Attachment 3

COSTA MESA

City of the Arts

Local Hazard Mitigation Plan

Atlas Planning Solutions

11/4/2022

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Chapter 1 – Introduction

Plan Purpose and Authority

Hazard events can lead to injuries or death, affect the overall health and safety of a community, damage or destroy public and private property, harm ecosystems, and disrupt key services. Although the hazard event itself often gets the most attention, it is only one part of a larger emergency management cycle.

Emergency planners and first responders can take steps during the response, recovery, mitigation, and preparedness phases of the cycle to minimize the harm caused by a disaster. This Local Hazard Mitigation Plan (LHMP) focuses on optimizing the mitigation phase of the cycle. Mitigation involves making a community more resilient to disasters so that when hazard events do ultimately occur, the community suffers less damage and can recover more effectively. It differs from preparedness, which involves advanced planning for how best to respond when a disaster occurs or is imminent. For example, a policy to make homes structurally stronger so they suffer less damage during an earthquake is a mitigation action, while fully equipping shelters to accommodate people who lose their homes in an earthquake is a preparedness action. Some activities may qualify as both.

The City of Costa Mesa (City), like other communities, could potentially suffer severe harm from hazard events, and although large disasters may cause widespread devastation, even smaller disasters can have substantial effects. The City cannot make itself completely immune to hazard events, but this LHMP can help make the community a safer place to live, work, and visit. This LHMP provides a comprehensive assessment of the threats that the City faces from natural and human-caused hazard events and a coordinated strategy to reduce these threats. It identifies resources and information to help community members, City staff, and local officials understand local threats and make informed decisions. The LHMP can also support increased coordination and collaboration between the City, other public agencies, local employers, service providers, community members, and other key stakeholders.

KEY TERMS

HAZARD EVENT: AN EMERGENCY DUE TO A NATURAL OR HUMAN-CAUSED EVENT THAT HAS THE POTENTIAL TO CAUSE HARM.

Federal Authority

The City is not required to prepare an LHMP, but state and federal regulations encourage it. The federal Robert T. Stafford Disaster Relief and Emergency Act, amended by the Disaster

Management Act of 2000, creates a federal framework for local hazard mitigation planning. Compliance with the act by developing an LHMP grants eligibility for federal hazard mitigation grant funding upon plan approval by the Federal Emergency Management Agency (FEMA). Guidelines for LHMP development are outlined in the Code of Federal Regulations, Title 44, Part 201, and discussed in greater detail in FEMA's Local Mitigation Plan Review Tool.

State Authority

California Government Code Sections 8685.9 and 65302.6

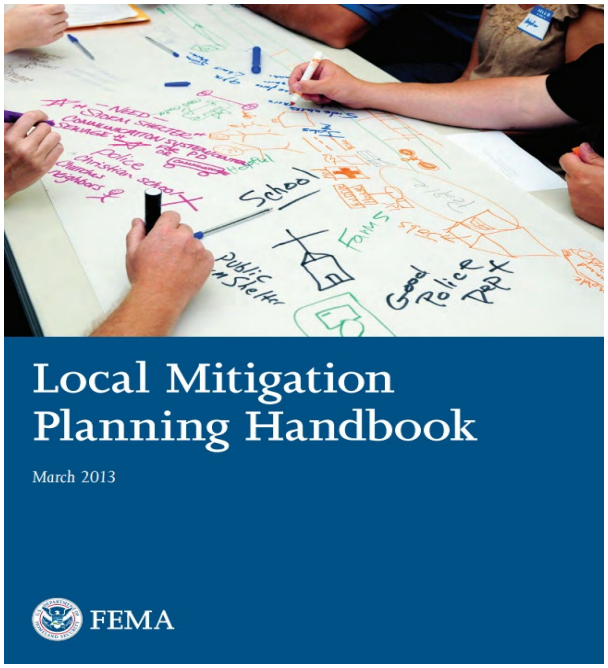
California Government Code Section 8685.9 (also known as Assembly Bill 2140) limits the State of California's share of disaster relief funds paid out to local governments to 75 percent of the funds not paid for by federal disaster relief efforts unless the jurisdiction has adopted a valid hazard mitigation plan consistent with the Disaster Management Act of 2000 and has incorporated the hazard mitigation plan into the jurisdiction's general plan. In these cases, the State may cover more than 75 percent of the remaining disaster relief costs.

All cities and counties in California must prepare a general plan, which must include a safety element that addresses various hazard conditions and other public safety issues. The safety element may be a stand-alone chapter or incorporated into another section/element, as the community wishes. California Government Code Section 65302.6 specifies that a community may adopt an LHMP into its safety element if the LHMP meets applicable state requirements. This allows communities to use the LHMP to satisfy state requirements for safety elements. As the General Plan is an overarching long-term plan for community growth and development, incorporating the LHMP creates a stronger mechanism for implementing the LHMP.

