the hazard: <ul style="list-style-type: none"> ❖ Locate structure or mission critical functions outside of hazard area whenever possible • Reduce vulnerability to the hazard: <ul style="list-style-type: none"> ❖ Mitigate personal property for the impacts of tsunami • Increase the ability to respond to or be prepared for the hazard: <ul style="list-style-type: none"> ❖ Develop and practice a corporate evacuation plan. ❖ Support/participate in the Redwood Coast Tsunami Working Group. ❖ Educate employees on the risk exposure from the tsunami hazard and ways to minimize that risk 	<ul style="list-style-type: none"> • Manipulate the hazard: <ul style="list-style-type: none"> ❖ Build wave abatement structures (e.g. the “Jacks” looking structure designed by the Japanese) • Reduce exposure to the hazard: <ul style="list-style-type: none"> ❖ Locate structure or functions outside of hazard area whenever possible. ❖ Harden infrastructure for tsunami impacts. ❖ Relocate identified critical facilities located in tsunami high hazard areas. • Reduce vulnerability to the hazard: <ul style="list-style-type: none"> ❖ Adopt higher regulatory standards that will provide higher levels of protection to structures built in a tsunami inundation area. ❖ Utilize tsunami mapping once available, to guide development away from high risk areas through land use planning • Increase the ability to respond to or be prepared for the hazard: <ul style="list-style-type: none"> ❖ Create a probabilistic tsunami map for the planning area. ❖ Provide incentives to guide development away from hazard areas. ❖ Develop a tsunami warning and response system. ❖ Provide residents with tsunami inundation maps ❖ Join NOAA’s Tsunami Ready program ❖ Develop and communicate evacuation routes ❖ Enhance the public information program to include risk reduction options for the tsunami hazard

Table 22-8. Alternatives to Mitigate the Wildfire Hazard

Personal-Scale	Corporate-Scale	Government-Scale
<ul style="list-style-type: none"> • Manipulate the hazard: <ul style="list-style-type: none"> ❖ Clear potential fuels on property such as dry overgrown underbrush and diseased trees • Reduce exposure to the hazard: <ul style="list-style-type: none"> ❖ Create and maintain defensible space around structures ❖ Locate outside of hazard area ❖ Mow regularly • Reduce vulnerability to the hazard: <ul style="list-style-type: none"> ❖ Create and maintain defensible space around structures and provide water on site ❖ Use fire-retardant building materials ❖ Create defensible spaces around home • Increase the ability to respond to or be prepared for the hazard: <ul style="list-style-type: none"> ❖ Employ techniques from the National Fire Protection Association's Firewise Communities program to safeguard home ❖ Identify alternative water supplies for fire fighting ❖ Install/replace roofing material with non-combustible roofing materials. 	<ul style="list-style-type: none"> • Manipulate the hazard: <ul style="list-style-type: none"> ❖ Clear potential fuels on property such as dry underbrush and diseased trees • Reduce exposure to the hazard: <ul style="list-style-type: none"> ❖ Create and maintain defensible space around structures and infrastructure ❖ Locate outside of hazard area • Reduce vulnerability to the hazard: <ul style="list-style-type: none"> ❖ Create and maintain defensible space around structures and infrastructure and provide water on site ❖ Use fire-retardant building materials ❖ Use fire-resistant plantings in buffer areas of high wildfire threat. • Increase the ability to respond to or be prepared for the hazard: <ul style="list-style-type: none"> ❖ Support Firewise community initiatives. ❖ Create /establish stored water supplies to be utilized for fire fighting. 	<ul style="list-style-type: none"> • Manipulate the hazard: <ul style="list-style-type: none"> ❖ Clear potential fuels on property such as dry underbrush and diseased trees ❖ Implement best management practices on public lands. • Reduce exposure to the hazard: <ul style="list-style-type: none"> ❖ Create and maintain defensible space around structures and infrastructure ❖ Locate outside of hazard area ❖ Enhance building code to include use of fire resistant materials in high hazard area. • Reduce vulnerability to the hazard: <ul style="list-style-type: none"> ❖ Create and maintain defensible space around structures and infrastructure ❖ Use fire-retardant building materials ❖ Use fire-resistant plantings in buffer areas of high wildfire threat. ❖ Consider higher regulatory standards (such as Class A roofing) ❖ Establish biomass reclamation activities • Increase the ability to respond to or be prepared for the hazard: <ul style="list-style-type: none"> ❖ More public outreach and education efforts, including an active Firewise program ❖ Possible weapons of mass destruction funds available to enhance fire capability in high-risk areas ❖ Identify fire response and alternative evacuation routes ❖ Seek alternative water supplies ❖ Become a Firewise community ❖ Use academia to study impacts/solutions to wildfire risk ❖ Establish/maintain mutual aid agreements between fire service agencies. ❖ Create/implement fire plans ❖ Consider the probable impacts of climate change on the risk associated with the wildfire hazard in future land use decisions

23. ACTION PLAN AND IMPLEMENTATION

23.1 STATUS OF PREVIOUS PLAN ACTIONS

The 2011 City of Los Angeles Hazard Mitigation Plan identified 307 mitigation actions for implementation. For the current update, these actions were reviewed by City bureaus and offices and other relevant agencies. For each action, it was determined whether the action had been completed, was in progress or had not been started. Incomplete actions were reviewed to determine if they should be carried over to the 2017 plan or removed from the plan due to a change in priorities, capabilities, or feasibility. In total, 48 (16 percent) of the identified actions have been started or completed. Of the 307 identified actions 87 (28 percent) were carried over to the 2017 plan. A total of 172 (56 percent) of the identified actions were withdrawn from the plan based on a review by the planning team. The reasons for a withdrawal of an action ranged from the action no longer being considered feasible to the action being identified as a core capability by the 2017 planning process. Each carried over has a new action number assigned to it for the 2017 plan, and many were reworded to more clearly state their intent. Appendix C summarizes the status of the recommended actions from the 2011 hazard mitigation plan.

23.2 HAZARD MITIGATION ACTION PLAN

The Steering Committee reviewed the catalogs of hazard mitigation alternatives and selected actions to be included in a hazard mitigation action plan. The selection of actions was based on the risk assessment of identified hazards of concern and the defined hazard mitigation goals and objectives. Table 23-1 lists the recommended hazard mitigation actions that make up the action plan. The timeframe indicated in the table is defined as follows:

- Short Term = to be completed in 1 to 5 years
- Long Term = to be completed in greater than 5 years
- Ongoing = currently being funded and implemented under existing programs.

Table 23-1. Action Plan

Applies to new or existing assets	Hazards Mitigated	Objectives Met	Lead Agency	Estimated Cost	Sources of Funding	Timeline
Department of Animal Services (DAS)						
DAS-01: Continue to coordinate with the Emergency Management Department and other City departments on identification and implementation of loss avoidance and risk reduction projects for DAS managed facilities.						
New and Existing	All Hazards	7, 8, 9, 11, 12, 14, 15	DAS	Medium	DAS operational funds, FEMA hazard Mitigation Grants	Short-term, ongoing
Department of Building and Safety (LADBS)						
LADBS-01: Continue the development and distribution of; "Be Prepared, Homeowners" Guide for Erosion Control Booklets						
New and Existing	Flood, Landslide, Wildfire	8, 9, 11, 14, 16	LADBS	Low	LADBS operational funds	Short-term, ongoing
LADBS-02: Provide Updates to the Flood Hazard Mitigation Coordinator						
New and Existing	Flood, Tsunami, Dam failure, Sea-level rise	1, 3, 4, 6, 9, 14,16	LADBS, DPW	Low	LADBS operational funds	Short-term, ongoing
LADBS-03: Safety Assessment Program Training for LADBS Inspectors and Engineers						
New and Existing	All Hazards	7, 8, 9	LADBS	LOW	Staff time, General Funds	Short term (2 years)
Department on Disability (DDS)						
DDS-01: Disaster Response Sign Language Interpreters						
New and Existing	All Hazards	2, 5, 8, 9, 14,16	DDS	Low	Staff time, General Funds	Short Term, Ongoing
DDS-02: Emergency Preparedness Manual (for People with Disabilities)						
New and Existing	All Hazards	2, 5, 8, 9, 14,16	DDS	Low	Staff time, General Funds	Short Term, Ongoing
DDS-03: Assessment of Disability Needs						
New and Existing	All Hazards	5, 7, 8, 9, 16	DDS	Low	Staff time, General Funds	Short Term, Ongoing
DDS-04: Disaster Preparedness On-Line Planning Tool for People with Disabilities						
New and Existing	All Hazards	2, 5, 8, 9, 14,16	DDS	Low	Staff time, General Funds	Short Term, Ongoing
Emergency Management Department (EMD)						
EMD-01: Coordinate the implementation and maintenance of the 2017 City of Los Angeles Hazard Mitigation Plan						
New and Existing	All Hazards	All Objectives	EMD	Medium	Staff time, General Funds, FEMA Hazard Mitigation Assistance (HMA) Planning Grants	Ongoing
Fire Department (LAFD)						
LAFD-01: Protect Fire Stations 40, 49, 110, 111, 112 from tsunami impact						
Existing	Tsunami, Sea-level rise	1, 7, 12,16	LAFD	Medium	LAFD operations funds, FEMA HMA programs	Long-term, ongoing
LAFD-02: Continue implementation of Fire Road Maintenance Program						
New and Existing	Wildfire	7, 11,16	LAFD	Low	Staff time, General Funds	Short term, ongoing

Applies to new or existing assets	Hazards Mitigated	Objectives Met	Lead Agency	Estimated Cost	Sources of Funding	Timeline
LAFD-03: Update/maintain Wild Land Operational Plan with best available data and science on wildfire risk and severity within the operational area.						
New and Existing	Wildfire	1, 2, 6, 7, 8, 9, 11,14,16	LAFD	Medium	LAFD operations funds, FEMA HMA programs	Short term, ongoing
LAFD-04: Security/Safety action for memorial training center at 1700 stadium way. The current project is re securing the property by installing iron security fencing around the property.						
Existing	All Hazards	7, 9, 11,16	LAFD	\$1,000,000 Low	LAFD operations funds	Short term (Dec 2018)
General Services Department (GSD)						
GSD-01: Continue Division Training in Emergency Procedures						
New and Existing	All Hazards	2, 7, 8, 9, 14,16	GSD with support from EMD	Low	Staff time, General Funds	Short term, ongoing
Harbor Department, Port of LA (HAR)						
HAR-01: Continue to Maintain Advanced Transportation Management Information System						
Existing	All hazards	2, 5, 7, 8, 9, 14, 16	HAR	Low	Staff time, General Funds	Short term, ongoing
HAR-02: Badger Avenue Conley joint improvement (24988)						
Existing	Transportation	1, 4, 14,16	HAR	Medium	HAR operational funds, possible FEMA HMA grant funding	Ongoing
HAR-03: Install or Retrofit Emergency Generators in Terminals						
Existing	All Hazards	7, 7, 16	HAR	Medium	HAR operational funds, possible FEMA HMA grant funding	Short term, ongoing
HAR-04: Conduct Non-Structural seismic hazard mitigation of vulnerable facilities						
Existing	Earthquake	1, 4, 6, 14,16	HAR	Medium	HAR operational funds, possible FEMA HMA grant funding	Short term, ongoing
HAR-05: 705 N. Front Street Inspection Facility (B 87-89 Scanning Facility 24971)						
Existing	Terrorism	1, 4, 6, 14,16	HAR	Low	Staff time, General Funds, DHS Urban Area Security Initiative grant funding	Short term, ongoing
HAR-06: B. 195-196 – Wharf Improvements / 300 Water Street – Maritime Law Enforcement Training Center (24989)						
Existing	Terrorism	1, 4, 6, 14,16	HAR	Low	Staff time, General Funds, DHS Urban Area Security Initiative grant funding	Short term, ongoing
HAR-07: Port Police Computer Aided Dispatch and Records Management System (25000)						
Existing	Terrorism	2, 5, 7, 8, 9, 14, 16	HAR	Low	Staff time, General Funds	Short term, ongoing
HAR-08: Port Police Tactical Radio Communications Improvement (25002)						
Existing	Terrorism	2, 5, 7, 8, 9, 14, 16	HAR	Low	Staff time, General Funds	Short term, ongoing

