

# CITY OF IRVINE

## CLIMATE ADAPTATION FRAMEWORK

DRAFT

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Preparing Irvine for the impacts of climate change requires significant investment in time and resources across all parts of the community, including businesses, health, emergency services, government, schools, infrastructure, culture, and natural resources. This chapter provides a list of 151 potential actions the City of Irvine can consider for future climate adaptation and resilience efforts. Actions are divided into climate hazard sections (and include a “City-wide” section), like the body of the Vulnerability Assessment as follows:

- Citywide (48 actions)
- Extreme Heat Events (23 actions)
- Drought (15 actions)
- Wildfire (27 actions)
- Flooding (22 actions)
- Liquefaction/Landslide (16 actions)

The hazard sections are organized by the following categories (not all categories apply to each hazard):

## PLANNING AND COLLABORATION

The complexity and interconnectedness of climate change requires a significant investment in community engagement and education to increase awareness and resilience. In addition, land use, geography, and transportation network infrastructure necessitate comprehensive and multi-jurisdictional adaptation approaches and solutions in partnership with local, regional, and State partners. Programs that educate and inform residents, visitors, businesses, and local decision-makers can empower individuals to take actions to reduce risk for themselves. Programs that seek to bring community members together can create lasting connectivity among neighbors who can plan together to get out of harm’s way.

## HEALTHY COMMUNITIES

Climate change can affect the health of residents, workers, and tourist of Irvine. Impacts include respiratory impacts from smoke, heat-related illnesses, increasing allergies and asthma, food-borne and water-borne illnesses, and mental health impacts from extreme events. More frequent and severe storms, floods, heat waves, wildfires, and other extreme events create additional stresses to healthcare systems, employees, and infrastructure. Maintaining and improving the physical and mental health should be a top priority.

As climate-related hazards are expected to worsen in coming decades, the Irvine community will need to increase their preparation, response, recovery, and mitigation efforts. The intent is to strengthen safety nets by expanding and strengthening community preparedness and resilience through collaboration, education, and lasting partnerships that emphasize community well-being.

## CLIMATE EQUITY

As discussed in the Vulnerability Assessment, Climate change does not affect all residents evenly. Climate hazards can disproportionality effect vulnerable populations that may have a more challenging time responding to hazard events because of age, language barriers, income, housing, or other characteristics. To address these differences, climate adaptation actions were developed to address the specific needs of those most vulnerable to hazards.

## EMERGENCY PREPAREDNESS

Emergency preparedness requires proactive planning, strong communication, and reliable and clear sources of information available through multiple channels. To minimize the impact of potential disasters for community members, the City plays a key role in making sure residents and visitors have the correct information about what to do and where to go in the event of a disaster. Individuals also have a responsibility in emergency preparedness, and should stay informed, prepare emergency kits, and otherwise take precautions to minimize risk to themselves and their families. In addition, clear evacuation protocol, planning, and practice are crucial factors for community preparedness.

Future planning efforts should focus on regional connectivity and communication, engaging the right regional partners in evacuation planning, optimizing the Irvine and Orange County evacuation protocols, and identifying key potential challenges in regional evacuations.

## RESILIENT BUILDINGS

Irvine development includes a mix of buildings, including master-planned communities and neighborhoods of single- and multi-family homes, along with commercial and industrial buildings. Upgrades to business and residential structures to reduce fire-, flood-, geologic-, and seismic-related vulnerability can be combined with efforts to increase energy efficiency and reduce greenhouse gas emissions. Both objectives lead to meaningful climate action that save money and improve quality of life for residents and promote a sustainable economy.

## RESILIENT INFRASTRUCTURE

Implementation and management of Irvine infrastructure will determine how well it can protect residents and accommodate or mitigate future climate and extreme weather impacts. As the City does not own directly owned or operated all the critical infrastructure (e.g., electricity, water, or telecommunications), it must work directly with those companies, agencies, and organizations to enhance the resilience of those systems. Continuous investment in transportation infrastructure may be needed to facilitate mobility throughout the City in both everyday life and in an emergency.

## RESILIENT ECOSYSTEMS

Natural systems provide valuable functions to both residents and visitors in the form of ecosystem services (water storage, etc.) in the watershed and open space. Natural lands and open space are increasingly will be increasingly affected by climate change and will need to be managed for continued natural function. Some of the climate-related threats include pests and diseases that can affect native trees, drought that weakens vegetation, floods and large storms that knock down trees and destroy landscaping, and overall climate shifts that make existing vegetation incompatible with the new conditions.

Adaptation actions were developed to maintain and strengthen natural ecosystems by enhancing wildfire resistance and resilience; protecting and restoring native habitats and species; and enhancing ecosystem services.

## Notes on the Evaluation and Implementation of Climate Adaptation Actions

As part of the adaptation assessment process, potentially relevant adaptation actions were collected through research of Irvine planning documents (e.g., Local Hazard Mitigation Plan), other climate adaptation plans in the State of California, and from communities across the country. These actions were modified specifically for Irvine and should be updated accordingly as adaptation planning and implementation processes progress.<sup>1</sup>

Actions listed can be complementary, directly dependent on the implementation of another action (before or after), implemented in conjunction (or sequentially) with other actions, or mutually exclusive of one another (implementing one action negates the effectiveness or ability to implement another action).

The list of actions provided is not necessarily the full suite of actions that are appropriate for the City. Instead, this list provides the City with a suite of the most appropriate options to consider when working to achieve the community's current climate resiliency goals. As industry and best practices evolve, it is likely that additional actions will be considered (or removed from consideration) as adaptation planning progresses.

It is up to the City to discuss these actions with the community and take into consideration various factors to determine which actions get implemented. To determine if these actions were appropriate and suitable, the following three-part evaluation process can be implemented to evaluate each of the actions. This screening process should allow for quick filtering of actions that are not a good fit for the community, by considering whether the action(s):

- Will help the City achieve its resilience goals;
- Will be effective;
- Will be very costly; or
- Has low feasibility.

### Evaluation Terminology

**Effectiveness** is the extent to which the adaptation action achieves the desired outcomes. Considerations for effectiveness include, but are not limited to:

- Does the action reduce vulnerability, risk, or short- and long-term impacts of climate change and extreme weather events?
- What future losses will be avoided? Does the scale of the action meet the scale of the challenge?
- Is the approach equitable?

**Cost-efficient** is the extent to which the adaptation action makes efficient use of resources (funding, expertise, and staff time). Considerations for cost-efficiency include, but are not limited to:

- Does the effort and resources needed to implement the action match the intended result?

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<sup>1</sup> Those actions pulled from Irvine planning documents are noted in the actions list and have not been modified.

- Are there co-benefits to implementation?
- Can the action be implemented in parallel with another action?

**Feasibility** is the extent to which the adaptation action can successfully be implemented.

Considerations for feasibility include, but are not limited to:

- Is the appropriate technical, political, and community capacity in place to make the action successful?
- Is it deemed acceptable by all segments of the community?

### Action Key

*Each action is formatted as follows.*

**Action Code #:** [Citywide (CW), Extreme Heat (EH), Drought (D), Wildfire (WF), Flooding (F), Liquefaction/Landslide (L) - Grouping Initials - #]:

**ACTION** (in bold).

- **Type of action:** Project/Policy/Program
- **Example Partners:** Internal City departments and external agencies that should be or considered for involvement in planning and implementation of the action. Some actions will require a lead and additional partners to successfully implement the action.
- **Estimated Cost:** *Low (<\$100k), Medium (\$100k - \$1,000,000), High (>\$1 million).* These are potential cost ranges that are likely to change as actions are refined and improved prior to implementation.
- **Timeframe for Implementation:** *Ongoing, Near-term (<5 years), Medium-term (5-20 years), Long-term (>20 years).* While most actions in the Adaptation Framework focus on the near-term, thought it may not be feasible or realistic to implement them within that time frame due to shifts in priority or capacity. A few actions have specific timeframes of effectiveness, but others can be implemented if or when deemed necessary.