California Government Code Section 65302 (g)(4)

California Government Code Section 65302 (g)(4), also known as Senate Bill (SB) 379, requires that the safety element of a community's general plan address the hazards created or exacerbated by climate change. The safety element must identify how climate change is expected to affect hazard conditions in the community and include measures to adapt and increase resilience to these anticipated changes.

Because the LHMP can be incorporated into the safety element, including these items in the LHMP can satisfy this state requirement. SB 379 requires that climate change be addressed in the safety element when the LHMP is updated after January 1, 2017, for communities that already have an LHMP, or



FEMA's Local Mitigation Planning Handbook, last updated in 2013, is one of the key guidance documents for local communities in preparing hazard mitigation plans.

by January 1, 2022, for communities without an LHMP.

This LHMP is consistent with current standards and regulations, as outlined by the California Office of Emergency Services (Cal OES) and FEMA. It uses the best available science, and its mitigation actions/strategies reflect best practices and community values. It meets the current state and federal guidelines/requirements and makes the City eligible for all appropriate benefits under state and federal law and practices. Note that while FEMA is responsible for reviewing and certifying this LHMP, and Cal OES is responsible for conducting a preliminary review, it does not grant FEMA or Cal OES any increased role in the governance of the City or authorize either agency to take any specific action in the community.

Plan Organization and Use

The Costa Mesa LHMP is both a reference document and an action plan. It has information and resources to educate readers and decision-makers about hazard events and related issues and a comprehensive strategy that the City and community members can follow to improve resilience in the City. It is divided into the following chapters:

- *Chapter 1: Introduction*. This chapter describes the Plan's background, its goals and objectives, and the process used in its development.
- *Chapter 2: Community Profile*. This chapter discusses Costa Mesa's history, physical setting and land uses, demographics, and other important community characteristics.
- *Chapter 3: Hazard Assessment*. This chapter identifies and describes the hazards that pose a threat to Costa Mesa and discusses past and future events and the effects of climate change.
- *Chapter 4: Vulnerability Assessment*. This chapter describes the threat of each hazard on Costa Mesa's key facilities and community members, including socially vulnerable individuals.
- *Chapter 5: Mitigation Strategy*. This chapter lists the mitigation actions to reduce Costa Mesa's vulnerability to hazard events and provides an overview of the community's existing capabilities to improve hazard resilience.
- *Chapter 6: Plan Maintenance*. This chapter summarizes the process for implementing, monitoring, and updating the LHMP and opportunities for continued public involvement.

Plan Goals

This Plan was developed to broadly increase resilience in Costa Mesa. The following key goals were developed for the City's LHMP:

- Protect against threats from natural hazards to life, injury, and property damage for Costa Mesa residents and visitors.
- Increase public awareness of potential hazard events.
- Preserve critical services and functions by protecting key facilities and infrastructure.
- Protect natural systems from current and future hazard conditions.

- Coordinate mitigation activities among City departments, neighboring jurisdictions, and with federal agencies.
- Prepare for long-term variations in hazard conditions resulting from climate change.

These goals identify the community's hazard mitigation priorities, which guide future investments undertaken by the City or private development in areas anticipated to grow and change in the coming years.

Planning Process

State and federal guidance for LHMPs do not require that jurisdictions follow a standardized planning process. FEMA encourages communities to create their own planning process that reflects local values, goals, and characteristics. However, FEMA does suggest the planning process follows the general milestones illustrated in **Figure 1-1**. For the City of Costa Mesa, the planning process used to create this plan is described below.

Figure 1-1 - Typical Planning Process

Hazard Mitigation Planning Committee

The City established a Hazard Mitigation Planning Committee (hereafter referred to as the Committee). The Committee is made up of representatives from key City departments and stakeholder members that include representatives from local and regional agencies and companies that are key to hazard mitigation activities. **Table 1-1** identifies the members that were invited and/or attended Committee meetings. Key stakeholders invited to participate in the process included Mesa Water District, Newport-Mesa Unified School District, emergency managers from surrounding jurisdictions (Newport Beach, Irvine, Santa Ana, Huntington Beach, and Fountain Valley), and Orange County Fire Authority.

Table 1-1: Costa Mesa Hazard Mitigation Planning Committee

Name	Title	Department
Brenda Emrick	Acting Emergency Services Manager	Police/Fire
Alma Reyes	Assistant to the City Manager	CMO
Stacy Bennett	Deputy City Clerk	City Clerk, CMO
Tony Dodero	Public Information Officer	City Manager, Communications
Jennifer Le	Development Services Director	Development Services
Dan Inloes	Economic Development Administrator	Development Services
Carol Molina	Finance Director	Finance
Jon Neal	Fire Marshal	Fire
Captain Joe Noceti	Public Information Officer	Fire
Kasama Lee	Human Resources Manager	Human Resources
Steve Ely	IT Director	Information Technology
Roxi Fyad	Public Affairs Manager	Police
Jason Minter	PCS Director	Parks and Community Services
Captain Joyce LaPointe	Police Captain	Police
Jennifer Rosales	Transportation Services Manager	Public Services
Bart Mejia (recently retired)	Interim City Engineer	Public Services
Seung Yang	City Engineer	Public Services
Daniel Jojola	Maintenance Supervisor	Public Services

The Committee held three meetings throughout the plan development process to lay out the methods and approach for the Plan, draft, and review content, make revisions, and engage members of the public.