Applies to new or existing assets	Hazards Mitigated	Objectives Met	Lead Agency	Estimated Cost	Sources of Funding	Timeline
Housing Department (LAHD)						
LAHD is now referred to as Los Angeles Housing and Community Investment Department. See actions below.						
Los Angeles Housing and Community Investment Department (HCID)						
HCID-01: Pre-Disaster Housing Recovery Strategy for the City. This plan will provide the framework and strategy for how the City will: 1) manage the transition from mass care and shelter response to housing-related recovery in future disasters; 2) collect and analyze data and information related to the disaster; and 3) design effective housing recovery programs that may be implemented to maximize and leverage available recovery resources and funding to rehouse displaced residents and reconstruct damaged housing of all types.						
New and Existing	All hazards	9, 16	HCID	\$2,000,000 Medium	City Staff time, FEMA Planning Grant, CDBG-DR	Short Term
HCID-02: Seismic Retrofit Program. This program seeks to complete mandatory seismic retrofitting of residential properties with identified soft-story hazards, as required by City Ordinance 184081 enacted in February 2016. In addition, other residential seismic retrofit needs in the city will be researched (e.g. non-ductile concrete buildings).						
Existing	Earthquake	4, 5, 10,12	HCID	\$850,000,000 High	Apartment owner funds; Cost recovery from Tenants (i.e. rent increases and/or surcharges); City Staff time, FEMA HMA grant funding	Short term, ongoing
Information Technology Agency (ITA)						
ITA-01: Geographic Information Systems (GIS) Hazard Mapping						
New and Existing	All Hazards	2, 3, 8, 16	ITA	Low	Staff time, General Funds	Short term, ongoing
ITA-02: Disaster Recovery Support Services						
New and Existing	All Hazards	7, 11,16	ITA	Low	Staff time, General Funds	Short term, ongoing
ITA-03: Emergency Operations Center Incident Management System (IMS) Software Support						
New and Existing	All Hazards	2, 3, 8, 16	ITA	Low	Staff time, General Funds	Short term, ongoing
ITA-04: Participate in and provide IT support to Citywide & Departmental Emergency Exercises						
New and Existing	All Hazards	2, 3, 8, 16	ITA	Low	Staff time, General Funds	Short term, ongoing
ITA-05: Support EMD in the maintenance of the Hazus model that was created to support the update of this hazard mitigation plan. This support would be in the form of maintaining the necessary software licensing needed to run the Hazus platform and/or providing technical support in the use of the software.						
New and Existing	Dam failure, earthquake, flood, tsunami and Sea-level rise	2, 7, 8, 9, 14,16	ITA	Low	Staff time, General Funds	Short term, ongoing
Los Angeles World Airports (LAWA)						
LAWA-01: Improved LAX Airport Passenger Access and Airfield Modifications to Improve Safety and Efficiency (Airfield Expansions)						
New	Earthquake	4, 6, 14,16	LAWA	Medium	Staff time, General Funds, FEMA HMA Grants	Short term, ongoing

Applies to new or existing assets	Hazards Mitigated	Objectives Met	Lead Agency	Estimated Cost	Sources of Funding	Timeline
City Planning Department (PL)						
PL-01: Integrate the City's hazard mitigation plan into future updates to the general plan in compliance with CA. state mandates (AB2140, SB379, SB1000)						
New and Existing	All Hazards	2, 3, 4, 6, 8, 14, 16	PL	Low	Staff time, General Funds	Short term, ongoing
PL-02: All future updated to plans and programs that manage land use within the City should consider the best available data and science on the risk exposure and vulnerability to all hazards the City is susceptible to.						
New and Existing	All Hazards	2, 3, 4, 6, 8, 14, 16	PL	Low	Staff time, General Funds	Short term, ongoing
PL-03: consider the adoption of higher regulatory standards that are appropriate to manage risk and fall within the core capabilities of the City.						
New and Existing	All Hazards	2, 3, 4, 6, 8, 14, 16	PL	Low	Staff time, General Funds	Short term, ongoing
Police Department (LAPD)						
LAPD-01: Mobile Command Response Unit						
New and Existing	All Hazards	7, 9, 11,16	LAPD	Low	Staff time, General Funds	Short term, ongoing
LAPD-02: Technological, Chemical, and Biological Detection Devices						
New and Existing	Hazardous Materials	7, 9, 11,16	LAPD	Low	Staff time, General Funds	Short term, ongoing
LAPD-03: Emergency Cyber Incident Response Program						
New and Existing	Cyber	7, 9, 11,16	LAPD	Low	Staff time, General Funds	Short term, ongoing
LAPD-04: Technology – Video Downlink/Video Surveillance & Monitoring Equipment						
New and Existing	Civil Unrest	7, 9, 11,16	LAPD	Low	Staff time, General Funds	Short term, ongoing
LAPD-05: Critical Asset Protection Program						
Existing	All Hazards	7, 9, 11,16	LAPD	Low	Staff time, General Funds	Short term, ongoing
LAPD-06: Regional Video Command Center Equipment						
New and Existing	All Hazards	7, 9, 11,16	LAPD	Low	Staff time, General Funds	Short term, ongoing
LAPD-07: Technology – Explosive Detection Devices						
New and Existing	Terrorism	7, 9, 11,16	LAPD	Low	Staff time, General Funds	Short term, ongoing
LAPD-08: Brushfire Response Plan (Wildland-Urban Interface Fires)						
New and Existing	Wildfire	2, 3, 4, 6, 8, 14, 16	LAPD	Medium	Staff time, General Funds	Short term, ongoing
LAPD-09: Terrorist Early Warning Group—Civil Disturbance						
New and Existing	Terrorism	7, 9, 11,16	LAPD	Low	Staff time, General Funds	Short term, ongoing
LAPD-10: LAPD's Hazardous Materials Unit						
New and Existing	Hazardous materials	7, 9, 11,16	LAPD	Low	Staff time, General Funds	Short term, ongoing

Applies to new or existing assets	Hazards Mitigated	Objectives Met	Lead Agency	Estimated Cost	Sources of Funding	Timeline
LAPD-11: Public Outreach/Education						
New and Existing	All Hazards	4, 5, 8, 9, 11,14,16	LAPD	Low	Staff time, General Funds	Short term, ongoing
LAPD-12: Police Department Emergency Operations Guide						
New and Existing	All Hazards	7, 9, 11,16	LAPD	Low	Staff time, General Funds	Short term, ongoing
LAPD-13: Technology-Cellular Telephone Disruption Device						
New and Existing	Terrorism	7, 9, 11,16	LAPD	Low	Staff time, General Funds	Short term, ongoing
Department of Public Works (DPW)						
DPW-01: Storm Water Facilities						
New and Existing	Flood, Adverse weather	1, 4, 6, 14,16	DPW	Medium	DPW operations funds, FEMA HMA programs	Long term, ongoing
DPW-02: : Prioritization for Capital Improvement Program						
New and Existing	Flood, Adverse Weather, Tsunami, Sea-level rise	1, 4, 6, 14,16	DPW	Medium	DPW operations funds, FEMA HMA programs	Long term, ongoing
DPW-03: Flood Zone Notification						
New and Existing	Flood, Adverse Weather, Tsunami, Sea-level rise	4, 5, 8, 9, 11,14,16	DPW	Low	Staff time, General Funds	Short term, ongoing
DPW-04: Bridge Improvement Program						
Existing	Flood, Earthquake	1, 4, 6, 14,16	DPW	Medium	DPW operations funds, FEMA HMA programs	Long term, ongoing
DPW-05: Provide dam inundation maps to the public						
New and Existing	Dam Failure	4, 5, 8, 9, 11,14,16	DPW	Low	Staff time, General Funds	Short term, ongoing
DPW-06: Brush Clearance at City owned landfills						
Existing	Wildfire	1, 7, 11,16	DPW	Low	Staff time, General Funds	Short term, ongoing
DPW-07: Continue ongoing Participation with Flood Organizations such as the CA Floodplain Management Association, the Association of State Floodplain Managers, and National Association of Stormwater and Floodplain Managers						
New and Existing	Flood, Adverse Weather, Tsunami, Sea-level rise	2, 3, 4, 6, 8, 14, 16	DPW	Low	Staff time, General Funds	Short term, ongoing
DPW-08: Mitigate vulnerable Wastewater Facilities						
Existing	Dam Failure, Earthquake, Flood, Landslide, Tsunami, Sea-level rise	1, 4, 6, 14,16	DPW	Medium	DPW operations funds, FEMA HMA programs	Long term, ongoing
DPW-09: Continue to support a Certified Flood Plain Manager initiative within DPW.						
New and Existing	Flood, Adverse Weather, Tsunami, Sea-level rise	2, 3, 4, 6, 8, 14, 16	DPW	Low	Staff time, General Funds	Short term, ongoing

Applies to new or existing assets	Hazards Mitigated	Objectives Met	Lead Agency	Estimated Cost	Sources of Funding	Timeline
DPW-10: Continue the implementation of the Seismic Bond Program						
Existing	Earthquake	1, 4, 6, 14,16	DPW	Medium	DPW operations funds, FEMA HMA programs	Long term, ongoing
DPW-11: Conduct National Flood Insurance Program Seminar for City staff with a role in floodplain management for the City.						
New and Existing	Flood, Adverse Weather, Tsunami, Sea-level rise	2, 3, 4, 6, 8, 14, 16	DPW	Low	Staff time, General Funds	Short term, ongoing
DPW-12: Continue the implementation of a Channel/Basin Debris Removal program						
Existing	Flood, Adverse Weather, Tsunami, Sea-level rise	1, 7, 11,16	DPW	Low	Staff time, General Funds	Short term, ongoing
DPW-13: Standby/Emergency Power Generation for All Wastewater Pumping & Treatment Plants						
Existing	All Hazards	1, 4, 6, 14,16	DPW	Medium	DPW operations funds, FEMA HMA programs	Long term, ongoing
DPW-14: Structural/Nonstructural seismic retrofit of Personnel Building						
Existing	Earthquake	1, 4, 6, 14,16	DPW	Medium	DPW operations funds, FEMA HMA programs	Short term, ongoing
DPW-15: Hazard Mapping and Survey Support						
New and existing	All Hazards	2, 7, 8, 9, 14,16	DPW	Medium	DPW operations funds, FEMA HMA programs	Short term, ongoing
DPW-16: GIS Mapping and Modeling for Storm Water Facilities						
New and Existing	Adverse Weather, Flood	2, 7, 8, 9, 14,16	DPW	Medium	DPW operations funds, FEMA HMA programs	Short term, ongoing
DPW-17: Prioritize Flood Problem Sites						
New and Existing	Flood, Adverse Weather, Tsunami, Sea-level rise	1, 4, 6, 14,16	DPW	Medium	DPW operations funds, FEMA HMA programs	Long term, ongoing
DPW-18: Seismic structural retrofit of Hollywood Recreation Center						
Existing	Earthquake	1, 4, 6, 14,16	DPW	Medium	DPW operations funds, FEMA HMA programs	Short term, ongoing
DPW-19: Educate the Public About Debris in the Storm Water System						
New and Existing	Adverse Weather, Flood	4, 5, 8, 9, 11,14,16	DPW	Low	Staff time, General Funds	Short term, ongoing
DPW-20: Non Structural Earthquake Hazard Mitigation of identified vulnerable facilities.						
Existing	Earthquake	1, 4, 6, 14,16	DPW	Medium	DPW operations funds, FEMA HMA programs	Short term, ongoing
DPW-21: Improve Soil Stability and Erosion Abatement Regulations						
New and Existing	Landslide, Wildfire	2, 3, 4, 6, 8, 14, 16	DPW	Low	Staff time, General Funds	Short term, ongoing
DPW-22: Continue to Maintain and Evaluate FEMA Elevation Certificates						
New and Existing	Flood, Adverse Weather, Tsunami, Sea-level rise	4, 5, 8, 9, 11,14,16	DPW	Low	Staff time, General Funds	Short term, ongoing