*Note: The numbering of actions is meant to serve as a coding system and make it easier to find actions. It does not represent priority or order of implementation.*

## CITYWIDE ACTIONS (CW)

### PLANNING AND COLLABORATION

**CW-1: Collaborate with local and regional partners to support business resilience through emergency preparedness education, training, and resources.**

- **Type of Action:** Program
- **Potential Partners:** Irvine Community Development Department, Irvine Office of Emergency Management, Irvine Chamber of Commerce, Local Businesses, Orange Chamber of Commerce and Visitor Bureau
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Near-term (<5 years)

**CW-2: Continue coordination with important community assets (e.g., schools, businesses) to ensure staff, personnel, and community members understand the ramifications of, and are planning for, extreme weather events and emergencies.**

- **Type of Action:** Program
- **Potential Partners:** Irvine Community Development Department, Irvine Office of Emergency Management, Irvine Unified School District Emergency Operations Center, Governor's Office of Emergency Services (Cal OES), FEMA's Youth Preparedness Programs, Red Cross, California Department of Education
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Ongoing

**CW-3: Require that climate projections and the impacts associated with them are included in all City planning documents, policies, programs, and ordinances as they are reviewed or updated.**

- **Type of Action:** Policy
- **Potential Partners:** Irvine Community Development Department, Irvine Public Works and Transportation Department
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Ongoing

**CW-4: Update climate adaptation assessment to include monitoring and evaluation metrics that evaluate the efficacy of the climate change resilience actions.**

- **Type of Action:** Project
- **Potential Partners:** Irvine Community Development Department, Irvine Public Works and Transportation Department
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Near-term (<5 years)

**CW-5: Involve community groups and schools in monitoring trigger/threshold level indicators to determine when adaptation actions should be implemented or modified in response to changing indicators.**

- **Type of Action:** Program
- **Potential Partners:** Irvine Environmental Programs, Irvine Community Development Department
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Near-term (<5 years)

**CW-6: Modify the City Council Agenda process and/or report template to require inclusion of a statement about how a proposed project or program supports or addresses climate adaptation.**

- **Type of Action:** Policy
- **Potential Partners:** Irvine Community Development Department, Irvine Office of Emergency Management, Irvine Public Works and Transportation Department,
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Near-term (<5 years)

CW-7: Actively pursue financing and funding opportunities to fund short- and long-term adaptation implementation projects (e.g., ensure the City has the appropriate planning documents to leverage FEMA mitigation funding).

- **Type of Action:** Project
- **Potential Partners:** Irvine Community Development Department, Irvine Office of Emergency Management, Irvine Public Works and Transportation Department, FEMA, CalOES,
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Near-term (< 5 years)

CW-8: Continue to update the Local Hazard Mitigation Plan every five years to comprehensively plan for current and future natural and human-caused hazards within the City.

- **Type of Action:** Program
- **Potential Partners:** Irvine Office of Emergency Management, Irvine Community Development Department, Irvine Public Works and Transportation Department, CalOES, FEMA, CAL FIRE
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Near-term (< 5 years)

CW-9: Coordinate with regional health care facilities to ensure effective care to all City residents and regional travelers during an emergency.

- **Type of Action:** Program
- **Potential Partners:** Irvine Health and Human Services, Orange County Fire Authority, Orange County Health Care Agency, OC Access (OCTA)
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Near-term (< 5 years)

CW-10: Support regional healthcare providers as they develop climate change-related mental health and trauma treatment measures and incorporate them as appropriate into existing City plans, trainings, programs, and policies.

- **Type of Action:** Project
- **Potential Partners:** Irvine Health and Human Services, Orange County Health Care Agency, Irvine Office of Emergency Management
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Near-term (< 5 years)

CW-11: Establish relationships with representatives from the CDC about the Community Assessment for Public Health Emergency Response (CASPER) program in preparation for extreme weather events or natural disasters.

- **Type of Action:** Project
- **Potential Partners:** Irvine Health and Human Services, Irvine Office of Emergency Management, Centers for Disease Control and Prevention (CDC)
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Near-term (<5 years)

CW-12: Support regional (or county-wide) vulnerability assessment for the healthcare system (including dialysis clinics and pharmacies) and its ability to handle climate hazards (including non-climate hazards that may exacerbate risk).

- **Type of Action:** Program
- **Potential Partners:** Irvine Health and Human Services, Orange County Fire Authority, Orange County Health Care Agency, UCI Medical Center, Hoag Hospital, Health Centers, Senior Living Facilities, Community Service Centers, and California Department of Public Health
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Near-term (< 5 years)

**CW-13: Formalize partnerships with regional partners (e.g., the University of California and their Climate Stewards Program) to support climate literacy.**

- **Type of Action:** Project
- **Potential Partners:** Irvine Health and Human Services, Irvine Community Development Department, University of California-Irvine, Climate Action Campaign
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Near-term (<5 years)

## HEALTHY COMMUNITIES

**CW-14: Expand upon existing climate awareness communications programs and campaigns that help community members understand potential risks, solutions, and opportunities to address climate impacts.**

- **Type of Action:** Program
- **Potential Partners:** Irvine Environmental Programs
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Near-term (< 5 years)

**CW-15: Publish a guide or online portal of actions that commercial and residential property owners can take to make their homes and buildings more resilient to climate change.**

- **Type of Action:** Project
- **Potential Partners:** Irvine Office of Emergency Management, Irvine Community Development Department, Irvine Environmental Programs
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Near-term (<5 years)

**CW-16: Continue to build the capacity of community groups (e.g., Neighborhood Action Plans, Earth Day Events, Cool Block Program) to increase their engagement in climate change adaptation related activities.**

- **Type of Action:** Program
- **Potential Partners:** Neighborhood groups, Irvine Environmental Programs, Irvine Community Development Department
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Near-term (<5 years)

**CW-17: Engage youth in the City's climate adaptation work through school education initiatives.**

- **Type of Action:** Project
- **Potential Partners:** Irvine Environmental Programs, Irvine Community Development Department, Irvine Unified School District
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Near-term (<5 years)

**CW-18: Reduce the exposure of persons experiencing homelessness to safety and health impacts from climate hazards.**

- **Type of Action:** Project
- **Potential Partners:** Irvine Community Development Department, Irvine Health and Human Services, Orange County Homeless Prevention – Continuum of Care System
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Near-term (<5 years)

## CLIMATE EQUITY

**CW-19: Work with or support community organizations as they identify gaps in vulnerable community resilience planning and further engage vulnerable community members in wildfire risk, evacuation, and resilience work.**

- **Type of Action:** Project



- **Potential Partners:** Irvine Community Development Department, Irvine Health and Human Services, California Association of Community Health Workers
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Near-term (<5 years)

**CW-20: Complete an equity impact evaluation for climate action and adaptation planning and implementation processes.**

- **Type of Action:** Project
- **Potential Partners:** Irvine Community Development Department, UCI Center for Environmental Health Disparities Research, Environmental Justice Orange County, Climate Action Campaign, Orange County Power Authority, Orange County Civic Engagement Table
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Near-term (<5 years)

**CW-21: Ensure that community evacuation plans include provisions for community members who do not have access to private vehicles or are otherwise unable to drive. (LHMP P5)**

- **Type of Action:** Project
- **Potential Partners:** Irvine Office of Emergency Management, Irvine Health and Human Services, Irvine Police Department, Orange County Fire Authority, Orange County Health Care Agency, OC Access (OCTA), Orange County Social Services Agency – Independent Living Program
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Ongoing

**CW-22: Continue to ensure effective emergency notifications through multiple media formats, in at least English, Spanish, Mandarin, Farsi, Korean, and Vietnamese; about pending, imminent, or ongoing emergency events. Ensure that information is accessible to persons with disabilities and functional needs. (LHMP P6)**

- **Type of Action:** Project
- **Potential Partners:** Irvine Office of Emergency Management, Irvine Health and Human Services, Irvine Police Department, Orange County Fire Authority, Orange County Health Care Agency, OC Access (OCTA), Orange County Social Services Agency – Independent Living Program, Orange County Deaf Equal Access Foundation, California Public Utilities Commission
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Near-term (< 5 years)

**CW-23: Promote the California Low-Income Home Energy Assistance Program (LIHEAP) and Low-Income Weatherization Program (LIWP) to ensure all residents, especially low-income residents, have access to and understand what resources are available.**