Committee Meeting #1 (October 7, 2020): The Committee members confirmed the project goals and the responsibilities of the Committee. They revised the community engagement and outreach strategy, confirmed, and prioritized the hazards to be included in the Plan, and identified critical facilities for the threat assessment.

Committee Meeting #2 (February 3, 2021): Members held a detailed discussion about the results of the hazards assessment and mapping that showed the areas facing an elevated risk. The Committee also reviewed the hazard prioritization and vulnerability assessment results.

Committee Meeting #3 (March 3, 2021): The Committee reviewed the draft mitigation actions and strategies to address vulnerabilities shared in Meeting #2. As part of this

meeting, the Committee provided feedback and revisions to the proposed actions and prioritized these actions.

The invitation to Committee meetings, as well as meeting agendas/materials, were provided via email. Appendix A contains copies of invitations, meeting agendas, sign-in sheets, and other relevant materials distributed for these meetings.

Public Engagement

Under FEMA guidelines, local hazard mitigation planning processes should create opportunities for members of the public to be involved in plan development—at a minimum, during the initial drafting stage and plan approval. To accomplish this, the City developed a webpage (**Figure 1-2**) dedicated to the LHMP that included information regarding the process, identified the hazards of concern, and provided links to the online survey (**Figure 1-3**) developed as part of the City's Community Engagement Strategy. The City developed a community engagement and outreach strategy to guide all public engagement activities, which was implemented by the City's Public Information Officers and staff who conduct outreach and engagement activities regularly. Outreach opportunities were shared with the public through Facebook posts, the City of Costa Mesa City Hall Snapshot, which is regularly used to update the community on initiatives and projects. **Appendix B** contains a copy of these outreach materials and information.


City Hall » City departments » Police » Department Divisions » Administration » The Office of Emergency Management (OEM) »

LOCAL HAZARD MITIGATION PLAN

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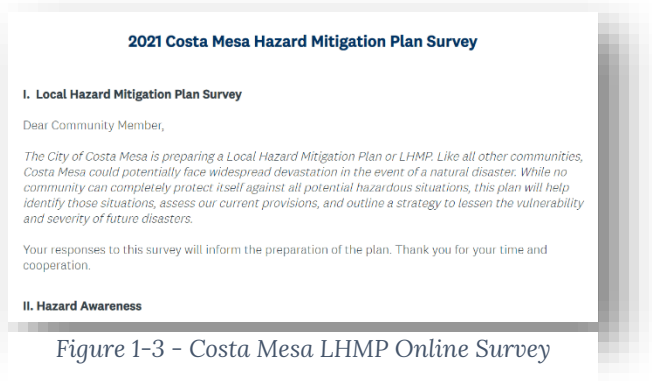
The City of Costa Mesa is preparing a Local Hazard Mitigation Plan, or LHMP. This plan will help create a safer community for residents, businesses, and visitors. The LHMP allows public safety officials, city staff, elected officials, and members of the public to understand the threats from natural and human-caused hazards in our community. The plan will also recommend specific actions to proactively decrease these threats before disasters occur.

Local Hazard Mitigation Plan Survey

Why have an LHMP?

An LHMP will let Costa Mesa better plan for future emergencies. Usually, after a disaster occurs, communities take steps to recover from the emergency and rebuild. An LHMP is a way for the City to better prepare in advance of these disasters, so when they do occur, less damage occurs and recovery is easier. Our community can use LHMP strategies to reduce instances of property damage, injury, and loss of life from disasters. Besides protecting public health and safety, this approach can save money. Studies estimate that every dollar spent on mitigation saves an average of four dollars on response and recovery costs. An LHMP can also help strengthen the mission of public safety officers, such as police and fire department staff, providing them with clear roles and responsibilities to build a safer community.

Figure 1-2 - Costa Mesa LHMP (https://bit.ly/3uqgl36)


2021 Costa Mesa Hazard Mitigation Plan Survey

I. Local Hazard Mitigation Plan Survey

Dear Community Member,

The City of Costa Mesa is preparing a Local Hazard Mitigation Plan or LHMP. Like all other communities, Costa Mesa could potentially face widespread devastation in the event of a natural disaster. While no community can completely protect itself against all potential hazardous situations, this plan will help identify those situations, assess our current provisions, and outline a strategy to lessen the vulnerability and severity of future disasters.

Your responses to this survey will inform the preparation of the plan. Thank you for your time and cooperation.