Applies to new or existing assets	Hazards Mitigated	Objectives Met	Lead Agency	Estimated Cost	Sources of Funding	Timeline
DPW-23: Incorporate Flood Plain Management Information into the Zoning Information and Map Access System						
New and Existing	Flood, Adverse Weather, Tsunami, Sea-level rise	4, 5, 8, 9, 11,14,16	DPW	Low	Staff time, General Funds	Short term, ongoing
DPW-24: New Storm Water Projects						
New	Adverse Weather, Flood	1, 4, 6, 14,16	DPW	Medium	DPW operations funds, FEMA HMA programs	Long term, ongoing
DPW-25: : Implementation of Flash Flood Warning System for Donald C. Tilman Plant, Los Angeles-Glendale Plant, Pumping Plant #3 and Pumping Plant #49						
Existing	Adverse Weather, Flood	1, 4, 6, 14,16	DPW	Medium	DPW operations funds, FEMA HMA programs	Long term, ongoing
DPW-26: Proposed Mitigation Measures under Department of Public Works						
New and Existing	All Hazards	1, 4, 6, 14,16	DPW	Medium	DPW operations funds, FEMA HMA programs	Long term, ongoing
DPW-27: Potrero Canyon Slope Stabilization on Pacific Coast Highway, a.k.a. Potrero Canyon Development Unit 4.						
New and Existing	Landslide, Wildfire	2, 3, 4, 6, 8, 14, 16	DPW	Low	Staff time, General Funds	Short term, ongoing
DPW-28: San Pedro 3rd Street Relief Storm Drain Project						
Existing	Adverse Weather, Flood	1, 4, 6, 14,16	DPW	Medium	DPW operations funds, FEMA HMA programs	Short-term, ongoing
DPW-29: Coordinate the implementation and maintenance of the 2015 City of Los Angeles Flood Hazard Management Plan with the implementation of this hazard mitigation plan. The 2015 City of Los Angeles Flood Hazard Management Plan and all of its actions and recommendation are considered to be fully integrated with this hazard mitigation plan by reference.						
New and Existing	Flood, Adverse Weather, Tsunami, Sea-level rise	2, 3, 4, 6, 8, 14, 16	DPW, EMD	Low	DPW operations funds, FEMA HMA programs	Short Term, ongoing
DPW-30: Continue to maintain good standing and compliance under the National Flood Insurance Program (NFIP). This will be accomplished through the implementation of floodplain management programs that will, at a minimum, meet the requirements of the NFIP:						
<ul style="list-style-type: none"> • Enforce the flood damage prevention ordinance • Participate in floodplain identification and mapping updates • Provide public assistance/information on floodplain requirements and impacts. 						
New and Existing	Flood, Adverse Weather, Tsunami, Sea-level rise	2, 3, 4, 6, 8, 14, 16	DPW,LADBS	Low	DPW operations funds, LADBS operations funds	Short Term, ongoing
DPW-31: Oakdale Redwing Storm Drain Project						
Existing	Adverse Weather, Flood	1, 4, 6, 14,16	DPW	Medium	DPW operations funds, FEMA HMA programs	Short-term, ongoing
DPW-32: Burwood Figueroa Storm Drain Project						
Existing	Adverse Weather, Flood	1, 4, 6, 14,16	DPW	Medium	DPW operations funds, FEMA HMA programs	Short-term, ongoing
DPW-33: Westgate Montana Storm Drain Project						
Existing	Adverse Weather, Flood	1, 4, 6, 14,16	DPW	Medium	DPW operations funds, FEMA HMA programs	Short-term, ongoing

Applies to new or existing assets	Hazards Mitigated	Objectives Met	Lead Agency	Estimated Cost	Sources of Funding	Timeline
Department of Public Works-Bureau of Engineering (DPWBE)						
DPWBE-01: Nichols Canyon Road, Side-hill Structure Project. Restore lateral support to existing side-hill structure by drilling and installing rock anchors with reinforcing steel and shotcreting the slope to prevent further erosion.						
New and Existing	Landslide/Debris Flow	2, 4, 14	City of Los Angeles Public Works-Bureau of Engineering	750,000.00 Medium	Gas Tax, Measure M, General Fund, FEMA HMA grant funding	Short-4 years
DPWBE-02: Holly drive & Bryn Mawr Drive Rock-fall Mitigation Project. Lose rock and boulders will be scaled/removed from the slope surface. The slope will then be stabilized by drilling and installing rock anchor bolts and a wire mesh stabilization system in order to prevent the rock from toppling.						
New and Existing	Landslide/Debris Flow	2, 4, 14	City of Los Angeles Public Works-Bureau of Engineering	500,000.00 Medium	Gas Tax, FEMA HMA Grant funding	Short-4 Years
DPWBE-03: Mulholland Drive (13319) Bulkhead Project. This urgency/necessity project will restore lateral support to the existing roadway. Construction will consist of a new bulkhead extension.						
Existing	Landslide/Debris Flow	2, 4, 14	City of Los Angeles Public Works-Bureau of Engineering	634,000.00 Medium	Gas Tax Street Improvement Fund, FEMA HMA grant funding	Short
Department of Water and Power (DWP)						
DWP-01: Generation Backup Program						
New and Existing	All Hazards	1, 4, 6, 14,16	DWP	Medium	DPW operations funds, FEMA HMA programs	Long term, ongoing
DWP-02: Integrate Customer Connect with existing centers						
New and Existing	All Hazards	4, 5, 8, 9, 11,14,16	DWP	Low	Staff time, General Funds	Short term, ongoing
DWP-03: Security Lighting Upgrade Program						
Existing	All Hazards	1, 4, 6, 14,16	DWP	Low	Staff time, General Funds	Short term, ongoing
DWP-04: Perimeter Fencing						
Existing	All Hazards	1, 4, 6, 14,16	DWP	Low	Staff time, General Funds	Short term, ongoing
DWP-05: Weed Abatement						
Existing	Wildfire	1, 4, 6, 14,16	DWP	Low	Staff time, General Funds	Short term, ongoing
DWP-06: Pump Stations Program						
New and Existing	All Hazards	1, 4, 6, 14,16	DWP	Medium	DPW operations funds, FEMA HMA programs	Long term, ongoing
DWP-07: Regulator Stations Program						
New and Existing	All Hazards	1, 4, 6, 14,16	DWP	Medium	DPW operations funds, FEMA HMA programs	Long term, ongoing
DWP-08: Trunk Lines and Major System Connections Program						
New and Existing	All Hazards	1, 4, 6, 14,16	DWP	Medium	DPW operations funds, FEMA HMA programs	Long term, ongoing

Applies to new or existing assets	Hazards Mitigated	Objectives Met	Lead Agency	Estimated Cost	Sources of Funding	Timeline
DWP-09: Infrastructure Reservoir Improvements Program(tanks only)						
New and Existing	All Hazards	1, 4, 6, 14,16	DWP	Medium	DPW operations funds, FEMA HMA programs	Long term, ongoing
DWP-10: Griffith Park Improvements Project						
New	All hazards	1, 4, 6, 14,16	DWP	Medium	DPW operations funds, FEMA HMA programs	Short term, ongoing
DWP-11: Security projects at reservoirs, Dams, Facilities						
Existing	All Hazards	2, 6, 14,16	DWP	Medium	Staff time, General Funds	Short term, ongoing
DWP-12: Water Quality Additions and Betterments						
Existing	All Hazards	1, 4, 6, 14,16	DWP	Medium	Staff time, General Funds	Short term, ongoing
DWP-13: Infrastructure Reservoir Improvements Program (dams only)						
Existing	Dam Failure	1, 4, 6, 14,16	DWP	Medium	Staff time, General Funds	Long term, ongoing
DWP-14: Water Quality Improvement Project Reservoir Improvement Program						
Existing	Dam Failure	1, 4, 6, 14,16	DWP	Medium	Staff time, General Funds	Long term, ongoing
DWP-15: Seismic Strengthen of DS Yard walls						
Existing	Earthquake	1, 4, 6, 14,16	DWP	Medium	Staff time, General Funds	Long term, ongoing
DWP-16: S. Haiwee Reservoir Spillway Channel Modifications. Harden Spillway channel upstream and downstream to prevent Erosion and Scour. Needed to protect new LADWP-owned Facilities downstream of S. Haiwee Dam.						
Existing	Adverse Weather, Flood, Dam Failure, Critical Infrastructure	4, 6, 12	DWP	Medium	LADWP	Short Term
DWP-17: Tinemaha Reservoir Spillway Channel Improvement Project. Earthen Spillway channel requires a hardened invert and approach apron to prevent excessive Erosion and Scour. Higher Side Berms and Hardened Arizona crossings are needed to protect the channel from breaching its banks and preventing back flows towards the toe of the Dam. Increased spillway channel capacity back to the Owens River will reduce the risks of flooding State Highway 395 and reduce the risk of Dam failure.						
Existing	Adverse Weather, Flood, Dam Failure, Critical Infrastructure	4, 6, 12	DWP	Medium	LADWP	Short Term
DWP-18: Four Culverts Replacement Project – Bishop Flood Bypass Channel. This facility was severely damaged during High flow events in Run-off Season 2017. The entire system of four CMP culverts and Regulatory slide gates, retaining walls and wing walls require 100 % rebuild. This release facility protects the City of Bishop, CA from flood damage by rerouting flood waters to a Flood Control Channel designed by the Army Corps of Engineers.						
Existing	Adverse Weather, Flood, Critical Infrastructure	4, 6, 12	DWP	Medium	LADWP	Short Term
DWP-19: Self-Propelled Suction Dredge for Sediment Removal along the LAA. A self-propelled suction dredge is required for sand trap cleaning, sediment removal operations in our aqueduct, and channel maintenance for flows through our reservoirs from inlet to outlet structures. The last suction Dredge was decommissioned in the late 1980's and needs to be replaced. New uses are channel maintenance for major Environmental Mitigation Projects like the 62-mile long Lower Owens River Project.						
Existing	Adverse Weather, Flood, Critical Infrastructure	4, 6, 12	DWP	Medium	LADWP	Short Term