- **Type of Action:** Project
- **Potential Partners:** Irvine Community Development Department, California Department of Community Services and Development
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Medium-term (5-20 years)

**CW-24: Consult with disability specialists to ensure that plans and protocols provide adequate access and function for people with disabilities.**

- **Type of Action:** Project
- **Potential Partners:** Irvine Health and Human Services, Orange County Fire Authority, Orange County Health Care Agency, OC Access (OCTA), Orange County Social Services Agency – Independent Living Program, Orange County Deaf Equal Access Foundation, California Public Utilities Commission
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Near-term (< 5 years)

## EMERGENCY PREPAREDNESS

**CW-25: Support updates (if necessary) to ensure that the City and County emergency response plans reflect equitable approaches to emergency preparedness and fully address the needs of all residents (e.g., hearing/visually impaired).**

- **Type of Action:** Program
- **Potential Partners:** Irvine Office of Emergency Management, Irvine Health and Human Services, Irvine Police Department, Orange County Fire Authority, Orange County Health Care Agency, OC Access (OCTA), Orange County Social Services Agency – Independent Living Program, Orange County Deaf Equal Access Foundation, California Public Utilities Commission
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Near-term (< 5 years)

**CW-26: Educate all community members about evacuation protocols, maps, and procedures for emergency preparedness and evacuation.**

- **Type of Action:** Program
- **Potential Partners:** Irvine Office of Emergency Management, Irvine Police Department, Orange County Fire Authority, Prepare Irvine, AlertOC, Irvine's Community Emergency Response Team
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Ongoing

**CW-27: Coordinate regularly with surrounding municipalities and Orange County to enhance evacuation and emergency management protocols, agreements, and processes.**

- **Type of Action:** Program
- **Potential Partners:** Irvine Office of Emergency Management, Irvine Police Department, Orange County Fire Authority, CAL FIRE
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Ongoing

**CW-28: Work with local businesses and organizations to conduct regular workplace emergency preparedness drills. (LHMP P3)**

- **Type of Action:** Program
- **Potential Partners:** Irvine Office of Emergency Management, Orange County Chamber of Commerce
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Ongoing

**CW-29: Expand participation in the Irvine Community Emergency Response Team (CERT) program for residents and businesses. (LHMP P4)**

- **Type of Action:** Project
- **Potential Partners:** Irvine Office of Emergency Management, Irvine Police Department, Orange County Fire Authority
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Ongoing

**CW-30: Identify opportunities to expand access to emergency and evacuation notices via multiple sources, including voice, text, siren, radio, and outdoor broadcasts.**

- **Type of Action:** Project
- **Potential Partners:** Irvine Office of Emergency Management, Irvine Police Department, Orange County Fire Authority, CAL FIRE
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Near-term (< 5 years)

**CW-31: Evaluate and enhance existing preparedness and evacuation programs (e.g., Prepare Irvine, AlertOC) to better educate, inform, and engage the public about emergency preparedness in the case of a disaster.**

- **Type of Action:** Project
- **Potential Partners:** Irvine Office of Emergency Management, Irvine Police Department, Orange County Fire Authority, CAL FIRE
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Near-term (< 5 years)

**CW-32: Strengthen community resilience through the development of neighborhood disaster plans.**

- **Type of Action:** Project
- **Potential Partners:** Irvine Office of Emergency Management, Irvine Police Department, Orange County Fire Authority, Irvine Community Development Department
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Near-term (< 5 years)

**CW-33: Ensure that emergency staging locations and temporary evacuation refuge areas are not situated in areas subject to temporary or permanent flooding or in high-risk wildfire zones.**

- **Type of Action:** Project
- **Potential Partners:** Irvine Office of Emergency Management, Irvine Police Department, Orange County Fire Authority, Irvine Community Development Department, Governor's Office of Emergency Services (Cal OES), FEMA
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Near-term (< 5 years)

**CW-34: Preserve and improve the transportation infrastructure to streamline traffic flow in case of an emergency evacuation by integrating sustainable methods (e.g., up-to-date traffic control centers, solar powered signs)**

- **Type of Action:** Program
- **Potential Partners:** Irvine Office of Emergency Management, Irvine Police Department, Irvine Public Works and Transportation Department, Orange County Fire Authority, Irvine Community Development Department, Caltrans, Orange County Transit Authority
- **Estimated Cost:** High (\$100k-\$1 million)
- **Timeframe for Implementation:** Near-term (< 5 years)

**CW-35: Continue agreements with local school districts to ensure that school facilities can act as evacuation sites during major emergencies. (LHMP P2)**

- **Type of Action:** Policy
- **Potential Partners:** Irvine Office of Emergency Management, Irvine Unified School District
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Ongoing

**CW-36: Develop formalized agreements (MOU's) with hotels, AirBnBs and other vacation rental services, and other commercial spaces to designate them as Red Cross facilities in the case of an emergency.**

- **Type of Action:** Policy
- **Potential Partners:** Irvine Office of Emergency Management, Airbnb, Vrbo,
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Near-term (< 5 years)

## **RESILIENT BUILDINGS**

**CW-37: Identify opportunities to use school facilities as evacuation centers, cooling centers, and charging stations, during extreme heat or weather events.**

- **Type of Action:** Project

- **Potential Partners:** Irvine Office of Emergency Management, Irvine Community Development, Department Governor’s Office of Emergency Services (Cal OES)
- **Estimated Cost:** Medium (\$100k - \$1 million)
- **Timeframe for Implementation:** Near-term (<5 years)

**CW-38: Ensure that any new development provides adequate emergency response capabilities.**

- **Type of Action:** Policy/Project
- **Potential Partners:** Irvine Office of Emergency Management, Irvine Police Department, Irvine Public Works and Transportation Department, Orange County Fire Authority, Irvine Community Development Department,
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Near-term (< 5 years)

**CW-39: Ensure that all regional and City transportation plans reflect updated evacuation routes, strategies, and data.**

- **Type of Action:** Project
- **Potential Partners:** Irvine Office of Emergency Management, Irvine Police Department, Irvine Public Works and Transportation Department, Orange County Fire Authority, Irvine Community Development Department, Caltrans, Orange County Transit Authority
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Near-term (< 5 years)

**CW-40: Identify gaps in current communication pathways with vulnerable community members during planned (e.g., PSPS events) or unplanned power outages (with particular attention to those with developmental or physical disabilities).**

- **Type of Action:** Project
- **Potential Partners:** Southern California Edison, California Public Utilities Commission, Irvine Office of Emergency Management
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Near-term (< 5 years)

**CW-41: Complete detailed City evacuation planning maps and incorporate them into the Neighborhood Action Plans that include localized community refuge areas (that are not in locations vulnerable to climate hazards).**

- **Type of Action:** Project
- **Potential Partners:** Irvine Office of Emergency Management, Irvine Police Department, Irvine Public Works and Transportation Department, Orange County Fire Authority, Irvine Community Development Department
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Near-term (< 5 years)

**CW-42: Update evacuation and emergency plans and consider ways in which non-related climate stressors would impact evacuation planning (e.g., pandemics, earthquakes, terrorist attacks).**

- **Type of Action:** Project
- **Potential Partners:** Irvine Office of Emergency Management, Irvine Police Department, Irvine Public Works and Transportation Department, Orange County Fire Authority, Irvine Community Development Department, CalOES, FEMA
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Near-term (< 5 years)

## RESILIENT INFRASTRUCTURE

**CW-43: Maintain at least one emergency power-generating station in all critical facilities that the City could use as an emergency public assembly area, such as City Hall, Community Centers, and any others that the City may so designate in the future. (LHMP P7)**

- **Type of Action:** Project
- **Potential Partners:** Irvine Office of Emergency Management, Department of Public Works and Transportation, SCE
- **Estimated Cost:** Medium (\$100k - \$1 million)
- **Timeframe for Implementation:** Ongoing

**CW-44: Coordinate with regional and local transportation agencies to ensure redundancy of high-use transportation corridors to allow for continued access and movement in the event of an emergency.**

- **Type of Action:** Program
- **Potential Partners:** Irvine Office of Emergency Management, Irvine Public Works and Transportation Department, Irvine Community Development Department, Caltrans, Orange County Transit Authority
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Near-term (< 5 years)