II. Hazard Awareness

Figure 1-3 - Costa Mesa LHMP Online Survey

Public Meetings

In-person public meetings were not a possibility due to Covid-19. However, because public outreach and involvement are a central component to the City's mitigation plan creation process, they were held virtually to ensure public opinion. These meetings provided an opportunity for members of the public to learn about multiple hazards and the LHMP update. These meetings were in coordination with the Costa Mesa Fire Department and the Costa Mesa Police Department. At these meetings, members of the public could speak directly to City staff and other stakeholders and provide detailed feedback. The City held two public meetings, and notices of each meeting were widely distributed in advance in accordance with City notification requirements, the engagement strategy, legal requirements, and best practices.

Public Engagement Opportunity #1 (February 16, 2021) The City provided an overview of the Local Hazard Mitigation Plan process to City Council, providing opportunities for feedback and comments from council members and the public. No comments were received during this engagement opportunity. A follow-up item on March 2 occurred at the Costa Mesa City Council meeting to provide additional information and opportunities for input from the community.

Appendix B includes a copy of the notices used to promote these meetings.

Online Engagement

The City recognized that not all community members are able to attend public meetings and conducted public engagement through social media and online platforms. To assist with engagement, the City set up a project website Local Hazard Mitigation Plan Project Site [1] as a simple, one-stop location for community members to learn about the LHMP. The website included information about what an LHMP is and why the City prepared one. It had links to materials, a public survey about past experiences with natural hazards, links to both FEMA and Cal OES informational websites, information on how to get involved in the LHMP development process, useful tips and recommendations on emergency preparedness, and Plan documents as they became available and allowed members of the public to receive notifications about upcoming events. As part of this engagement, members of the public had opportunities to indicate their interest in receiving future updates by providing their contact information within the online survey questionnaire.

The City also promoted the planning process through the following online methods:

- City Website
- Social Media (Facebook and Instagram)
- City Hall Snapshot

Based on analytics tracked by the City, the City Hall Snapshot, Instagram, and Facebook posts reached an average of 11,800 accounts and received 221 impressions, respectively.

A central part of the engagement strategy was an online survey. This survey asked community members about their experience and familiarity with emergency conditions, their level of preparedness for future emergencies, and preferred actions for the City to take to increase resiliency. The survey received 32 completed responses. Key information from these responses is summarized below:

- 61% of the respondents live in Costa Mesa, 23% of respondents both live and work in Costa Mesa, roughly 10% of respondents work in Costa Mesa, and 6% are individuals solely interested in the resiliency of the City.
- Approximately 60% of respondents indicated that they have been impacted by hazard events in their current residence, with Energy/Power Shortage, Drought, and Flooding being the top three hazard events experienced.

[1] Full website address: (https://www.costamesaca.gov/city-hall/city-departments/police/department-divisions/administration/the-office-of-emergency-management-oem/local-hazard-mitigation-plan)

- When addressing Climate Change in the City, 53% of respondents are very concerned, roughly 31 % are somewhat concerned, while the remaining 16% are somewhat unconcerned or not at all concerned about the possible effects of Climate Change in Costa Mesa.
- 60% of respondents have completed some form of improvement to their homes to make them less vulnerable to hazards (such as earthquakes, floods, and fires), while 28% have NOT completed any improvements, with the remaining 12% indicating that they rent their residence and are therefore not applicable.

Appendix B contains copies of all materials used for public outreach, including the full results of the community survey.

Public Review Draft

On September 19, 2022, the City released a draft copy of the LHMP for public review and comment. The document was posted electronically on the City's website. The City also distributed notifications about the public review draft through the interest list developed during the planning process, social media posts, and other online sources frequently used. The public review period was conducted from September 19, 2022, to October 20, 2022, during which time no comments were received.

Plan Revision and Adoption

On November 11, 2022 the plan was transmitted to Cal OES initiating the formal LHMP review process.

Plan Resources

The City used several different plans, studies, technical reports, datasets, and other resources to prepare the Plan's hazard assessment, mapping, threat assessment, and other components. **Table 1-2** provides some of the primary resources the Committee used to prepare this Plan.

Table 1-2: Key Resources for Plan Development

Section	Key Resources Reviewed	Data Incorporated from Resource
Multiple	• Cal-Adapt • California Department of Conservation • California Geological Survey • California Office of Emergency Services • California State Hazard Mitigation Plan • City of Costa Mesa General Plan • FEMA Local Hazard Mitigation Plan Guidance	• Science and background information on different hazard conditions • Records of past disaster events in and around Costa Mesa • Current and anticipated climate conditions in and around Costa Mesa • Projections of future seismic conditions and events