Applies to new or existing assets	Hazards Mitigated	Objectives Met	Lead Agency	Estimated Cost	Sources of Funding	Timeline
DWP-20: Tinemaha Reservoir Outlet Tower Seismic Evaluation & Hazard Mitigation Study to Determine Remedial Actions Required. Hazard Mitigation Study is Ongoing. A 2004 Seismic Evaluation determined that the tower would fail to perform its primary function of being able to control the outflow of water from the reservoir. The current H.M. Study will determine the ultimate remedial actions required. Alternatives vary from Demolition and 100% Rebuilding of a new outlet tower, down to Seismic strengthening of the existing tower and relining the outlet tunnel & adding a new control valve downstream of the existing Dam.						
Existing	Adverse Weather, Flood, Critical Infrastructure	4, 6, 12	DWP	Medium	LADWP	Short Term
City of Los Angeles, Industrial Safety & Compliance Division, Hazardous Material & Waste management (LASAN)						
LASAN-01: Special, Mobile Hazardous Waste Collection						
Existing	Hazardous Materials	2, 5	LASAN/PW	\$3,300,000.00	Special Fund	Annually
LASAN-02: Spill Prevention Program at Industrial Waste Management Division						
Existing	Hazardous Materials	2, 5	LASAN/PW	\$70,000.00	General Fund	Annually
LASAN-03: Debris Removal						
Existing	Hazardous Materials	2, 6	LASAN/PW	\$1,345,283.00	Special/General Fund	Annually
LASAN-04: Standby Power Generation for All Wastewater Pumping & Treatment Plants						
Existing	Public Health	11,12,14	LASAN/PW	N/A	Special Fund	Annually
LASAN-05: Accelerated Sewer Repair						
Existing	Public Health	6	LASAN/PW	\$9,697.00	Special/General Fund	01/09/2021
LASAN-06: ICSD – Offsite Backup Tape Storage/Archiving for LASAN						
Existing	Terrorism	11,12	LASAN/PW	Low	Staff Time	Long Term
LASAN-07: Implementation of Flash Flood Warning System for Donald C. Tilman Plant, Los Angeles-Glendale Plant, Pumping Plant #3 and Pumping Plant #49						
Existing	Urban Flood	1	LASAN/PW	N/A		Long Term
LASAN-08: Refine the Use of the Plan Check Inspection System						
Existing	Urban Flood	8, 14	LASAN, DPWBE	Low	General Fund, Storm Water Pollution Abatement Fund	N/A
LASAN-09: Revise the Map of Hillside Areas						
Existing	Urban Flood	8, 14	LASAN, DPWBE	Low	Storm Water Pollution Abatement Fund, General Fund	
LASAN-10: Educate the Public About Debris in the Storm Water System						
Existing	Urban Flood	5, 9, 10,15	LASAN, DPWBE	Low	Storm Water Pollution Abatement Fund	Long Term
LASAN-11: Establish New Flood Hazard Mitigation Techniques						
Existing	Urban Flood	1, 2, 3, 4, 15	LASAN, DPWBE	Low	Storm Water Pollution Abatement Fund	Long Term

23.2.1 Benefit-Cost Review

The action plan must be prioritized according to a benefit/cost analysis of the proposed actions (44 CFR, Section 201.6(c)(3)(iii)). The benefits of proposed projects were weighed against estimated costs as part of the project prioritization process. The benefit/cost analysis was not of the detailed variety required by FEMA for project grant eligibility under the Hazard Mitigation Grant Program (HMGP) and Pre-Disaster Mitigation (PDM) grant program. A less formal approach was used because some projects may not be implemented for up to 10 years, and associated costs and benefits could change dramatically in that time. Therefore, a review of the apparent benefits versus the apparent cost of each project was performed. Parameters were established for assigning subjective ratings (high, medium, and low) to the costs and benefits of these projects.

Cost ratings were defined as follows:

- **High**—Existing funding will not cover the cost of the project; implementation would require new revenue through an alternative source (for example, bonds, grants, and fee increases).
- **Medium**—The project could be implemented with existing funding but would require a budget re-apportionment or amendment, or the cost of the project would have to be spread over multiple years.
- **Low**—The project could be funded under the existing budget. The project is part of or can be part of an ongoing existing program.

Benefit ratings were defined as follows:

- **High**—Project will provide an immediate reduction of risk exposure for life and property.
- **Medium**—Project will have a long-term impact on the reduction of risk exposure for life and property, or project will provide an immediate reduction in the risk exposure for property.
- **Low**—Long-term benefits of the project are difficult to quantify in the short term.

Using this approach, projects with positive benefit versus cost ratios (such as high over high, high over medium, medium over low, etc.) are considered cost-beneficial and are prioritized accordingly.

For many of the strategies identified in this action plan, financial assistance may be available under the HMGP or PDM programs, both of which require detailed benefit/cost analyses. These analyses will be performed on projects at the time of application using the FEMA benefit-cost model. For projects not seeking financial assistance from grant programs that require detailed analysis, “benefits” can be defined according to parameters that meet the goals and objectives of this plan.

23.2.2 Action Plan Prioritization

Table 23-2 lists the priority of each action. The priorities are defined as follows:

- **High Priority**—A project that meets multiple objectives (i.e., multiple hazards), has benefits that exceed cost, has funding secured or is an ongoing project and meets eligibility requirements for the HMGP or PDM grant program. High priority projects can be completed in the short term (1 to 5 years).
- **Medium Priority**—A project that meets goals and objectives, that has benefits that exceed costs, and for which funding has not been secured but that is grant eligible under HMGP, PDM or other grant programs. Project can be completed in the short term, once funding is secured. Medium priority projects will become high priority projects once funding is secured.
- **Low Priority**—A project that will mitigate the risk of a hazard, that has benefits that do not exceed the costs or are difficult to quantify, for which funding has not been secured, that is not eligible for HMGP or PDM grant funding, and for which the time line for completion is long term (1 to 10 years). Low priority projects may be eligible for other sources of grant funding from other programs.

Table 23-2. Prioritization of Mitigation Actions

Action #	# of Objectives Met	Benefits	Costs	Do Benefits Equal or Exceed Costs?	Is Project Grant-Eligible?	Can Project Be Funded Under Existing Programs/Budgets?	Implementation Priority ^a	Grant Priority ^a
DASA-01	8	Medium	Medium	Yes	No	Yes	High	N/A
LADBS-01	5	Medium	Low	Yes	No	Yes	High	N/A
LADBS-02	7	Medium	Low	Yes	No	Yes	High	N/A
LADBS-03	3	Medium	Low	Yes	No	Yes	High	N/A
DDS-01	6	Medium	Low	Yes	No	Yes	High	N/A
DDS-02	6	Medium	Low	Yes	No	Yes	High	N/A
DDS-03	5	Medium	Low	Yes	No	Yes	High	N/A
DDS-04	6	Medium	Low	Yes	No	Yes	High	N/A
EMD-01	16	High	Medium	Yes	Yes	Yes	High	High
LAFD-01	4	Medium	Medium	Yes	No	Yes	High	N/A
LAFD-02	3	Low	Low	Yes	No	Yes	High	N/A
LAFD-03	9	Medium	Medium	Yes	Yes	Yes	Medium	Medium
LAFD-04	4	Medium	Low	Yes	No	Yes	High	N/A
GSD-01	6	Low	Low	Yes	No	Yes	High	N/A
HAR-01	7	Medium	Low	Yes	No	Yes	High	N/A
HAR-02	4	Medium	Medium	Yes	Yes	Yes	High	High
HAR-03	3	Medium	Medium	Yes	Yes	Yes	High	High
HAR-04	5	High	Medium	Yes	Yes	Yes	High	High
HAR-05	5	Medium	Low	Yes	Yes	Yes	High	High
HAR-06	5	Medium	Low	Yes	Yes	Yes	High	High
HAR-07	7	Low	Low	Yes	No	Yes	High	N/A
HAR-08	7	Low	Low	Yes	No	Yes	High	N/A
HCID-01	2	Medium	Medium	Yes	Yes	Yes	High	High
HCID-02	4	High	High	Yes	Yes	No	Medium	High
ITA-01	4	Low	Low	Yes	Yes	Yes	High	N/A
ITA-02	3	Low	Low	Yes	Yes	Yes	High	N/A
ITA-03	4	Low	Low	Yes	Yes	Yes	High	N/A
ITA-04	4	Low	Low	Yes	Yes	Yes	High	N/A
ITA-05	6	Low	Low	Yes	Yes	Yes	High	N/A
LAWA-01	4	High	Medium	Yes	Yes	Yes	High	High
PL-01	7	Medium	Low	Yes	No	Yes	High	N/A
PL-02	7	Medium	Low	Yes	No	Yes	High	N/A
PL-03	7	Medium	Low	Yes	No	Yes	High	N/A
LAPD-01	4	Medium	Low	Yes	No	Yes	High	N/A
LAPD-02	4	Medium	Low	Yes	No	Yes	High	N/A
LAPD-03	4	Medium	Low	Yes	No	Yes	High	N/A
LAPD-04	4	Low	Low	Yes	No	Yes	High	N/A
LAPD-05	4	Low	Low	Yes	No	Yes	High	N/A
LAPD-06	4	Low	Low	Yes	No	Yes	High	N/A
LAPD-07	4	High	Low	Yes	No	Yes	High	N/A

Action #	# of Objectives Met	Benefits	Costs	Do Benefits Equal or Exceed Costs?	Is Project Grant-Eligible?	Can Project Be Funded Under Existing Programs/Budgets?	Implementation Priority ^a	Grant Priority ^a
LAPD-08	7	Low	Low	Yes	No	Yes	High	N/A
LAPD-09	4	Low	Low	Yes	No	Yes	High	N/A
LAPD-10	4	Low	Low	Yes	No	Yes	High	N/A
LAPD-11	7	Low	Low	Yes	No	Yes	High	N/A
LAPD-12	4	Low	Low	Yes	No	Yes	High	N/A
LAPD-13	4	Low	Low	Yes	No	Yes	High	N/A
DPW-01	5	Medium	Medium	Yes	Yes	Yes	High	High
DPW-02	5	Medium	Medium	Yes	Yes	Yes	High	High
DPW-03	7	Low	Low	Yes	No	Yes	High	N/A
DPW-04	5	High	Medium	Yes	Yes	Yes	High	High
DPW-05	7	Low	Low	Yes	No	Yes	High	N/A
DPW-06	4	Medium	Low	Yes	No	Yes	High	N/A
DPW-07	7	Low	Low	Yes	No	Yes	High	N/A
DPW-08	5	High	Medium	Yes	Yes	Yes	High	High
DPW-09	7	Low	Low	Yes	No	Yes	High	N/A
DPW-10	5	High	Medium	Yes	Yes	Yes	High	Medium
DPW-11	7	Low	Low	Yes	No	Yes	High	N/A
DPW-12	4	Medium	Low	Yes	No	Yes	High	N/A
DPW-13	5	Medium	Medium	Yes	Yes	Yes	High	High
DPW-14	5	High	Medium	Yes	Yes	Yes	High	High
DPW-15	6	Medium	Medium	Yes	Yes	Yes	High	Medium
DPW-16	6	Medium	Medium	Yes	Yes	Yes	High	Medium
DPW-17	5	High	Medium	Yes	Yes	Yes	High	High
DPW-18	5	High	Medium	Yes	Yes	Yes	High	High
DPW-19	7	Low	Low	Yes	No	Yes	High	N/A
DPW-20	5	High	Medium	Yes	Yes	Yes	High	High
DPW-21	7	Medium	Low	Yes	No	Yes	High	N/A
DPW-23	7	Low	Low	Yes	No	Yes	High	N/A
DPW-24	7	High	Low	Yes	No	Yes	High	N/A
DPW-25	5	High	Medium	Yes	Yes	Yes	High	Medium
DPW-26	5	High	Medium	Yes	No	Yes	High	N/A
DPW-27	7	Medium	Medium	Yes	No	Yes	High	N/A
DPW-28	5	Medium	Low	Yes	Yes	Yes	High	Medium
DPW-29	7	High	Medium	Yes	Yes	Yes	High	High
DPW-30	7	High	Low	Yes	No	Yes	High	N/A
DPW-31	5	Medium	Low	Yes	Yes	Yes	High	Medium
DPW-32	5	Medium	Low	Yes	Yes	Yes	High	Medium
DPW-33	5	Medium	Low	Yes	Yes	Yes	High	Medium
DPWBE-01	3	High	Medium	Yes	Yes	Yes	High	High
DPWBE-02	3	High	Medium	Yes	Yes	Yes	High	High
DPWBE-03	3	High	Medium	Yes	Yes	Yes	High	High