**CW-45: Advocate for and work with regional utilities to enhance the preparedness, protection, and resilience of water, energy, and telecommunications infrastructure.**

- **Type of Action:** Program
- **Potential Partners:** Irvine Office of Emergency Management, Southern California Edison, California Public Utilities Commission, Metropolitan Water District, Irvine Ranch Water District, Orange County Water District, Telecommunications Network Carriers (Verizon, T-Mobile, AT&T), Internet Providers.
- **Estimated Cost:** High (>\$1 million)
- **Timeframe for Implementation:** Medium (5-20 years)

**CW-46: Ensure that the City integrates transit agencies into the evacuation preparedness planning, comprehensive safety protocols, and emergency command structure.**

- **Type of Action:** Project
- **Potential Partners:** Irvine Office of Emergency Management, Irvine Public Works and Transportation Department, Irvine Community Development Department, Orange County Transit Authority
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Near-term (< 5 years)

**CW-47: Coordinate with regional and local transit providers to ensure that transit services can continue to operate during and after extreme events by coordinating with regional transit providers to identify alternative routes and stops if the primary infrastructure is damaged or closed.**

- **Type of Action:** Project
- **Potential Partners:** Irvine Office of Emergency Management, Irvine Public Works and Transportation Department, Irvine Community Development Department, Caltrans, Orange County Transit Authority
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Near-term (< 5 years)

**CW-48: Enhance the capacity and resilience of the transportation network with multimodal and local access improvements.**

- **Type of Action:** Project
- **Potential Partners:** Irvine Public Works and Transportation Department, Irvine Community Development Department, Orange County Transit Authority
- **Estimated Cost:** High (>\$1 million)
- **Timeframe for Implementation:** Near-term (<5 years)

# EXTREME HEAT EVENTS (EH)

## PLANNING AND COLLABORATION

**EH-1: Collaborate with State and regional agencies and organizations to share best practices for addressing heat Impacts.**

- **Type of Action:** Project
- **Potential Partners:** Irvine Office of Emergency Management, Irvine Health and Human Services, Irvine Community Development Department
- **Estimated Cost:** High (>\$1 million)
- **Timeframe for Implementation:** Ongoing

**EH-2: Notify residents through public service announcements a couple of days in advance of a severe weather event (e.g., extreme heat event). Focus on media methods that target vulnerable populations, such as the elderly, sick, lower-income, or persons with limited mobility to better ensure they have adequate time to prepare. (LHMP 11.01)**

- **Type of Action:** Project
- **Potential Partners:** Irvine Office of Emergency Management, Irvine Public Works and Transportation Department, Irvine Community Development Department
- **Estimated Cost:** High (>\$1 million)
- **Timeframe for Implementation:** Ongoing

**EH-3: Work with regional and local health agencies to evaluate extreme heat warning thresholds and protocols and incorporate enhanced extreme heat preparedness into local operations.**

- **Type of Action:** Project
- **Potential Partners:** Irvine Office of Emergency Management, Irvine Public Works and Transportation Department, Irvine Community Development Department
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Medium-term (5-20 years)

**EH-4: Establish a City-wide Heat Alert Program (HAP) when weather forecasts predict heat waves or extreme heat days.**

- **Type of Action:** Program
- **Potential Partners:** Irvine Office of Emergency Management, Irvine Public Works and Transportation Department, Irvine Community Development Department, Cal OES
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Near-term (< 5 years)

## HEALTHY COMMUNITIES

**EH-5: Educate vulnerable community members and their caregivers (e.g., aging, elderly, ill) to detect signs and symptoms of, and prevent heat-related illness. Emphasize the importance of immediate medical assistance for heat-related illnesses.**

- **Type of Action:** Program
- **Potential Partners:** Irvine Health and Human Services
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Near-term (<5 years)

**EH-6: Support and provide opportunities for alternative and/or flexible schedules, including remote working, for government and private outdoor workers.**

- **Type of Action:** Program
- **Potential Partners:** Irvine Health and Human Services
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Near-term (<5 years)

**EH-7: Collaborate with local businesses and institutions to provide a “Cool Zone” area network (i.e., cooling centers).**

- **Type of Action:** Program
- **Potential Partners:** Irvine Community Development Department, University of California-Irvine, California Natural Resources Agency
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Near-term (<5 years)

**EH-8: Expand hours of operation of cooling centers during extreme heat events.**

- **Type of Action:** Program
- **Potential Partners:** Irvine Office of Emergency Management, Irvine Community Development Department
- **Estimated Cost:** Medium (\$100k - \$1 million)
- **Timeframe for Implementation:** Medium-term (5-20 years)

**EH-9: Expand the number of publicly operated cooling centers based on the need of vulnerable populations.**

- **Type of Action:** Project
- **Potential Partners:** Irvine Community Development Department, Irvine Public Works and Transportation Department
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Near-term (<5 years)

**EH-10: Provide working touchless water refill stations at public facilities, parks, and bus shelters.**

- **Type of Action:** Program
- **Potential Partners:** Irvine Community Development Department, Irvine Public Works and Transportation Department, Irvine Environmental Programs, Metropolitan Water District, Irvine Ranch Water District, Orange County Water District
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Near-term (<5 years)

**EH-11: Implement a tree-planting program to diversify tree age and increase shaded areas in the City to reduce the effects of the urban heat island effect. (LHMP 11.02)**

- **Type of Action:** Project
- **Potential Partners:** Irvine Community Development Department, Irvine Public Works and Transportation Department
- **Estimated Cost:** Medium (\$100k - \$1 million)
- **Timeframe for Implementation:** Medium-term (5-20 years)

**EH-12: Promote tourist activities that accommodate a warmer climate.**

- **Type of Action:** Program
- **Potential Partners:** Irvine Community Development Department, Irvine Chamber of Commerce, Local Businesses, Orange Chamber of Commerce and Visitor Bureau
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Medium-term (5-20 years)

## **RESILIENT BUILDINGS**

**EH-13: Consider incentives and/or programs for important service facilities to assess power needs, ensure adequate backup generation capacity (that considers climate projections during extreme heat days), and install off-grid distributed alternative energy systems with islanding capabilities.**

- **Type of Action:** Program
- **Potential Partners:** Irvine Office of Emergency Management, Irvine Public Works and Transportation Department, Irvine Community Development Department, Southern California Edison, California Public Utilities Commission

- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Near-term (< 5 years)

**EH-14: Partner with local school districts to ensure every school has adequate air conditioning.**

- **Type of Action:** Program
- **Potential Partners:** Irvine Community Development Department, Irvine Unified School District
- **Estimated Cost:** Medium (\$100k - \$1 million)
- **Timeframe for Implementation:** Near-term (<5 years)

**EH-15: Ensure cooling centers are resilient to climate hazard events (e.g., supply cooling centers with refrigerators for storing medicine, backup water supplies, and social services information in multiple languages.)**

- **Type of Action:** Project
- **Potential Partners:** Irvine Office of Emergency Management, Irvine Community Development Department
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Near-term (<5 years)

**EH-16: Modify building codes to encourage the implementation of heat reduction techniques.**

- **Type of Action:** Policy
- **Potential Partners:** Irvine Community Development Department, Irvine Public Works and Transportation Department
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Near-term (<5 years)

**EH-17: Promote and support the implementation of green roofs.**

- **Type of Action:** Policy/Program
- **Potential Partners:** Irvine Community Development Department, Irvine Public Works and Transportation Department
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Near-term (<5 years)

**EH-18: Promote passive cooling design (brise soleil, long roof overhangs, locating windows away from southern facades) in new developments during the design review process. (LHMP 11.04)**

- **Type of Action:** Policy
- **Potential Partners:** Irvine Community Development Department, Irvine Public Works and Transportation Department
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Near-term (<5 years)

**EH-19: Upgrade HVAC within City facilities to more efficient systems that may include split systems or decentralized systems that allow for heating and cooling the spaces needed, not entire buildings. (LHMP 11.05)**

- **Type of Action:** Project
- **Potential Partners:** Irvine Community Development Department, Irvine Public Works and Transportation Department
- **Estimated Cost:** Medium (\$100k - \$1 million)
- **Timeframe for Implementation:** Near-term (<5 years)