	• National Oceanic and Atmospheric Administration • National Weather Service • US Geological Survey • US Census Bureau 2013-2017 American Community Survey	
Community Profile	• US Census Bureau 2013-2017 American Community Survey • City of Costa Mesa General Plan Background Reports • California Energy Commission	• Demographic information for Costa Mesa and Orange County • History of the region • Economic trends in Costa Mesa • Commute patterns in Costa Mesa • Local land-use patterns • Background information on utilities serving Costa Mesa
Hazard Assessment (Aircraft Incidents)	• Federal Aviation Administration	• Data on aircraft incidents in and around Costa Mesa
Hazard Assessment (Dam Failure)	• Mesa Water District • Orange County Water District • US Army Corps of Engineers	• Mapping of dam failure inundation areas • Profiles and conditions of dams in and around Costa Mesa
Hazard Assessment (Disease and Pest Hazards)	• California Department of Public Health • Centers for Disease Control • World Health Organization	• Science and historical records of disease outbreaks
Hazard Assessment (Drought)	• Cal Adapt • US Drought Monitor	• Historic drought information • Current drought conditions
Hazard Assessment (Energy/Power Shortage)	• Southern California Edison (SCE) • California Public Utilities Commission (CPUC)	• Public Safety Power Shutoff maps and background information

Hazard Assessment (Flood Hazards)	• FEMA Map Service Center • Orange County Flood Control District	• Records of past flood events in and around Costa Mesa • Locations of flood-prone areas in Costa Mesa
Hazard Assessment (Geologic Hazards)	• U.S. Geological Survey • U.S. Department of Agriculture	• Geologic mapping • Soil Surveys
Hazard Assessment (Hazardous Materials Release)	• Agency for Toxic Substances and Disease Registry	• Location and dates of past hazardous materials release • Effects of hazardous materials release
Hazard Assessment (Human-Caused Hazards)	• Global Terrorism Database	• Historical records of terrorism
Hazard Assessment (Seismic Hazards)	• Southern California Earthquake Data Center • The Third California Earthquake Rupture Forecast (UCERF3)	• Locations of fault zones • Records of past earthquakes
Hazard Assessment (Severe Weather Hazards)	• California Department of Water Resources • US Drought Monitor • Western Regional Climate Center • Cal Adapt	• Records of past severe weather events • Location of severe weather zones in and around Costa Mesa
Hazard Assessment (Urban Fire Hazards)	• California Department of Forestry and Fire Prevention • Fire and Resource Assessment Program	• Records of past fire events • Location of fire hazard zones in and around Costa Mesa

Note: Sections that are not individually called out in this table relied primarily on sources identified in multiple sections.

Chapter 2 – Community Profile

The Community Profile section of the LHMP summarizes the community's physical setting, history, economy and demographics, current and future land uses, and key infrastructure. The Community Profile helps to establish the baseline conditions in Costa Mesa, which inform the development of the hazard mitigation actions in Chapter 5.

Setting and Location

The City of Costa Mesa is in southern Orange County, California, adjacent to the cities of Newport Beach, Irvine, Huntington Beach, Fountain Valley, and Santa Ana. The city itself lies on a coastal tableland (plateau) overlooking the Pacific Ocean, at the mouth of the Santa Ana River, 37 miles southeast of Los Angeles. Along with the neighboring city of Newport Beach, Costa Mesa forms Orange County's "Harbor Area." [2]

History [3]

The city that we know today as Costa Mesa was originally settled by Native American Indians on the mesa near the banks of the Santa Ana River. Artifacts found in the area indicate that the site was a part of a Native American village called Lukup.

With the arrival of the Spanish and subsequent expeditions up the coast led by Gaspar de Portola in 1769, California began to be explored and opened up to missionaries. A further expedition led by Father Junipero Serra, a Franciscan friar and missionary, named the area Vallejo de Santa Ana (Valley of Saint Anne). In November of 1776, he established the Mission San Juan Capistrano, the first permanent European settlement in Alta California, New Spain. The padres would occasionally visit Lukup, spreading the word of their faith and doing missionary work for the Catholic Church. Capistrano's cattle began to graze in the Costa Mesa area in the early 1800s. Because of this, provisions to create shelter and housing for the herdsman had to be made. Possibly as early as 1817, but most likely in between 1820 and 1823, a small adobe structure was constructed to house the foreman and his men. The structure still stands today and has been restored as a museum in Estancia Park.

In 1810, this land was part of the Spanish land grant of Santiago Del Santa Ana, which was presented to Jose Antonio Yorba. This grant included 62,500 acres which he named Rancho San Antonio. This vast area of land encompasses the present-day communities of Costa Mesa, Olive, Orange, Villa Park, Santa Ana, Tustin, and Newport Beach. After the Mexican American War (1846-1848), California was officially part of the United States. By 1880, American settlers began to buy up swathes of land from Yorba's heirs and established the town of Fairview. This was a flourishing, tourist-driven railroad town located near some hot-springs, boasting a 25 room hotel. In 1889, disaster struck in the form of a flood, and the railroad connector to Fairview was damaged severely, and the town reverted to its farming and agricultural roots.

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[2] Britannica, T. Editors of Encyclopedia. "Costa Mesa." *Encyclopedia Britannica*, May 12, 2016. https://www.britannica.com/place/Costa-Mesa.