Action #	# of Objectives Met	Benefits	Costs	Do Benefits Equal or Exceed Costs?	Is Project Grant-Eligible?	Can Project Be Funded Under Existing Programs/Budgets?	Implementation Priority ^a	Grant Priority ^a
DWP-01	5	Medium	Medium	Yes	Yes	Yes	High	High
DWP-02	7	Medium	Low	Yes	No	Yes	High	N/A
DWP-03	5	Medium	Low	Yes	No	Yes	High	N/A
DWP-04	5	Medium	Low	Yes	No	Yes	High	N/A
DWP-05	5	Medium	Low	Yes	No	Yes	High	N/A
DWP-06	5	Medium	Medium	Yes	Yes	Yes	High	High
DWP-07	5	Medium	Medium	Yes	Yes	Yes	High	High
DWP-08	5	Medium	Medium	Yes	Yes	Yes	High	High
DWP-09	5	Medium	Medium	Yes	Yes	Yes	High	High
DWP-10	5	Medium	Medium	Yes	Yes	Yes	High	High
DWP-11	4	Medium	Medium	Yes	No	Yes	High	N/A
DWP-12	5	Medium	Medium	Yes	No	Yes	High	N/A
DWP-13	5	Medium	Medium	Yes	No	Yes	High	N/A
DWP-14	5	Medium	Medium	Yes	No	Yes	High	N/A
DWP-15	5	Medium	Medium	Yes	No	Yes	High	N/A
DWP-16	4	High	Medium	Yes	Yes	Yes	Medium	Medium
DWP-17	4	High	Medium	Yes	Yes	Yes	Medium	Medium
DWP-18	4	High	Medium	Yes	Yes	Yes	Medium	Medium
DWP-19	4	High	Medium	Yes	Yes	Yes	Medium	Medium
DWP-20	4	High	Medium	Yes	Yes	Yes	Medium	Medium
LASAN-01	2	Medium	Low	Yes	No	Yes	High	N/A
LASAN-02	2	Medium	Low	Yes	No	Yes	High	N/A
LASAN-03	2	Medium	Low	Yes	No	Yes	High	N/A
LASAN-04	3	Medium	Low	Yes	Yes	Yes	High	High
LASAN-05	1	Medium	Low	Yes	Yes	Yes	High	High
LASAN-06	2	Medium	Low	Yes	No	Yes	High	N/A
LASAN-07	1	Medium	Low	Yes	No	Yes	High	N/A
LASAN-08	2	Medium	Low	Yes	No	Yes	High	N/A
LASAN-09	2	Medium	Low	Yes	No	Yes	High	N/A
LASAN-10	5	Medium	Low	Yes	No	Yes	High	N/A
LASAN-11	5	Medium	Low	Yes	Yes	Yes	High	High

23.2.3 Analysis of Mitigation Actions

Each recommended action was classified based on the hazard it addresses and the type of mitigation it involves. Table 23-3 shows the classification based on this analysis. Mitigation types used for this categorization are as follows:

- **Prevention**—Government, administrative or regulatory actions that influence the way land and buildings are developed to reduce hazard losses. Includes planning and zoning, floodplain laws, capital improvement programs, open space preservation, and stormwater management regulations.
- **Property Protection**—Modification of buildings or structures to protect them from a hazard or removal of structures from a hazard area. Includes acquisition, elevation, relocation, structural retrofit, storm shutters, and shatter-resistant glass.
- **Public Education and Awareness**—Actions to inform residents and elected officials about hazards and ways to mitigate them. Includes outreach projects, real estate disclosure, hazard information centers, and school-age and adult education.
- **Natural Resource Protection**—Actions that minimize hazard loss and preserve or restore the functions of natural systems. Includes sediment and erosion control, stream corridor restoration, watershed management, forest and vegetation management, and wetland restoration and preservation.
- **Emergency Services**—Actions that protect people and property during and immediately after a hazard event. Includes warning systems, emergency response services, and the protection of essential facilities.
- **Structural Projects**—Actions that involve the construction of structures to reduce the impact of a hazard. Includes dams, setback levees, floodwalls, retaining walls, and safe rooms.
- **Climate Resilience**—Any action that will promote or support the community’s adaptive capacity to the potential impacts from global climate change.

Table 23-3. Analysis of Mitigation Actions

Hazard Type	Action Addressing Hazard, by Mitigation Type ^a						
	1. Prevention	2. Property Protection	3. Public Education and Awareness	4. Natural Resource Protection	5. Emergency Services	6. Structural Projects	7. Climate Resilient
Adverse Weather	DAS-01, LADBS-02, EMD-01, HAR-01, ITA-01, PL-01, PL-02, PL-03, DPW-07, DPW-09, DPW-12, DPW-15, DPW-16, DPW-22, DPW-29, DWP-06	LADBS-03, HAR-03, LAFD-04, DPW-08, DPW-09, DPW-13, DPW-22, DPW-29, DWP-03, DWP-04, DWP-07	DDS-01, DDS-02, DDS-04, LAPD-11, DPW-03, DPW-09, DPW-19, DPW-23, DPW-29, DWP-02, LASAN-10	PL-01, PL-02, PL-03, DPW-09, DPW-29, DWP-12	DDS-03, GSD-01, ITA-02, ITA-03, ITA-04, LAPD-01, LAPD-12, DPW-09, DPW-25, DPW-29, DWP-01,	DPW-01, DPW-02, DPW-09, DPW-24, DPW-26, DPW-28, DPW-29, DPW-31, DPW-32, DPW-33, DWP-09, DWP-16, DWP-17, DWP -18:	PL-01, PL-02, PL-03, DPW-09, DPW-29
Dam Failure	DAS-01, EMD-01, HAR-01, ITA-01, ITA-05, PL-01, PL-02, PL-03, DPW-07, DPW-09, DPW-12, DPW-15, DPW-22, DPW-29, DWP-06, DWP-14, DWP -20	LADBS-03, HAR-03, LAFD-04, DPW-08, DPW-09, DPW-13, DPW-22, DPW-29, DWP-03, DWP-04, DWP-07, DWP-13	DDS-01, DDS-02, DDS-04, LAPD-11, DPW-03, DPW-05, DPW-09, DPW-23, DPW-29, DWP-02	PL-01, PL-02, PL-03, DPW-09, DPW-29, DWP-12, DWP-14	DDS-03, GSD-01, ITA-02, ITA-03, ITA-04, ITA-05, LAPD-01, LAPD-12, DPW-09, DPW-29, DWP-01,	DPW-02, DPW-09, DPW-26, DPW-29, DWP-08, DWP-09, DWP-16, DWP-17, DWP -18:	PL-01, PL-02, PL-03, DPW-09, DPW-29
Drought	DAS-01, EMD-01, HAR-01, ITA-01, PL-01, PL-02, PL-03, DPW-15, DWP-06	LADBS-03, HAR-03, LAFD-04, DPW-08, DPW-13, DWP-03, DWP-04, DWP-07	DDS-01, DDS-02, DDS-04, LAPD-11, DWP-02	PL-01, PL-02, PL-03, DWP-12	DDS-03, GSD-01, ITA-02, ITA-03, ITA-04, LAPD-01, LAPD-12, DWP-01,	DPW-26, DWP-08	PL-01, PL-02, PL-03, DWP-09
Earthquake	DAS-01, EMD-01, HAR-01, ITA-01, ITA-05, LAWA-01, PL-01, PL-02, PL-03, DPW-10, DPW-15, DWP-06, DWP -20	LADBS-03, HAR-03, HAR-04, LAFD-04, HCID-02, LAWA-01, DPW-04, DPW-08, DPW-10, DPW-13, DPW-14, DPW-18, DPW-20, DWP-03, DWP-04, DWP-07, DWP-15	DDS-01, DDS-02, DDS-04, LAPD-11, DWP-02	PL-01, PL-02, PL-03, DWP-12	DDS-03, GSD-01, ITA-02, ITA-03, ITA-04, ITA-05, LAPD-01, LAPD-12, DWP-01,	LAWA-01, DPW-26, DWP-08	PL-01, PL-02, PL-03, DWP-09

Hazard Type	Action Addressing Hazard, by Mitigation Type ^a						
	1. Prevention	2. Property Protection	3. Public Education and Awareness	4. Natural Resource Protection	5. Emergency Services	6. Structural Projects	7. Climate Resilient
Flood	DAS-01, LADBS-02, EMD-01 HAR-01, ITA-01, ITA-05, PL-01, PL-02, PL-03, DPW-07, DPW-09, DPW-12, DPW-15, DPW-16, DPW-22, DPW-29, DPW-30, DWP-06, DWP -20, LASAN-08, LASAN-09	LADBS-03 HAR-03, LAFD-04 DPW-04, DPW-08 DPW-09, DPW-13 DPW-22, DPW-29 DPW-30, DWP-03 DWP-04, DWP-07 LASAN-11	LADBS-01, DDS-01, DDS-02, DDS-04 LAPD-11 DPW-03 DPW-09 DPW-11 DPW-19 DPW-23 DPW-29 DPW-30 DWP-02 LASAN-10	PL-01, PL-02, PL-03 DPW-09 DPW-29 DPW-30 DWP-12	DDS-03, GSD-01, ITA-02, ITA-03, ITA-04, ITA-05, LAPD-01, LAPD-12 DPW-09, DPW-25 DPW-29, DPW-30 DWP-01, LASAN-07	DPW-01, DPW-02, DPW-09 DPW-17 DPW-24 DPW-26 DPW-28 DPW-29 DPW-30 DPW-31 DPW-32 DPW-33 DWP-08 DWP-10 DWP-16 DWP-17 DWP -18: DWP -19	PL-01, PL-02, PL-03 DPW-09 DPW-29 DPW-30 DWP-09
Landslide	DAS-01, EMD-01 HAR-01, ITA-01, PL-01, PL-02, PL-03 DPW-15, DWP-06 LASAN-09	LADBS-03 HAR-03, LAFD-04, DPW-08, DPW-13 DWP-03, DWP-04 DWP-07	LADBS-01, DDS-02, DDS-04, LAPD-11 DWP-02	PL-01, PL-02, PL-03 DWP-12	DDS-03 GSD-01, HCID-01, ITA-02, ITA-03, ITA-04, LAPD-01 LAPD-12, DWP-01,	DPW-21 DPW-26 DPW-27 DPWBE-01 DPWBE-02 DWPBE-03 DWP-08 DWP-10	PL-01, PL-02, PL-03 DWP-09
Tsunami	DAS-01, LADBS-02, EMD-01 HAR-01, ITA-01, ITA-05, PL-01, PL-02, PL-03, DPW-07, DPW-09, DPW-12, DPW-15, DPW-22, DPW-29 DWP-06	LADBS-03 HAR-03, LAFD-01, LAFD-04, DPW-08 DPW-09, DPW-13 DPW-22, DPW-29 DWP-03, DWP-04 DWP-07	DDS-01, DDS-02 DDS-04 LAPD-11 DPW-03 DPW-09 DPW-23 DPW-29 DWP-02	PL-01, PL-02, PL-03 DPW-09 DPW-29 DWP-12	DDS-03, LAFD-01, GSD-01, HCID-01, ITA-02, ITA-03, ITA-04, ITA-05, LAPD-01, LAPD-12 DPW-09, DPW-29 DWP-01,	DPW-09 DPW-26 DPW-29 DWP-08 DWP-10	PL-01, PL-02, PL-03 DPW-09 DPW-29 DWP-09
Wildfire	DAS-01, EMD-01 HAR-01, LAFD-02, LAFD-03, ITA-01, PL-01, PL-02, PL-03 DPW-06, DPW-15 DWP-05, DWP-06	LADBS-03 HAR-03, LAFD-04, DPW-08, DPW-13 DPW-13, DWP-03 DWP-04, DWP-07	LADBS-01, DDS-01, DDS-02 LAPD-11 DWP-02	PL-01, PL-02, PL-03 DPW-06 DWP-12	DDS-03, LAFD-02, LAFD-03, GSD-01, LAFD-03, HCID-01, ITA-02, ITA-03, ITA-04, LAPD-01, LAPD-08 LAPD-12, DWP-01,	DPW-21 DPW-26 DPW-27 DWP-08 DWP-10	PL-01, PL-02, PL-03 DWP-09