## RESILIENT INFRASTRUCTURE

**EH-20: Coordinate with regional utilities to assess the vulnerability of critical infrastructure to extreme heat events.**

- **Type of Action:** Program
- **Potential Partners:** Irvine Community Development Department, University of California-Irvine, California Natural Resources Agency
- **Estimated Cost:** Low (<\$100k)



- **Timeframe for Implementation:** Near-term (<5 years)

**EH-21: Coordinate with regional and state transportation agencies to assess the vulnerability of transportation infrastructure to extreme heat events.**

- **Type of Action:** Program
- **Potential Partners:** Irvine Community Development Department, University of California-Irvine, California Natural Resources Agency
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Near-term (<5 years)

## RESILIENT ECOSYSTEMS

**EH-22: Coordinate with regional partners to study the impact of climate change on ecosystem resilience, invasive species, ecosystem functions, and values in areas impacted by disease, fire suppression, and other ecosystem stressors.**

- **Type of Action:** Program
- **Potential Partners:** Irvine Community Development Department, University of California-Irvine, California Natural Resources Agency
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Near-term (<5 years)

**EH-23: Coordinate with regional partners to identify opportunities to restore ecosystem resilience, functions and values in areas impacted by disease, invasive species, fire suppression, climate change, and other ecosystem stressors.**

- **Type of Action:** Program
- **Potential Partners:** Irvine Community Development Department, University of California-Irvine, California Natural Resources Agency
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Near-term (<5 years)

DRAFT

# DROUGHT (D)

## PLANNING AND COLLABORATION

**D-1: Continue to support and participate in the development of a regional and local drought contingency plan.**

- **Type of Action:** Project
- **Potential Partners:** Irvine Community Development Department, Irvine Public Works and Transportation Department, Metropolitan Water District, Irvine Ranch Water District, Orange County Water District
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Medium-term (5-20 years)

**D-2: Support regional partners in education and outreach efforts focused on water conservation measures (e.g., water reuse, water use, and irrigation efficiency) for City residents.**

- **Type of Action:** Project
- **Potential Partners:** Irvine Community Development Department, Irvine Public Works and Transportation Department, Irvine Environmental Programs, Metropolitan Water District, Irvine Ranch Water District, Orange County Water District
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Near-term (<5 years)

**D-3: Update "Division 7 - Sustainability in Landscaping" of the Irvine Municipal Code of Ordinances and the Master Streetscape & Landscape Design Manual to reflect the latest advances in best practices in landscape design that reduce water use within the City. (LHMP 5.02)**

- **Type of Action:** Project
- **Potential Partners:** Irvine Community Development Department, Irvine Public Works and Transportation Department, Metropolitan Water District, Irvine Ranch Water District, Orange County Water District
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Near-term (<5 years)

**D-4: Encourage drought tolerant native landscaping, low-flow water fixtures beyond the state minimum code, and daytime watering restrictions on properties throughout the city to reduce water consumption. (LHMP 5.03)**

- **Type of Action:** Project
- **Potential Partners:** Irvine Community Development Department, Irvine Public Works and Transportation Department, Metropolitan Water District, Irvine Ranch Water District, Orange County Water District
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Near-term (<5 years)

**D-5: Use drought-tolerant plants when installing new or retrofitting City-owned landscapes. Limit turf that is not drought tolerant to recreational fields and lawns, and only in instances where no feasible drought-tolerant alternatives exist. (LHMP 5.04)**

- **Type of Action:** Project
- **Potential Partners:** Irvine Community Development Department, Irvine Public Works and Transportation Department, Metropolitan Water District, Irvine Ranch Water District, Orange County Water District
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Near-term (<5 years)

**D-6: Collaborate with federal, State, and local agencies and organizations to explore alternative sources (e.g., desalination) and improve capacity in consideration of increased demand and drought.**

- **Type of Action:** Project
- **Potential Partners:** Irvine Community Development Department, Irvine Public Works and Transportation Department, Metropolitan Water District, Irvine Ranch Water District, Orange County Water District, United States Bureau of Reclamation
- **Estimated Cost:** Medium (\$100k - \$1 million)
- **Timeframe for Implementation:** Medium-term (5-20 years)

## HEALTHY COMMUNITIES

### D-7: Develop a tree and shade master plan with a particular focus on climate resilient tree species.

- **Type of Action:** Project
- **Potential Partners:** Irvine Community Development Department, Irvine Public Works and Transportation Department
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Medium-term (5-20 years)

### D-8: Benchmark residential and commercial water use (gallons per capita per day), set goals to reduce water use, and publicize results, especially during droughts.

- **Type of Action:** Program
- **Potential Partners:** Irvine Community Development Department, Irvine Public Works and Transportation Department, Irvine Environmental Programs, Metropolitan Water District, Irvine Ranch Water District, Orange County Water District
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Near-term (<5 years)

## RESILIENT BUILDINGS

### D-9: Promote a system for rapidly detecting, reporting, and repairing water leaks in public facilities and the water conveyance system.

- **Type of action:** Program
- **Potential Partners:** Irvine Community Development Department, Irvine Public Works and Transportation
- **Estimated Cost:** Medium (\$100k - \$1 million)
- **Timeframe for Implementation:** Near-term (<5 years)

### D-10: Reduce indoor and outdoor potable water use in new and existing public and private developments.

- **Type of action:** Policy, Program
- **Potential Partners:** Irvine Community Development Department, Irvine Public Works and Transportation
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Near-term (<5 years)

## RESILIENT INFRASTRUCTURE

### D-11: Continue to support Irvine Ranch Water District's recycled water program and explore opportunities to enhance water recycling.

- **Type of Action:** Policy
- **Potential Partners:** Irvine Community Development Department, Irvine Public Works and Transportation Department, Metropolitan Water District, Irvine Ranch Water District, Orange County Water District
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Near-term (<5 years)

### D-12: Explore the feasibility of recycled water distribution for residential use on all lot sizes.

- **Type of Action:** Project
- **Potential Partners:** Irvine Community Development Department, Irvine Public Works and Transportation Department, Irvine Ranch Water District, Orange County Water District
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Near-term (<5 years)

### D-13: Protect groundwater supply against contamination, degradation, or loss due to flooding.

- **Type of Action:** Project

- **Potential Partners:** Irvine Community Development Department, Irvine Public Works and Transportation Department, Irvine Ranch Water District, Orange County Water District
- **Estimated Cost:** Medium (\$100k - \$1 million)
- **Timeframe for Implementation:** Medium-term (5-20 years)

## RESILIENT ECOSYSTEMS

**D-14: Require native, fire-resistant species for public properties, parks, yards, and grounds.**

- **Type of Action:** Policy
- **Potential Partners:** Irvine Community Development Department, Irvine Public Works and Transportation Department
- **Estimated Cost:** Medium (\$100k - \$1 million)
- **Timeframe for Implementation:** Near-term (<5 years)

**D-15: Promote nature-based methods and BMPs (e.g., bioswales, natural ground cover) through the City's stormwater program.**

- **Type of Action:** Policy
- **Potential Partners:** Irvine Community Development Department, Irvine Public Works and Transportation Department
- **Estimated Cost:** Medium (\$100k - \$1 million)
- **Timeframe for Implementation:** Near-term (<5 years)

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## WILDFIRE (WF)

### PLANNING AND COLLABORATION

**WF-1: Adopt thresholds for restricting certain activities (e.g., outdoor sporting events, working outdoors) in accordance with Air Quality Index thresholds set under the California Department of Industrial Relations' Division of Occupational Health and Safety emergency regulation (July 2019) to protect workers from wildfire smoke.**

- **Type of Action:** Policy
- **Potential Partners:** Irvine Planning and Development Department, Irvine Public Works and Transportation Department, Irvine Health and Human Services, Cal/OSHA, South Coast Air Quality Management District
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Near-term (< 5 years)

**WF-2: Routinely participate in the update of the Orange County Community Wildfire Protection Plan for areas within the Very High, High, and Moderate Fire Hazard Severity Zones. (LHMP 12.04)**

- **Type of Action:** Program
- **Potential Partners:** Irvine Planning and Development Department, Irvine Public Works and Transportation Department, Irvine Health and Human Services, Cal/OSHA, South Coast Air Quality Management District
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Ongoing