3 City of Costa Mesa. "Chapter 11: Historical and Cultural Resources Element."

By this time, the little town of Harper, named after a nearby rancher, had taken hold on a siding of the Santa Ana and Newport Railroad. The general store was the town's first business and became home to the City's first post office in 1909. On May 11, 1920, Harper officially changed its name to Costa Mesa and continued as an agricultural community whose primary crops were corn, strawberries, sweet potatoes, apples, and tomatoes.

New building and oil drilling were starting to flourish in the City and supplement the economy. The community flourished until the Great Depression, which forced businesses to close and industry to contract. In 1933, the Long Beach Earthquake struck, damaging businesses and the Main School. Repairs and reconstruction after this event rebuilt the school, which is still in use today for administrative and service purposes.

World War II brought about a massive influx of people who came to train at the Santa Ana Army Air Base (SAAAB), which at its peak had over 26,000 people stationed there. The former SAAAB, is now the home of the Orange County Fairgrounds, Orange Coast College, and the present site of the Civic Center. There were a number of other military installations located in close proximity to the City including, EL Toro Marine Corps Air Station (now the Great Park in Irvine), the Naval Weapons Station Seal Beach, and the Bolsa Chica Military Reservation (Huntington Beach). After the war, many of these men and women returned home to the states and were discharged or reassigned from SAAAB. [4] Many of these service men and women started their families and contributed to the population increase that makes up the "Baby Boomer" generation, resulting in residential growth within Costa Mesa, and the rest of the United States.

The 1950s brought about the construction of expressways, which also stimulated residential growth, and the city began to prosper once again. June 29th, 1953, brought about the incorporation of Costa Mesa, which encompassed approximately 3.5 square miles and had a population of 16,840. By 1988, the City's population had grown to over 90,000 in an area of approximately 17 square miles.

Today, Costa Mesa is a major Orange County commercial and industrial center with a population of approximately 111,918. With an adopted slogan of "City of the Arts," the City is home to the Pacific Symphony and the South Coast Repertory Theater, the 3,000-seat Segerstrom Center for the Arts (previously known as Orange County Performing Arts Center), 2,000-seat Renee and Henry Segerstrom Concert Hall, and 500-seat Samueli Theater.

Since its incorporation, Costa Mesa has transformed from a quiet suburban community with its roots in agriculture to a world-class city boasting some of the best retail centers, restaurants, and cultural arts in the nation and holds the title of the "Capital of the Action Sports Industry."

[4] Brigundi, Phil, Orange County's World War II Military Bases, https://www.ochistoryland.com/wwiibases

Demographics

The data used in this section comes from the most comprehensive 2020 Decennial Census and 2020 American Community Survey (ACS), administered by the United States Census Bureau (US Census)If . Data from the 2020 Decennial Census is limited in detail and requires supplemental information from the 2020 ACS. As such, Table 2-2 within this chapter is the only table that relies on the 2020 Decennial Census data. Based on these datasets, Costa Mesa's 2020 population was estimated to be 111,918, with a median age of 35, which is three years younger than the average median age in Orange County. Comparatively, the number of senior residents aged 65 and older is lower than the rest of Orange County, while Costa Mesa residents have a lower median household income than the County. In addition, a higher proportion of Costa Mesa residents rent compared to Orange County overall. **Table 2-1** shows the basic demographics for Costa Mesa and Orange County, according to the ACS.

Table 2-1: Basic Demographics, Costa Mesa and Orange County (2020)

Demographics	Costa Mesa	Orange County
Total Population	**112,958**	**3,186,989**
Percent of residents who are less than 10 years old (i.e., children)	11%	11.5%
Percent of residents who are senior citizens (65+)	12%	16%
Median age	35.6	38.3
Total households	40,660	1,040,001
Median household income	$90,370	$94,441
Percent of rental households	59.5%	42.8%

Source: U.S. Census Bureau, 2020 American Community Survey (ACS) – Costa Mesa and Orange County

In terms of its racial and ethnic composition, Costa Mesa is a white-majority city, with 54% of all Costa Mesa residents identifying as white. This population makeup is similar to greater Orange County. **Table 2-2** shows the racial and ethnic composition for all groups in Costa Mesa and Orange County according to the ACS.

Costa Mesa residents have attained similar higher education levels in comparison to Orange County. For example, a slightly higher percentage of the City's population has attained a bachelor's degree, while a slightly lower percentage of the city has attained graduate or professional degrees when compared to Orange County. Other categories are almost equal, such as percentage of people not having education past 9th grade and people not having graduated high school. **Table 2-3** shows all levels of educational attainment of residents 25 years of age or older in both Costa Mesa and Orange County, according to the Census.