Hazard Type	Action Addressing Hazard, by Mitigation Type ^a						
	1. Prevention	2. Property Protection	3. Public Education and Awareness	4. Natural Resource Protection	5. Emergency Services	6. Structural Projects	7. Climate Resilient
Sea-Level Rise	DAS-01, LADBS-02, EMD-01 HAR-01, ITA-01, ITA-05, PL-01, PL-02, PL-03, DPW-07, DPW-09, DPW-12, DPW-15, DPW-22, DPW-29 DWP-06	LADBS-03 HAR-03, LAFD-01, LAFD-04, DPW-08 DPW-09, DPW-13 DPW-22, DPW-29 DWP-03, DWP-04, DWP-07	DDS-01, DDS-02, DDS-04 LAPD-11 DPW-03 DPW-09 DPW-23 DPW-29 DWP-02	PL-01, PL-02, PL-03 DPW-09 DPW-29 DWP-12	DDS-03, LAFD-01 GSD-01, HCID-01, ITA-02, ITA-03, ITA-04, ITA-05, LAPD-01, LAPD-12 DPW-09, DPW-29 DWP-01,	DPW-02 DPW-09 DPW-26 DPW-29 DWP-08 DWP-10 DWP-16	PL-01, PL-02, PL-03 DPW-09 DPW-29 DWP-09
Critical Infrastructure	DAS-01, EMD-01 HAR-01, ITA-01, PL-02, PL-03 DWP-06, DWP -20	LADBS-03, LAFD-04 HAR-02: HAR-03, LAFD-04 DPW-13, DWP-03 DWP-04, DWP-07	DDS-01, DDS-02, DDS-04 LAPD-11 DWP-02	DWP-12	DDS-03 GSD-01, HCID-01, ITA-02, ITA-03, ITA-04, LAPD-01, LAPD-06, LAPD-12 DWP-01,	DWP-10 DWP-17 DWP -18:	DWP-09
Cyber-attack	DAS-01, EMD-01 HAR-01, ITA-01, PL-02, PL-03 DWP-06	LADBS-03 HAR-03, LAPD-05 DWP-03, DWP-04 DWP-07	DDS-01, DDS-02, DDS-04, LAPD-11 DWP-02	DWP-12	DDS-03 GSD-01, HCID-01, ITA-02, ITA-03, ITA-04, LAPD-01, LAPD-03, LAPD-06 LAPD-12, DWP-01,	DWP-10	DWP-09
Hazardous Materials Incidents	DAS-01, EMD-01 HAR-01, ITA-01, PL-02, PL-03, LAPD-02, DWP-06 LASAN-01, LASAN-02, LASAN-03	LADBS-03 HAR-03, LAFD-04, LAPD-05, DWP-03 DWP-04, DWP-07	DDS-01, DDS-02, DDS-04, LAPD-11 DWP-02	DWP-12 LASAN-03	DDS-03 GSD-01, HCID-01, ITA-02, ITA-03, ITA-04, LAPD-01, LAPD-06, LAPD-10 LAPD-12, DWP-01,	DWP-10	DWP-09
High-Rise/ High-Occupancy Building Fire	DAS-01, EMD-01 HAR-01, ITA-01, PL-02, PL-03 DWP-06	LADBS-03 HAR-03, LAFD-04, LAPD-05, DWP-03 DWP-04, DWP-07	DDS-01, DDS-02 DDS-04, LAPD-11 DWP-02	DWP-12	DDS-03 GSD-01, HCID-01, ITA-02, ITA-03, ITA-04, LAPD-01, LAPD-06, LAPD-12 DWP-01,	DWP-10	DWP-09
Public Health Hazards	DAS-01, EMD-01 HAR-01, ITA-01, PL-02, PL-03 DWP-06	LADBS-03 HAR-03, LAPD-05 DWP-03, DWP-04 DWP-07, LASAN-04	DDS-01, DDS-02, DDS-04, LAPD-11 DWP-02	DWP-12	DDS-03 GSD-01, HCID-01, ITA-02, ITA-03, ITA-04, LAPD-01 LAPD-12, DWP-01,	DWP-10 LASAN-05	DWP-09

Hazard Type	Action Addressing Hazard, by Mitigation Type ^a						
	1. Prevention	2. Property Protection	3. Public Education and Awareness	4. Natural Resource Protection	5. Emergency Services	6. Structural Projects	7. Climate Resilient
Radiological Incidents	DAS-01, EMD-01 HAR-01, ITA-01, PL-02, PL-03 DWP-06	LADBS-03 HAR-03, LAFD-04, LAPD-05, DWP-03 DWP-04, DWP-07	DDS-01, DDS-02, DDS-04, LAPD-11 DWP-02	DWP-12	DDS-03 GSD-01, HCID-01, ITA-02, ITA-03, ITA-04, LAPD-01, LAPD-06, LAPD-12 DWP-01,	DWP-10	DWP-09
Special Events	DAS-01, EMD-01 HAR-01, ITA-01, LAPD-04, DWP-06	LADBS-03, LAFD-04 HAR-03, LAFD-04, LAPD-05, DWP-03 DWP-04, DWP-07	DDS-01, DDS-02, DDS-04, LAPD-11 DWP-02	DWP-12	DDS-03 GSD-01, HCID-01, ITA-02, ITA-03, ITA-04, LAPD-01, LAPD-04,LAPD-0 6 LAPD-12, DWP-01,	DWP-10	DWP-09
Terrorism and Weapons of Mass Destructions	DAS-01, EMD-01 HAR-01, HAR-05, HAR-07, ITA-01, PL-03, LAPD-04, LAPD-07, LAPD-13 DWP-06, LASAN-06	LADBS-03,LAFD-0 4,LAPD-05,LAPD- 07, DPW-13, DWP-03, DWP-04, DWP-07	DDS-01, DDS-02' DDS-04, HAR-06, LAPD-11 DWP-02	DWP-12	DDS-03 GSD-01, HAR-08, HCID-01, ITA-02, ITA-03, ITA-04, LAPD-01, LAPD-06, LAPD-07 LAPD-08, LAPD-12 DWP-01,	DWP-10	DWP-09

a. See Section 23.2.3 for description of mitigation types

23.3 PLAN ADOPTION

A hazard mitigation plan must document that it has been formally adopted by the governing body of the jurisdiction requesting federal approval of the plan (44 CFR Section 201.6(c)(5)). DMA compliance and its benefits cannot be achieved until the plan is adopted. This plan will be submitted for a pre-adoption review to Cal OES prior to adoption. Once pre-adoption approval has been provided, the City of Los Angeles will formally adopt the plan. A copy of the resolution is provided in Figure 23-1.

23.4 PLAN MAINTENANCE STRATEGY

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

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

Insert Plan Adoption Resolution When Available

Figure 23-1. Resolution Adopting Hazard Mitigation Plan

This section details the formal process that will ensure that the hazard mitigation plan remains an active and relevant document and that the City of Los Angeles maintains its eligibility for applicable funding sources. The plan maintenance process includes a schedule for monitoring and evaluating the plan annually and producing an updated plan every five years. This section also describes how public participation will be integrated throughout the plan maintenance and implementation process. It also explains how the mitigation strategies outlined in this plan will be integrated with existing planning mechanisms and programs, such as comprehensive land-use planning processes, capital improvement planning, and building code enforcement and implementation. The plan's format allows sections to be reviewed and updated when new data become available, resulting in a plan that will remain current and relevant.

23.4.1 Plan Implementation

The effectiveness of the hazard mitigation plan depends on its implementation and incorporation of its action items into existing local plans, policies and programs. Together, the action items in the Plan provide a framework for activities that the City of Los Angeles can implement over the next 5 years. The planning team and the Steering Committee have established goals and objectives and have prioritized mitigation actions that will be implemented through existing plans, policies, and programs.

The City of Los Angeles Emergency Management department (EMD) will have lead responsibility for overseeing the Plan implementation and maintenance strategy. Plan implementation and evaluation will be a shared responsibility among all agencies identified as lead agencies in the mitigation action plan.

23.4.2 Steering Committee

The Steering Committee is a total volunteer body that oversaw the development of the Plan and made recommendations on key elements of the plan, including the maintenance strategy. It was the Steering Committee's position that an oversight committee with representation similar to that of the Steering Committee should have an active role in the plan maintenance strategy. Therefore, it is recommended that a steering committee remain a viable body involved in key elements of the Plan maintenance strategy. The new steering committee should include representation from stakeholders in the planning area.

The principal role of the new steering committee in this plan maintenance strategy will be to review the annual progress report and provide input to EMD on possible enhancements to be considered at the next update. Future plan updates will be overseen by a steering committee similar to the one that participated in this plan development process, so keeping an interim steering committee intact will provide a head start on future updates. It will be the steering committee's role to review the progress report in an effort to identify issues needing to be addressed by future plan updates.

23.4.3 Annual Progress Report

The minimum task of the ongoing annual steering committee meeting will be the evaluation of the progress of its individual action plan during a 12-month performance period. This review will include the following:

- Summary of any hazard events that occurred during the performance period and the impact these events had on the planning area
- Review of mitigation success stories
- Review of continuing public involvement
- Brief discussion about why targeted strategies were not completed
- Re-evaluation of the action plan to determine if the timeline for identified projects needs to be amended (such as changing a long-term project to a short-term one because of new funding)
- Recommendations for new projects

- Changes in or potential for new funding options (grant opportunities)
- Impact of any other planning programs or actions that involve hazard mitigation.

The planning team has created a template for preparing a progress report (see Appendix D). The plan maintenance steering committee will provide feedback to the planning team on items included in the template. The planning team will then prepare a formal annual report on the progress of the plan. This report should be used as follows:

- Posted on the EMD website page dedicated to the hazard mitigation plan
- Provided to the local media through a press release
- Presented to Los Angeles City Council inform them of the progress of actions implemented during the reporting period

Annual progress reporting is not a requirement specified under 44 CFR. However, it may enhance opportunities for funding. While failure to implement this component of the plan maintenance strategy will not jeopardize compliance under the DMA, it may jeopardize the opportunity to leverage funding opportunities with other agencies.

23.4.4 Plan Update

Local hazard mitigation plans must be reviewed, revised if appropriate, and resubmitted for approval in order to remain eligible for benefits under the DMA (44 CFR, Section 201.6(d)(3)). The City of Los Angeles intends to update the hazard mitigation plan on a 5-year cycle from the date of initial plan adoption. This cycle may be accelerated to less than 5 years based on the following triggers:

- A Presidential Disaster Declaration that impacts the planning area
- A hazard event that causes loss of life
- A comprehensive update of the City of Los Angeles General Plan.

It will not be the intent of future updates to develop a complete new hazard mitigation plan for the planning area. The update will, at a minimum, include the following elements:

- The update process will be convened through a steering committee.
- The hazard risk assessment will be reviewed and, if necessary, updated using best available information and technologies.
- The action plan will be reviewed and revised to account for any actions completed, dropped, or changed and to account for changes in the risk assessment or new policies identified under other planning mechanisms (such as the General Plan).
- The draft update will be sent to appropriate agencies and organizations for comment.
- The public will be given an opportunity to comment on the update prior to adoption.
- The Los Angeles City Council will adopt the updated plan.