**WF-3: Conduct outreach to residents and businesses prior to the severe winds (Santa Ana Wind events) on proper tree maintenance and identification of potentially hazardous trees. (LHMP 11.07)**

- **Type of Action:** Project
- **Potential Partners:** Irvine Planning and Development Department, Irvine Public Works and Transportation Department, Irvine Health and Human Services, Cal/OSHA, South Coast Air Quality Management District
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Ongoing

**WF-4: Create a hillside weed abatement pilot program using goats or other livestock to reduce fuel loads in fire-prone areas. (LHMP 12.03)**

- **Type of Action:** Program
- **Potential Partners:** Irvine Planning and Development Department, Irvine Public Works and Transportation Department, Irvine Health and Human Services, Cal/OSHA, South Coast Air Quality Management District
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Near-term (< 5 years)

**WF-5: Coordinate with partners to clear dead vegetation in flood control facility footprints, railroad rights-of-way, parks, and open spaces, especially during and after a drought episode. (LHMP 12.07)**

- **Type of Action:** Project
- **Potential Partners:** Irvine Planning and Development Department, Irvine Public Works and Transportation Department, Irvine Health and Human Services, Cal/OSHA, South Coast Air Quality Management District
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Ongoing

**WF-6: Work with Orange County Fire Authority on home preparedness assessments to assist more residents in understanding and addressing their wildfire risk. (LHMP 12.09)**

- **Type of Action:** Program
- **Potential Partners:** Irvine Planning and Development Department, Irvine Public Works and Transportation Department, Irvine Health and Human Services, Cal/OSHA, South Coast Air Quality Management District
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Ongoing

**WF-7: Coordinate with regional partners to explore and deploy fire detection cameras as part of a wildfire monitoring network.**

- **Type of action:** Project
- **Potential Partners:** Irvine Office of Emergency Management, Irvine Public Works and Transportation Department, Irvine Community Development Department, Orange County Fire Authority, SoCal Edison, CalFire
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Near-term (< 5 years)

## HEALTHY COMMUNITIES

**WF-8: Integrate air quality and smoke tools (e.g., South Coast Air Quality Management District and EPA Smoke Ready Program) into operations planning.**

- **Type of Action:** Program
- **Potential Partners:** South Coast Air Quality Management District, Environmental Protection Agency (EPA)
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Near-term (< 5 years)

**WF-9: Ensure all City buildings have smoke and particulate filtration systems, specially dedicated emergency evacuation shelters and cooling centers.**

- **Type of Action:** Project
- **Potential Partners:** Irvine Office of Emergency Management, Irvine Public Works and Transportation Department, Irvine Community Development Department
- **Estimated Cost:** Medium (\$100k - \$1 million)
- **Timeframe for Implementation:** Medium-term (5-20 years)

**WF-10: Distribute low-cost smoke filtration systems to strategic locations (e.g., emergency evacuation shelters or homes) and provide guidance on how to use them.**

- **Type of Action:** Project
- **Potential Partners:** Irvine Public Works and Transportation Department, Irvine Community Development Department, Orange County Fire Authority, CalFire
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Near-term (< 5 years)

**WF-11: Enhance the City's strategic approach to reducing vegetation in hillside neighborhoods and along key evacuation routes.**

- **Type of action:** Project
- **Potential Partners:** Irvine Office of Emergency Management, Irvine Public Works and Transportation Department, Irvine Community Development Department, Orange County Fire Authority
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Near-term (<5 years)

**WF-12: Remove highly flammable vegetation in Very High, High, and Moderate Fire Hazard Severity Zones and replant with fire-adapted specimens. (LHMP 12.02)**

- **Type of action:** Project
- **Potential Partners:** Irvine Office of Emergency Management, Irvine Public Works and Transportation Department, Irvine Community Development Department, Orange County Fire Authority
- **Estimated Cost:** Medium (\$100k - \$1 million)
- **Timeframe for Implementation:** Near-term (<5 years)

**WF-13: Continue to promote and implement the Orange County Vegetation Management program to reduce wildfire risk.**

- **Type of action:** Project
- **Potential Partners:** Irvine Office of Emergency Management, Irvine Public Works and Transportation Department, Irvine Community Development Department, Orange County Fire Authority

- **Estimated Cost:** Medium (\$100k - \$1 million)
- **Timeframe for Implementation:** Near-term (<5 years)

**WF-14: Expand the fire hazard prevention awareness campaign to residents in the High and Very High Fire Hazard Severity Zones. (LHMP 12.08)**

- **Type of action:** Project
- **Potential Partners:** Irvine Office of Emergency Management, Irvine Public Works and Transportation Department, Irvine Community Development Department, Orange County Fire Authority
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Near-term (<5 years)

**WF-15: Support neighborhoods in the Wildland/Urban Interface to become Firewise Recognized Communities.**

- **Type of action:** Program
- **Potential Partners:** Irvine Office of Emergency Management, Irvine Public Works and Transportation Department, Irvine Community Development Department, Orange County Fire Authority, CAL FIRE
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Near-term (<5 years)

**WF-16: Conduct a study that considers the feasibility, costs, benefits, and finance options for undergrounding electric power lines for neighborhoods in the Wildland/Urban Interface to supplement increased efforts initiated through Senate Bill No. 901.**

- **Type of action:** Project
- **Potential Partners:** Irvine Office of Emergency Management, Irvine Public Works and Transportation Department, Irvine Community Development Department, Orange County Fire Authority, SoCal Edison, CalFire
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Near-term (<5 years)

## EMERGENCY PREPAREDNESS

**WF-17: Support effective implementation of the AlertOC system to warn residents of smoke hazards and inform them of actions they should take during an event (multiple languages, multiple media outlets).**

- **Type of action:** Program
- **Potential Partners:** Irvine Office of Emergency Management, Irvine Public Works and Transportation Department, Irvine Community Development Department, Orange County Fire Authority, CalFire
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Near-term (<5 years)

**WF-18: Provide ongoing risk communication regarding fire danger during fire seasons**

Implement wildfire risk communication messaging that:

- Occurs throughout high wildfire risk season so people know in advance how to use masks and air purifiers and where to get them.
  - Reaches non-English speaking individuals and those without cell phones.
  - Educate people on severity of smoke impacts using easy-to-understand, comparative risk language, and
  - Publicize fresh air centers—both City-designated and informal ones like movie theatres.
- **Type of action:** Program
  - **Potential Partners:** Irvine Office of Emergency Management, Irvine Public Works and Transportation Department, Irvine Community Development Department, Orange County Fire Authority, CalFire
  - **Estimated Cost:** Low (<\$100k)
  - **Timeframe for Implementation:** Near-term (<5 years)

## RESILIENT BUILDINGS

**WF-19: Require all new development in Very High, High, and Moderate Fire Hazard Severity Zones to use noncombustible building materials such as masonry, brick, stucco, concrete, steel, or others as appropriate. Establish zones of defensible space around homes in Very High, High, and Moderate Fire Hazard Severity Zones. (LHMP 12.10)**

- **Type of Action:** Policy
- **Potential Partners:** Irvine Planning and Development Department, Irvine Public Works and Transportation Department, Irvine Parks and Facilities Department, CAL FIRE, National Fire Prevention Association
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Ongoing

**WF-20: Develop a drought-resistant and wildfire-resistant landscaping certification program for homeowners in Irvine.**

- **Type of Action:** Program
- **Potential Partners:** Irvine Planning and Development Department, Irvine Public Works and Transportation Department, Irvine Parks and Facilities Department, CAL FIRE, National Fire Prevention Association
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Near-term (<5 years)

**WF-21: Support regional partners (e.g., Orange County Fire Authority's Ready, Set, Go Program) in their efforts to effectively educate residents about defensible space, vegetation management, and home hardening efforts.**

- **Type of action:** Program
- **Potential Partners:** Irvine Office of Emergency Management, Irvine Public Works and Transportation Department, Irvine Community Development Department, Orange County Fire Authority, CalFire
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Near-term (<5 years)

**WF-22: Seek opportunities to add wildfire home retrofit upgrades into other home financing mechanisms like those focused on energy efficiency.**