Table 2-2: Racial and Ethnic Composition, Costa Mesa and Orange County

Race or Ethnicity	Costa Mesa		Orange County	
	Population	Percentage	Population	Percentage
White	60,574	54%	1,383,257	43%
Black	1,442	1.3%	53,842	1.7%
American Indian and Alaskan Native	1,455	1.3%	38,322	1.2%
Asian	9,707	8.7%	706,813	22%
Native Hawaiian and Other Pacific Islander	460	0.4%	9,035	0.3%
Some other race alone	21,391	19%	548,539	17%
Two or more races	16,889	15%	447,181	14%
Hispanic or Latino (of any race) *	40,795	36%	1,086,834	34.0%
Total	**111,918**	**100%**	**3,186,989**	**100%**

* The US Census Bureau does not currently count persons who identify as Hispanic or Latino as a separate racial or ethnic category. Persons who identify as Hispanic or Latino are already included in the other racial or ethnic categories.

Source: U.S. Census Bureau, 2020 Decennial Census – Costa Mesa and Orange County

Table 2-3: Educational Attainment of Residents 25+ Years of Age in Costa Mesa and Orange County (2020)

Educational Attainment	Costa Mesa		Orange County	
	Number	Percentage	Number	Percentage
Less than 9th grade	6,273	7.8%	166,191	7.6%
9th grade to 12th grade (no diploma)	5,126	6.4%	138,501	6.3%
High school graduate or equivalent	13,711	17.0%	376,248	17.2%
Some college (no degree)	16,790	20.9%	430,405	19.7%
Associate degree	5,528	6.9%	171,104	7.8%
Bachelor's degree	23,178	28.8%	575,866	26.4%
Graduate or professional degree	9,875	12.3%	324,541	14.9%
Total	**80,481**	**100%**	**2,182,856**	**100%**

Source: U.S. Census Bureau, 2020 American Community Survey (ACS) – Costa Mesa and Orange County

Percentage values are rounded to the nearest tenth decimal.

Costa Mesa has a wide range of non-English languages spoken at home among its residents, with varying proficiency levels. Generally, Spanish is the second most spoken language in Costa Mesa. Asian and Pacific Islander languages are the third most-spoken languages in Costa Mesa. **Table 2-4** shows the most spoken languages and the levels of fluency among speakers aged five years and older in Costa Mesa and Orange County, according to the ACS.

Table 2-4: English Proficiency and Languages Spoken at Home Among Residents 5 Years or Older in Costa Mesa and Orange County (2020)

Languages	Costa Mesa		Orange County	
	Number of Speakers	Speak English Less Than "Very Well"	Number of Speakers	Speak English Less Than "Very Well"
English only	65,125	-	1,636,774	-
Spanish	30,807	12,175 (39.5%)	732,305	284,421 (38.8%)
Indo-European*	3,139	620 (19.8%)	129,010	32,957 (25.5%)
Asian and Pacific Islander*	6,669	2,300 (34.5%)	453,078	228,501 (50.4%)
All other languages	619	101 (16.3%)	33,390	10,292 (30.8%)
Total	**106,359**	**15,196****	**2,984,557**	**556,171****

*Census data does not break down the specific languages for languages spoken in these regions.
**Due to these figures only being a percentage of the overall number of speakers, they will not add up to 100%.
Source: U.S. Census Bureau, 2020 American Community Survey (ACS) – Costa Mesa and Orange County

Economy and Commute Patterns

Costa Mesa has a diverse economy of employers from various sectors, including restaurant services, information services, engineering services, automobile associations, financial services, retail services, communications and computers, and education. With a total employment base of 67,081 employees, the top employers in the City include El Pollo Loco, Experian Information Solutions, Inc., Newport Mesa Unified School District, Coast Community College District, Automobile Club of Southern California, Dynamic Cooking Systems, Filenet Corporation, and Vans. In total, these employers account for approximately 26% of the workforce within the city. In addition to these major employers, South Coast Plaza and its over 275 retailers and restaurants, employs thousands of people, and generates a significant amount of economic activity in the region. **Table 2-5** shows notable employers in Costa Mesa in 2022, according to the City's 2022 Community Economic Profile.

As of 2018, over 52,000 Costa Mesa residents are employed, with approximately 7,524 (14.5%) working within the City. This local workforce accounts for 8.1% of the entire workforce, with

the remaining workforce coming from surrounding cities throughout the region. **Table 2-6** shows the top five cities that contribute to Costa Mesa's workforce, accounting for approximately 30% of those employed within the city.

While the majority of Costa Mesa's residents commute outside the city for work, most of those residents (56.9%) travel less than 10 miles to reach their place of employment. Approximately 9.5% of commuters traveled 50 miles or more, with most of those trips heading into the Los Angeles or San Diego areas. The city boasts convenient freeway, rail (Metrolink stations in nearby Irvine, Tustin, and Santa Ana), and air access (John Wayne Airport) to Los Angeles, San Diego, Riverside, and San Bernardino Counties. **Table 2-7** shows the outflow of workers from Costa Mesa to other worksites in the region.