23.4.5 Continuing Public Involvement

The public will continue to be apprised of the plan's progress through the EMD website and by providing copies of annual progress reports to the media. The website will not only house the final plan, it will become the one-stop shop for information regarding the plan and plan implementation. Copies of the plan will be distributed to the City of Los Angeles library system. Upon initiation of future update processes, a new public involvement strategy will be initiated based on guidance from a new steering committee. This strategy will be based on the needs and capabilities of the City of Los Angeles at the time of the update. At a minimum, this strategy will include the use of local media outlets within the planning area.

23.4.6 Integration with Other Planning Mechanisms

The City of Los Angeles, through adoption of a General Plan and zoning ordinance, has planned for the impact of natural hazards. The process of updating this hazard mitigation plan provided the opportunity to review and expand on policies in these planning mechanisms. The information on hazard, risk, vulnerability, and mitigation contained in this hazard mitigation plan is based on the best science and technology available at the time this plan was prepared. The General Plan and the hazard mitigation plan are complementary documents that work together to achieve the goal of reducing risk exposure. The General Plan is considered to be an integral part of this plan. An update to the General Plan may trigger an update to the hazard mitigation plan.

The City of Los Angeles will create a linkage between the hazard mitigation plan and the General Plan by identifying a mitigation action as such and giving that action a high priority. Other planning processes and programs to be coordinated with the recommendations of the hazard mitigation plan include the following:

- City of Los Angeles General Plan
- Climate Action Plans
- Resilience Plans
- Recovery Plan
- Emergency response plans
- Capital improvement programs
- Municipal codes
- Community design guidelines
- Water-efficient landscape design guidelines
- Stormwater management programs
- Water system vulnerability assessments
- Master fire protection plans.

Some action items do not need to be implemented through regulation. Instead, these items can be implemented through the creation of new educational programs, continued interagency coordination, or improved public participation. As information becomes available from other planning mechanisms that can enhance this plan, that information will be integrated via the update process.

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GLOSSARY

ACRONYMS

CCR—California Code of Regulations
CDBG-DR—Community Development Block Grant—Disaster Recovery
CEQA—California Environmental Quality Act
CFR—Code of Federal Regulations
CIP—Capital Improvement Plan
CRS—Community Rating System
DFIRM—Digital Flood Insurance Rate Maps
DMA —Disaster Mitigation Act
DSOD—Division of Safety of Dams
DTSC—Department of Toxic Substances Control
DWR—Department of Water Resources (California)
EDD—Employment Development Department (California)
EF— Enhanced Fujita Scale
EPA—U.S. Environmental Protection Agency
ESA—Endangered Species Act
FEMA—Federal Emergency Management Agency
FERC—Federal Energy Regulatory Commission
FIRM—Flood Insurance Rate Map
FHSZ—Fire hazard severity zone
GIS—Geographic Information System
Hazardus—Hazards, United States
HMGP—Hazard Mitigation Grant Program
IBC—International Building Code
IRC—International Residential Code
LACDA—Los Angeles County Drainage Area
LADOT—Los Angeles Department of Transportation
LADWP—Los Angeles Department of Water and Power

LAPD—Los Angeles Police Department
LATCB— Los Angeles Tourism & Convention Board
MCI—Multi-casualty incident
MM—Modified Mercalli Scale
NCEI—National Centers for Environmental Information
NEHRP—National Earthquake Hazards Reduction Program
NIMS—National Incident Management System
NFIP—National Flood Insurance Program
NOAA—National Oceanic and Atmospheric Administration
NWS—National Weather Service
OES—Office of Emergency Services (California)
PDM—Pre-Disaster Mitigation Grant Program
PGA—Peak Ground Acceleration
SFHA—Special Flood Hazard Area
SPI—Standardized Precipitation Index
TRI—Toxics Release Inventory
UHI—Urban heat island
USGS—U.S. Geological Survey
WMD—Weapon of mass destruction
WRCC—Western Regional Climate Center

DEFINITIONS

100-Year Flood: The term “100-year flood” can be misleading. The 100-year flood does not necessarily occur once every 100 years. Rather, it is the flood that has a 1 percent chance of being equaled or exceeded in any given year. Thus, the 100-year flood could occur more than once in a relatively short period of time. The Federal Emergency Management Agency (FEMA) defines it as the 1 percent annual chance flood, which is now the standard definition used by most federal and state agencies and by the National Flood Insurance Program (NFIP).

Acre-Foot: An acre-foot is the amount of water it takes to cover 1 acre to a depth of 1 foot. This measure is used to describe the quantity of storage in a water reservoir. An acre-foot is a unit of volume. One acre foot equals 7,758 barrels; 325,829 gallons; or 43,560 cubic feet. An average household of four will use approximately 1 acre-foot of water per year.

Asset: An asset is any man-made or natural feature that has value, including people; buildings; infrastructure, such as bridges, roads, sewers, and water systems; lifelines, such as electricity and communication resources; and environmental, cultural, or recreational features such as parks, wetlands, and landmarks.

Base Flood: The flood having a 1% chance of being equaled or exceeded in any given year, also known as the “100-year” or “1% chance” flood. The base flood is a statistical concept used to ensure that all properties subject to the National Flood Insurance Program (NFIP) are protected to the same degree against flooding.

Basin: A basin is the area within which all surface water—whether from rainfall, snowmelt, springs, or other sources—flows to a single water body or watercourse. The boundary of a river basin is defined by natural topography, such as hills, mountains, and ridges. Basins are also referred to as “watersheds” and “drainage basins.”

Benefit: A benefit is a net project outcome and is usually defined in monetary terms. Benefits may include direct and indirect effects. For the purposes of benefit-cost analysis of proposed mitigation measures, benefits are limited to specific, measurable, risk reduction factors, including reduction in expected property losses (buildings, contents, and functions) and protection of human life.

Benefit/Cost Analysis: A benefit/cost analysis is a systematic, quantitative method of comparing projected benefits to projected costs of a project or policy. It is used as a measure of cost effectiveness.

Building: A building is defined as a structure that is walled and roofed, principally aboveground, and permanently fixed to a site. The term includes manufactured homes on permanent foundations on which the wheels and axles carry no weight.

Capability Assessment: A capability assessment provides a description and analysis of a community’s current capacity to address threats associated with hazards. The assessment includes two components: an inventory of an agency’s mission, programs, and policies, and an analysis of its capacity to carry them out. A capability assessment is an integral part of the planning process in which a community’s actions to reduce losses are identified, reviewed, and analyzed, and the framework for implementation is identified. The following capabilities were reviewed under this assessment:

- Legal and regulatory capability
- Administrative and technical capability
- Fiscal capability

Community Rating System (CRS): The CRS is a voluntary program under the NFIP that rewards participating communities (provides incentives) for exceeding the minimum requirements of the NFIP and completing activities that reduce flood hazard risk by providing flood insurance premium discounts.

Critical Area: An area defined by state or local regulations as deserving special protection because of unique natural features or its value as habitat for a wide range of species of flora and fauna. A sensitive/critical area is usually subject to more restrictive development regulations.

Critical Facility: Facilities and infrastructure that are critical to the health and welfare of the population. These become especially important after any hazard event occurs. For the purposes of this plan, critical facilities include:

- Structures or facilities that produce, use, or store highly volatile, flammable, explosive, toxic and/or water reactive materials;
- Hospitals, nursing homes, and housing likely to contain occupants who may not be sufficiently mobile to avoid death or injury during a hazard event.
- Police stations, fire stations, vehicle and equipment storage facilities, and emergency operations centers that are needed for disaster response before, during, and after hazard events, and
- Public and private utilities, facilities and infrastructure that are vital to maintaining or restoring normal services to areas damaged by hazard events.
- Government facilities.

Dam: Any artificial barrier or controlling mechanism that can or does impound 10 acre-feet or more of water.

Dam Failure: Dam failure refers to a partial or complete breach in a dam (or levee) that impacts its integrity. Dam failures occur for a number of reasons, such as flash flooding, inadequate spillway size, mechanical failure of valves or other equipment, freezing and thawing cycles, earthquakes, and intentional destruction.

Debris Flow: Dense mixtures of water-saturated debris that move down-valley; looking and behaving much like flowing concrete. They form when loose masses of unconsolidated material are saturated, become unstable, and move down slope. The source of water varies but includes rainfall, melting snow or ice, and glacial outburst floods.

Debris Slide: Debris slides consist of unconsolidated rock or soil that has moved rapidly down slope. They occur on slopes greater than 65 percent.

Disaster Mitigation Act of 2000 (DMA); The DMA is Public Law 106-390 and is the latest federal legislation enacted to encourage and promote proactive, pre-disaster planning as a condition of receiving financial assistance under the Robert T. Stafford Act. The DMA emphasizes planning for disasters before they occur. Under the DMA, a pre-disaster hazard mitigation program and new requirements for the national post-disaster hazard mitigation grant program (HMGP) were established.

Drainage Basin: A basin is the area within which all surface water- whether from rainfall, snowmelt, springs or other sources- flows to a single water body or watercourse. The boundary of a river basin is defined by natural topography, such as hills, mountains and ridges. Drainage basins are also referred to as **watersheds** or **basins**.

Drought: Drought is a period of time without substantial rainfall or snowfall from one year to the next. Drought can also be defined as the cumulative impacts of several dry years or a deficiency of precipitation over an extended period of time, which in turn results in water shortages for some activity, group, or environmental function. A hydrological drought is caused by deficiencies in surface and subsurface water supplies. A socioeconomic drought impacts the health, well being, and quality of life or starts to have an adverse impact on a region. Drought is a normal, recurrent feature of climate and occurs almost everywhere.

Earthquake: An earthquake is defined as a sudden slip on a fault, volcanic or magmatic activity, and sudden stress changes in the earth that result in ground shaking and radiated seismic energy. Earthquakes can last from a few seconds to over 5 minutes, and have been known to occur as a series of tremors over a period of several days. The actual movement of the ground in an earthquake is seldom the direct cause of injury or death. Casualties may result from falling objects and debris as shocks shake, damage, or demolish buildings and other structures.

Exposure: Exposure is defined as the number and dollar value of assets considered to be at risk during the occurrence of a specific hazard.

Extent: The extent is the size of an area affected by a hazard.

Fire Behavior: Fire behavior refers to the physical characteristics of a fire and is a function of the interaction between the fuel characteristics (such as type of vegetation and structures that could burn), topography, and weather. Variables that affect fire behavior include the rate of spread, intensity, fuel consumption, and fire type (such as underbrush versus crown fire).

Fire Frequency: Fire frequency is the broad measure of the rate of fire occurrence in a particular area. An estimate of the areas most likely to burn is based on past fire history or fire rotation in the area, fuel conditions, weather, ignition sources (such as human or lightning), fire suppression response, and other factors.

Flash Flood: A flash flood occurs with little or no warning when water levels rise at an extremely fast rate

Flood Insurance Rate Map (FIRM): FIRMs are the official maps on which the Federal Emergency Management Agency (FEMA) has delineated the Special Flood Hazard Area (SFHA).

Flood Insurance Study: A report published by the Federal Insurance and Mitigation Administration for a community in conjunction with the community's Flood Insurance rate Map. The study contains such background data as the base flood discharges and water surface elevations that were used to prepare the FIRM. In most cases, a community FIRM with detailed mapping will have a corresponding flood insurance study.

Floodplain: Any land area susceptible to being inundated by flood waters from any source. A flood insurance rate map identifies most, but not necessarily all, of a community's floodplain as the Special Flood Hazard Area (SFHA).