- **Type of action:** Project
- **Potential Partners:** Irvine Office of Emergency Management, Irvine Public Works and Transportation Department, Irvine Community Development Department, Orange County Fire Authority, CalFire
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Near-term (<5 years)

**WF-23: Reinforce and regularly inspect fire retardant infrastructure such as sprinklers, fire hose terminals, and fire suppression systems in City facilities. (LHMP 12.06)**

- **Type of Action:** Program
- **Potential Partners:** Irvine Planning and Development Department, Irvine Public Works and Transportation Department, Irvine Parks and Facilities Department, CAL FIRE, National Fire Prevention Association
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Ongoing

## RESILIENT INFRASTRUCTURE

**WF-24: Promote the proper maintenance and separation of power lines and efficient response to fallen power lines. (LHMP 12.01)**

- **Type of Action:** Program
- **Potential Partners:** Irvine Planning and Development Department, Irvine Public Works and Transportation Department, Irvine Parks and Facilities Department, CAL FIRE, National Fire Prevention Association
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Ongoing



## RESILIENT ECOSYSTEMS

### **WF-25: Promote planting of tree types that capture and settle particles in the air during wildfire-smoke episodes.**

- **Type of action:** Policy/Program
- **Potential Partners:** Irvine Public Works and Transportation Department, Irvine Community Development Department, Orange County Fire Authority
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Near-term (<5 years)

### **WF-26: Replant bare or disturbed hillside areas after wildfires to increase stability and reduce erosion that may lead to landslides.**

- **Type of action:** Project
- **Potential Partners:** Irvine Public Works and Transportation Department, Irvine Community Development Department, Orange County Fire Authority
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Ongoing

### **WF-27: Coordinate with federal, State, and local agencies to establish ecological recovery programs.**

- **Type of action:** Program
- **Potential Partners:** Irvine Public Works and Transportation Department, Irvine Community Development Department, California Department of Conservation, California Natural Resources Agency, California Department of Fish and Wildlife, United States Fish and Wildlife Service.
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Near-term (<5 years)

DRAFT

## FLOODING (F)

### PLANNING AND COLLABORATION

F-1: Collaborate with partner agencies and municipalities to align green infrastructure projects and regulations for watersheds across jurisdictions to reduce impervious hard surfaces and require the integration of green infrastructure techniques into site design.

- **Type of action:** Project
- **Potential Partners:** Irvine Office of Emergency Management, Irvine Community Development Department, Governor's Office of Emergency Services (Cal OES), FEMA
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Near-term (< 5 years)

F-2: Support efforts of other organizations and academic institutions to conduct studies of the impact from combined riverine and coastal flooding, groundwater intrusion, and increased precipitation on flood risk and vulnerability.

- **Type of action:** Project
- **Potential Partners:** Irvine Community Development Department, Cal OES, FEMA, University of California-Irvine, California Natural Resources Agency
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Ongoing

F-3: Explore and implement Low Impact Development (LID) standards for new development to reduce impacts from stormwater runoff.

- **Type of action:** Project
- **Potential Partners:** Irvine Community Development Department, Irvine Department of Public Works and Transportation, Orange County Public Works
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Near-term (< 5 years)

### HEALTHY COMMUNITIES

F-4: Provide residents, businesses, and neighborhood organizations storm evacuation procedures and shelter-in-place guidelines to grow community resilience.

- **Type of Action:** Project
- **Potential Partners:** Irvine Office of Emergency Management, Irvine Police Department, Orange County Fire Authority, Irvine Community Development Department
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Near-term (< 5 years)

F-5: Ensure that the City has an adequate supply of sandbags for residents and businesses, including prefilled sandbags for individuals who may be unable to fill them on their own. (LHMP P10)

- **Type of Action:** Program
- **Potential Partners:** Irvine Office of Emergency Management, Department of Public Works and Transportation
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Ongoing

F-6: Implement a public outreach program to increase the public awareness of flooding, stormwater management, and drought management issues and techniques for residents to mitigate those challenges on their property.

- **Type of Action:** Program
- **Potential Partners:** Irvine Office of Emergency Management, Irvine Community Development Department
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Near-term (<5 years)

**F-7: Support regional partners to inventory and map vegetation on hillsides with a specific focus on improving hillside stability in the case of extreme rainfall and seasonal erosion.**

- **Type of action:** Program
- **Potential Partners:** Irvine Community Development Department, Irvine Department of Public Works and Transportation, Orange County Public Works
- **Estimated Cost:** Medium (\$100k - \$1 million)
- **Timeframe for Implementation:** Near-term (< 5 years)

**F-8: Partner with Orange County Public Works to proactively disseminate information from the “H<sub>2</sub>OC Stormwater Program” to educate home and small business owners on regulations and highlight the role that engaged residents can play to assist with community-based stormwater management.**

- **Type of action:** Program
- **Potential Partners:** Irvine Community Development Department, Irvine Department of Public Works and Transportation, Orange County Public Works
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Near-term (< 5 years)

**F-9: Coordinate with local/State/national agencies to create a certificate (online and hard copy) that improves resale property value and insurability for homes that have complied with flood-prevention regulations (LID stormwater management requirements, flood proofing), community rating standards, and building codes.**

- **Type of Action:** Program
- **Potential Partners:** Irvine Community Development Department
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Medium-term (5-20 years)

## RESILIENT BUILDINGS

**F-10: Amend local codes and by-laws to mandate flood-proofing techniques in defined flood hazard zones and adjacent areas to protect them from future flood events.**

- **Type of action:** Policy
- **Potential Partners:** Irvine Office of Emergency Management, Irvine Police Department, Orange County Fire Authority, Irvine Community Development Department, Governor’s Office of Emergency Services (Cal OES), FEMA
- **Estimated Cost:** Medium (\$100k - \$1 million)
- **Timeframe for Implementation:** *Medium-term (5-20 years)*

**F-11: Investigate permeable paving and use landscaped swales for new and replacement of City-owned hardscaped areas. (LHMP 6.01)**

- **Type of Action:** Project
- **Potential Partners:** Irvine Community Development Department, Irvine Department of Public Works and Transportation
- **Estimated Cost:** Low (<\$100k))
- **Timeframe for Implementation:** Near-term (< 5 years)

**F-12: Encourage the use of porous surfaces on new and significantly retrofitted residential and commercial developments to reduce runoff. (LHMP 6.02)**

- **Type of Action:** Policy
- **Potential Partners:** Irvine Community Development Department, Irvine Department of Public Works and Transportation
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Ongoing

F-13: Analyze if new critical facilities can be built a minimum of 1 foot higher than the anticipated 500-year flood elevation height, to determine where it is feasible. (LHMP 6.05)

- **Type of Action:** Project
- **Potential Partners:** Irvine Community Development Department, Irvine Department of Public Works and Transportation
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Near-term (< 5 years)

## RESILIENT INFRASTRUCTURE

F-14: Ensure completeness and availability of identified flood emergency supplies and resources; including, but not limited to items such as water main repair parts, generators, pumps, sandbags, road clearing, medical, and communication.

- **Type of action:** Project
- **Potential Partners:** Irvine Office of Emergency Management, Irvine Community Development Department, Governor's Office of Emergency Services (Cal OES), FEMA
- **Estimated Cost:** High (>\$1 million)
- **Timeframe for Implementation:** *Medium-term (5-20 years)*

F-15: Develop or update long-term public works plan for critical facilities to address current and future flood risk.

- **Type of Action:** Project
- **Potential Partners:** Irvine Public Works and Transportation Department, Irvine Community Development Department
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Near-term (<5 years)

F-16: Require that future transportation infrastructure projects consider current and future flood risk and align the projected lifespan of the project with the best available science.

- **Type of Action:** Policy
- **Potential Partners:** Irvine Public Works and Transportation Department, Irvine Community Development Department
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Ongoing

F-17: Conduct frequent cleanings of storm drain intakes, especially before and during the rainy season. (LHMP 6.03)

- **Type of Action:** Program
- **Potential Partners:** Irvine Community Development Department, Irvine Department of Public Works and Transportation
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Ongoing

F-18: Update the City's Master Plan of Drainage on a regular basis to incorporate new data and/or address emerging issues. (LHMP 6.04)

- **Type of Action:** Project
- **Potential Partners:** Irvine Community Development Department, Irvine Department of Public Works and Transportation
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Near-term (< 5 years)

F-19: Ensure resilience and long-term functionality of stormwater and sewer systems.

Conduct comprehensive visual and functional test monitoring and asset condition assessment. Model potential impacts to utility infrastructure under future flooding scenarios. Specifically:

- Consider the impact of rising groundwater levels and increasing salinity on buried utility infrastructure like sewer and stormwater pipes. Prioritize replacement of iron pipes with high-density polyethylene or other non-corrosive materials as appropriate.
  - Consider the impact of flooding on electrical infrastructure (AMP), including utility poles.
  - Develop and implement an asset management plan that prioritizes repairing or replacing infrastructure that flooding is likely to impact.
- **Type of action:** Program
  - **Potential Partners:** Irvine Community Development Department, Irvine Public Works and Transportation
  - **Estimated Cost:** High (>\$1 million)
  - **Timeframe for Implementation:** *Medium-term (5-20 years)*

**F-20: Retrofit roadway medians to capture storm water during rain events. (LHMP 6.06)**

- **Type of Action:** Project
- **Potential Partners:** Irvine Community Development Department, Irvine Department of Public Works and Transportation
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Near-term (< 5 years)

**F-21: Design and implement Bioswales as a stormwater runoff conveyance system.**

- **Type of action:** Project
- **Potential Partners:** Irvine Community Development Department, Irvine Public Works and Transportation
- **Estimated Cost:** Medium (\$100k - \$1 million)
- **Timeframe for Implementation:** *Medium-term (5-20 years)*

**F-22: Encourage rain gardens in public and private spaces.**

- **Type of action:** Policy
- **Potential Partners:** Irvine Public Works and Transportation, Irvine Community Development Department
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Near-term (< 5 years)

## LIQUEFACTION AND LANDSLIDE (L)

### PLANNING AND COLLABORATION

L-1: Coordinate with Irvine Ranch Water District and the Navy on subsidence monitoring in areas of active groundwater extraction and work with water utilities to develop strategies based on the amount and severity of subsidence occurring. (LHMP 7.01)

- **Type of Action:** Project
- **Potential Partners:** Irvine Office of Emergency Management, Irvine Public Works and Transportation Department, Irvine Community Development Department
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Ongoing

L-2: Coordinate with Irvine Ranch Water District and Orange County Water District on emergency water storage and distribution following a liquefaction or landslide event.

- **Type of Action:** Project
- **Potential Partners:** Irvine Office of Emergency Management, Irvine Public Works and Transportation Department, Irvine Community Development Department
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Near-term (<5 years)

L-3: Coordinate with Caltrans and Orange County Transit Authority for inspection and maintenance of primary evacuation routes.

- **Type of Action:** Project
- **Potential Partners:** Irvine Office of Emergency Management, Irvine Public Works and Transportation Department, Irvine Community Development Department
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Near-term (<5 years)

L-4: Consider reducing land use densities in areas of significant landslide threat and identify strategies for existing development downstream of these hazard areas. (LHMP 7.02)

- **Type of Action:** Project
- **Potential Partners:** Irvine Office of Emergency Management, Irvine Public Works and Transportation Department, Irvine Community Development Department
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Medium-term (5-20 years)

L-5: Improve local understanding of the threat of a major earthquake by conducting a city-wide scenario modeling potential loss of life and injuries, destroyed and damaged structures, and interruptions to key services. (LHMP 10.06)

- **Type of Action:** Project
- **Potential Partners:** Irvine Office of Emergency Management, Irvine Public Works and Transportation Department, Irvine Community Development Department
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Near-term (<5 years)

### HEALTHY COMMUNITIES

L-6: Provide information to community groups and businesses about how to prepare for, and recover from, a seismic or geologic event.

- **Type of Action:** Project
- **Potential Partners:** Irvine Office of Emergency Management, Irvine Public Works and Transportation Department, Irvine Community Development Department

- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Near-term (<5 years)

L-7: Educate community groups and industry representatives assist in outreach to residents and businesses to obtain earthquake insurance through the California Earthquake Authority. (LHMP 10.04)

- **Type of Action:** Project
- **Potential Partners:** Irvine Office of Emergency Management, Irvine Public Works and Transportation Department, Irvine Community Development Department
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Near-term (<5 years)

## RESILIENT BUILDINGS

L-8: Assess soft story conditions for apartment buildings constructed prior to 1980. (LHMP 10.02)

- **Type of Action:** Project
- **Potential Partners:** Irvine Office of Emergency Management, Irvine Public Works and Transportation Department, Irvine Community Development Department
- **Estimated Cost:** Medium (\$100k - \$1 million)
- **Timeframe for Implementation:** Near-term (<5 years)

L-9: To the extent feasible, construct all new and significantly retrofitted City-owned facilities to remain operational in the event of a major earthquake. (LHMP 10.05)

- **Type of Action:** Project
- **Potential Partners:** Irvine Office of Emergency Management, Irvine Public Works and Transportation Department, Irvine Community Development Department
- **Estimated Cost:** High (>\$1 million)
- **Timeframe for Implementation:** Ongoing

L-10: Conduct an educational campaign and incentives to encourage the use of reinforced chimneys, anchored rooftop-mounted equipment, window film, and other preventative measures to reduce damage at private buildings. (LHMP 10.03)

- **Type of Action:** Project
- **Potential Partners:** Irvine Office of Emergency Management, Irvine Public Works and Transportation Department, Irvine Community Development Department
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Near-term (<5 years)

L-11: Retrofit key critical City facilities with seismically rated window film treatments that ensure glass windows do not shatter during a strong seismic event. Promote retrofit of key community facilities not owned by the City. (LHMP 10.07)

- **Type of Action:** Project
- **Potential Partners:** Irvine Office of Emergency Management, Irvine Public Works and Transportation Department, Irvine Community Development Department
- **Estimated Cost:** High (>\$1 million)
- **Timeframe for Implementation:** Ongoing

## RESILIENT INFRASTRUCTURE

L-12: Encourage the installation of resilient (seismically appropriate) piping for new or replacement pipelines, in close coordination with local water, natural gas, and other providers. (LHMP 10.01)

- **Type of Action:** Project

- **Potential Partners:** Irvine Office of Emergency Management, Irvine Public Works and Transportation Department, Irvine Community Development Department
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Ongoing

L-13: In coordination with Caltrans, update facilities condition assessments for bridges along evacuation routes to identify bridges that need seismic retrofiting. Consider pursuing highest standard improvement options (e.g., replacement instead of retrofiting) for bridges with seismic deficiencies. (LHMP 10.08)

- **Type of Action:** Project
- **Potential Partners:** Irvine Office of Emergency Management, Irvine Public Works and Transportation Department, Irvine Community Development Department
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Near-term (<5 years)

L-14: Pursue ground improvement projects, such as constructing a high strength capping layer, soil mixing, stone columns, soil wicks, chemical and pressure grouting, and other soil improvement techniques that reduce liquefaction susceptibility for key critical facilities in the event of an earthquake. (LHMP 10.09)

- **Type of Action:** Project
- **Potential Partners:** Irvine Office of Emergency Management, Irvine Public Works and Transportation Department, Irvine Community Development Department
- **Estimated Cost:** High (>\$1 million)
- **Timeframe for Implementation:** Near-term (<5 years)

L-15: Incentivize utilities to install flexible jointing and pipelines across fault segments located within the City. Ensure these pipelines have the necessary countermeasures to ensure breakage of lines is kept to a minimum and adequate shut off mechanisms to reduce exposure of pipeline contents to residents and businesses. (LHMP 10.10)

- **Type of Action:** Project
- **Potential Partners:** Irvine Office of Emergency Management, Irvine Public Works and Transportation Department, Irvine Community Development Department
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Ongoing

## RESILIENT ECOSYSTEMS

L-16: Replant bare or disturbed areas after landslides to reduce erosion.

- **Type of action:** Policy/Program
- **Potential Partners:** Irvine Public Works and Transportation Department, Irvine Community Development Department, Orange County Fire Authority
- **Estimated Cost:** Low (<\$100k)
- **Timeframe for Implementation:** Ongoing