Floodway: Floodways are areas within a floodplain that are reserved for the purpose of conveying flood discharge without increasing the base flood elevation more than 1 foot. Generally speaking, no development is allowed in floodways, as any structures located there would block the flow of floodwaters.

Floodway Fringe: Floodway fringe areas are located in the floodplain but outside of the floodway. Some development is generally allowed in these areas, with a variety of restrictions. On maps that have identified and delineated a floodway, this would be the area beyond the floodway boundary that can be subject to different regulations.

Freeboard: Freeboard is the margin of safety added to the base flood elevation.

Frequency: For the purposes of this plan, frequency refers to how often a hazard of specific magnitude, duration, and/or extent is expected to occur on average. Statistically, a hazard with a 100-year frequency is expected to occur about once every 100 years on average and has a 1 percent chance of occurring any given year. Frequency reliability varies depending on the type of hazard considered.

Fujita Scale of Tornado Intensity: Tornado wind speeds are sometimes estimated on the basis of wind speed and damage sustained using the Fujita Scale. The scale rates the intensity or severity of tornado events using numeric values from F0 to F5 based on tornado wind speed and damage. An F0 tornado (wind speed less than 73 miles per hour (mph)) indicates minimal damage (such as broken tree limbs), and an F5 tornado (wind speeds of 261 to 318 mph) indicates severe damage.

Goal: A goal is a general guideline that explains what is to be achieved. Goals are usually broad-based, long-term, policy-type statements and represent global visions. Goals help define the benefits that a plan is trying to achieve. The success of a hazard mitigation plan is measured by the degree to which its goals have been met (that is, by the actual benefits in terms of actual hazard mitigation).

Geographic Information System (GIS): GIS is a computer software application that relates data regarding physical and other features on the earth to a database for mapping and analysis.

Hazard: A hazard is a source of potential danger or adverse condition that could harm people and/or cause property damage.

Hazard Mitigation Grant Program (HMGP): Authorized under Section 202 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act, the HMGP is administered by FEMA and provides grants to states, tribes, and local governments to implement hazard mitigation actions after a major disaster declaration. The purpose of the program is to reduce the loss of life and property due to disasters and to enable mitigation activities to be implemented as a community recovers from a disaster

Hazards U.S. Multi-Hazard Loss Estimation Program (Hazus): Hazus is a GIS-based program used to support the development of risk assessments as required under the DMA. The Hazus software program assesses risk in a quantitative manner to estimate damages and losses associated with natural hazards. Hazus is FEMA’s nationally applicable, standardized methodology and software program and contains modules for estimating potential losses from earthquakes, floods, and wind hazards. Hazus has also been used to assess vulnerability (exposure) for other hazards.

Hydraulics: Hydraulics is the branch of science or engineering that addresses fluids (especially water) in motion in rivers or canals, works and machinery for conducting or raising water, the use of water as a prime mover, and other fluid-related areas.

Hydrology: Hydrology is the analysis of waters of the earth. For example, a flood discharge estimate is developed by conducting a hydrologic study.

Intensity: For the purposes of this plan, intensity refers to the measure of the effects of a hazard.

Inventory: The assets identified in a study region comprise an inventory. Inventories include assets that could be lost when a disaster occurs and community resources are at risk. Assets include people, buildings, transportation, and other valued community resources.

Landslide: Landslides can be described as the sliding movement of masses of loosened rock and soil down a hillside or slope. Fundamentally, slope failures occur when the strength of the soils forming the slope exceeds the pressure, such as weight or saturation, acting upon them.

Lightning: Lightning is an electrical discharge resulting from the buildup of positive and negative charges within a thunderstorm. When the buildup becomes strong enough, lightning appears as a “bolt,” usually within or between clouds and the ground. A bolt of lightning instantaneously reaches temperatures approaching 50,000°F. The rapid heating and cooling of air near lightning causes thunder. Lightning is a major threat during thunderstorms. In the United States, 75 to 100 Americans are struck and killed by lightning each year (see <http://www.fema.gov/hazard/thunderstorms/thunder.shtm>).

Liquefaction: Liquefaction is the complete failure of soils, occurring when soils lose shear strength and flow horizontally. It is most likely to occur in fine grain sands and silts, which behave like viscous fluids when liquefaction occurs. This situation is extremely hazardous to development on the soils that liquefy, and generally results in extreme property damage and threats to life and safety.

Local Government: Any county, municipality, city, town, township, public authority, school district, special district, intrastate district, council of governments (regardless of whether the council of governments is incorporated as a nonprofit corporation under State law), regional or interstate government entity, or agency or instrumentality of a local government; any Indian tribe or authorized tribal organization, or Alaska Native village or organization; and any rural community, unincorporated town or village, or other public entity.

Magnitude: Magnitude is the measure of the strength of an earthquake, and is typically measured by the Richter scale. As an estimate of energy, each whole number step in the magnitude scale corresponds to the release of about 31 times more energy than the amount associated with the preceding whole number value.

Mass movement: A collective term for landslides, debris flows, and lahars.

Mitigation: A preventive action that can be taken in advance of an event that will reduce or eliminate the risk to life or property.

Mitigation Actions: Mitigation actions are specific actions to achieve goals and objectives that minimize the effects from a disaster and reduce the loss of life and property.

Objective: For the purposes of this plan, an objective is defined as a short-term aim that, when combined with other objectives, forms a strategy or course of action to meet a goal. Unlike goals, objectives are specific and measurable.

Peak Ground Acceleration: Peak Ground Acceleration (PGA) is a measure of the highest amplitude of ground shaking that accompanies an earthquake, based on a percentage of the force of gravity.

Preparedness: Preparedness refers to actions that strengthen the capability of government, residents, and communities to respond to disasters.

Presidential Disaster Declaration: These declarations are typically made for events that cause more damage than state and local governments and resources can handle without federal government assistance. Generally, no specific dollar loss threshold has been established for such declarations. A Presidential Disaster Declaration puts into motion long-term federal recovery programs, some of which are matched by state programs, designed to help disaster victims, businesses, and public entities.

Probability of Occurrence: The probability of occurrence is a statistical measure or estimate of the likelihood that a hazard will occur. This probability is generally based on past hazard events in the area and a forecast of events that could occur in the future. A probability factor based on yearly values of occurrence is used to estimate probability of occurrence.

Repetitive Loss Property: Any NFIP-insured property that, since 1978 and regardless of any changes of ownership during that period, has experienced:

- Four or more paid flood losses in excess of \$1000.00; or
- Two paid flood losses in excess of \$1000.00 within any 10-year period since 1978 or
- Three or more paid losses that equal or exceed the current value of the insured property.

Return Period (or Mean Return Period): This term refers to the average period of time in years between occurrences of a particular hazard (equal to the inverse of the annual frequency of occurrence).

Riverine: Of or produced by a river. Riverine floodplains have readily identifiable channels. Floodway maps can only be prepared for riverine floodplains.

Risk: Risk is the estimated impact that a hazard would have on people, services, facilities, and structures in a community. Risk measures the likelihood of a hazard occurring and 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 occurrence of a specific type of hazard. Risk also can be expressed in terms of potential monetary losses associated with the intensity of the hazard.

Risk Assessment: Risk assessment is the process of measuring potential loss of life, personal injury, economic injury, and property damage resulting from hazards. This process assesses the vulnerability of people, buildings, and infrastructure to hazards and focuses on (1) hazard identification; (2) impacts of hazards on physical, social, and economic assets; (3) vulnerability identification; and (4) estimates of the cost of damage or costs that could be avoided through mitigation.

Risk Ranking: This ranking serves two purposes, first to describe the probability that a hazard will occur, and second to describe the impact a hazard will have on people, property, and the economy. Risk estimates are based

on the methodology used to prepare the risk assessment for this plan. The following equation shows the risk ranking calculation:

$$\text{Risk Ranking} = \text{Probability} + \text{Impact (people + property + economy)}$$

Robert T. Stafford Act: The Robert T. Stafford Disaster Relief and Emergency Assistance Act, Public Law 100-107, was signed into law on November 23, 1988. This law amended the Disaster Relief Act of 1974, Public Law 93-288. The Stafford Act is the statutory authority for most federal disaster response activities, especially as they pertain to FEMA and its programs.

Special Flood Hazard Area: The base floodplain delineated on a Flood Insurance Rate Map. The SFHA is mapped as a Zone A in riverine situations and zone V in coastal situations. The SFHA may or may not encompass all of a community's flood problems

Stakeholder: Business leaders, civic groups, academia, non-profit organizations, major employers, managers of critical facilities, farmers, developers, special purpose districts, and others whose actions could impact hazard mitigation.

Stream Bank Erosion: Stream bank erosion is common along rivers, streams and drains where banks have been eroded, sloughed or undercut. However, it is important to remember that a stream is a dynamic and constantly changing system. It is natural for a stream to want to meander, so not all eroding banks are "bad" and in need of repair. Generally, stream bank erosion becomes a problem where development has limited the meandering nature of streams, where streams have been channelized, or where stream bank structures (like bridges, culverts, etc.) are located in places where they can actually cause damage to downstream areas. Stabilizing these areas can help protect watercourses from continued sedimentation, damage to adjacent land uses, control unwanted meander, and improvement of habitat for fish and wildlife.

Steep Slope: Different communities and agencies define it differently, depending on what it is being applied to, but generally a steep slope is a slope in which the percent slope equals or exceeds 25%. For this study, steep slope is defined as slopes greater than 33%.

Thunderstorm: A thunderstorm is a storm with lightning and thunder produced by cumulonimbus clouds. Thunderstorms usually produce gusty winds, heavy rains, and sometimes hail. Thunderstorms are usually short in duration (seldom more than 2 hours). Heavy rains associated with thunderstorms can lead to flash flooding during the wet or dry seasons.

Tornado: A tornado is a violently rotating column of air extending between and in contact with a cloud and the surface of the earth. Tornadoes are often (but not always) visible as funnel clouds. On a local scale, tornadoes are the most intense of all atmospheric circulations, and winds can reach destructive speeds of more than 300 mph. A tornado's vortex is typically a few hundred meters in diameter, and damage paths can be up to 1 mile wide and 50 miles long.

Vulnerability: Vulnerability describes how exposed or susceptible an asset is to damage. 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. Flooding of an electric substation would affect not only the substation itself but businesses as well. Often, indirect effects can be much more widespread and damaging than direct effects.

Watershed: A watershed is an area that drains downgradient from areas of higher land to areas of lower land to the lowest point, a common drainage basin.

Wildfire: These terms refer to any uncontrolled fire occurring on undeveloped land that requires fire suppression. The potential for wildfire is influenced by three factors: the presence of fuel, topography, and air mass. Fuel can include living and dead vegetation on the ground, along the surface as brush and small trees, and in the air such as tree canopies. Topography includes both slope and elevation. Air mass includes temperature, relative humidity, wind speed and direction, cloud cover, precipitation amount, duration, and the stability of the atmosphere at the time of the fire. Wildfires can be ignited by lightning and, most frequently, by human activity including smoking, campfires, equipment use, and arson.

Windstorm: Windstorms are generally short-duration events involving straight-line winds or gusts exceeding 50 mph. These gusts can produce winds of sufficient strength to cause property damage. Windstorms are especially dangerous in areas with significant tree stands, exposed property, poorly constructed buildings, mobile homes (manufactured housing units), major infrastructure, and aboveground utility lines. A windstorm can topple trees and power lines; cause damage to residential, commercial, critical facilities; and leave tons of debris in its wake.

Zoning Ordinance: The zoning ordinance designates allowable land use and intensities for a local jurisdiction. Zoning ordinances consist of two components: a zoning text and a zoning map.