Table 2-5: Notable Employers in Costa Mesa (2022)

Employer	Number of Employees	Percentage of Total Employment
EPL Intermediate, Inc. (El Pollo Loco)	3,998	6.23%
Experian Information Solutions, Inc.	3,700	5.76%
Newport Mesa Unified School District	3,000	4.68%
Coast Community College District	2,900	4.52%
Automobile Club of Southern California	1,200	1.87%
Dynamic Cooking Systems, Inc.	700	1.09%
Filenet Corporation	600	0.93%
Vans	520	0.81%

Note: CDR Progress Report

Table 2-6: Top Five Cities-of-Origin for Costa Mesa's Workforce (2018)

Cities-of-Origin for Costa Mesa's Workforce	Number of Employees	Percentage
Costa Mesa	7,524	8.1%
Santa Ana	6,966	7.5%
Huntington Beach	4,777	5.1%
Los Angeles	4,420	4.7%
Anaheim	4,280	4.6%
Total	**27,967**	**30%**

Note: https://onthemap.ces.census.gov/

Table 2-7: Work Commute Distances for Costa Mesa's Residents (2018)

Work Destinations for Costa Mesa's Residents	Number	Percentage
Less than 10 miles	29,690	56.9%
10 to 24 miles	10,223	19.6%
25 to 50 miles	7,272	13.9%
Greater than 50 miles	4,953	9.5%
Total	**52,138**	**100%**

Note: https://onthemap.ces.census.gov/

Development Trends

Costa Mesa is located within a dense part of southern Orange County that has experienced significant growth and development over the past 30 years. In the past 10 years, the population of the City has grown by approximately 5%. The 2015 Costa Mesa General Plan Land Use Element identifies approximately 87 acres of the 8,042 net acres in the City (about 1%) that are vacant or underutilized. Most of the underutilized properties include agricultural uses, which are considered temporary, as the lands are entitled for development by the North Costa Mesa Specific Plan [5]. The potential for infill development is focused on areas of vacant or underutilized properties or redevelopment in areas with existing development. Through the City's existing planning processes, much of the new development/redevelopment will incorporate the latest code requirements and meet the most up-to-date standards to ensure higher levels of safety and resilience for residents and businesses. The challenge for existing developments within the City focuses on the best way to continue the operation of aging structures while ensuring improvement in the properties and structures that increase occupants' safety. The Development Services Department is currently overseeing two major developments undergoing construction, including a 393-unit apartment project on Anton Blvd and a 200-unit apartment project on Harbor Blvd. Other smaller projects are occurring throughout the City, with several focused along Newport Blvd., Bristol St., and Harbor Blvd., which are major economic corridors within the City. The growth of the cannabis industry will create further development opportunities for the city. **Figure 2-1** depicts the Costa mesa General Plan Land Use Map.

Major Community Elements

Residential Uses

With a population of approximately 113,000 residents, the City has a diverse residential base. The City has structures that date back to the 1800s, and over 4,000 properties were constructed before 1954. Homes in older neighborhoods may require retrofit improvements

[5] Land Use Element, City of Costa Mesa General Plan
http://ftp.costamesaca.gov/costamesaca/generalplan2015-2035/adopted/02_FinalDraftLandUseElement_02-2016.pdf

to reduce risks from natural hazards and bring them into compliance with current building practices and requirements.

Institutional Uses (Schools and Universities)

Education is a major component of the City's identity. Vanguard University, Orange Coast College, and Coastline Community College are located within the City, which has a combined enrollment (in person and online) of 75,000 students. These institutions can greatly increase the City's daytime population, impacting roadways, infrastructure, and community services. Costa Mesa is also home to Newport Mesa School District, Orange County Department of Education, numerous private schools, and trade and vocational schools, which contribute to the educational footprint in the city whether it is through in person instruction or via an online platform.

South Coast Plaza

The largest shopping center on the West Coast of the United States, with sales of over $1.5 billion annually, making it one of the highest-grossing retail centers in the United States. This center has nearly 2.8 million square feet of gross leasable areas that annually receive an estimated 24 million visitors. Located adjacent to Interstate 405 in an area called South Coast Metro, which includes portions of Costa Mesa and Santa Ana, South Coast Plaza is a major economic driver for the City.

OC Fair and Event Center

The OC Fair and Event Center is a 150-acre event venue within Costa Mesa that hosts over 150 events annually, attracting over 4.3 million visitors to the City. This site is home to the Orange County Fair (a 23-day event); Centennial Farm, an Equestrian Center; Costa Mesa Speedway; Pacific Amphitheater; and Heroes Hall, a museum commemorating the Santa Ana Army Air Base.

Segerstrom Center for the Arts

Formerly known as the Orange County Performing Arts Center, the Segerstrom Center for the Arts was renamed in 2011 to honor the Segerstrom family (owners of South Coast Plaza). This facility is one of the most nationally respected multi-disciplinary cultural institutions, home to multiple theaters and concert halls, including the 3,000 seat Segerstrom Hall and 2,000 seat Renee and Henry Segerstrom Concert Hall, home to the William J. Gillespie Concert Organ. The campus also includes various educational institutions dedicated to the arts, venues for learning and culture, and places for gathering. The Center is also the new site for the Orange County Museum of Art, further solidifying the City's goal of being a beacon for culture throughout southern California.

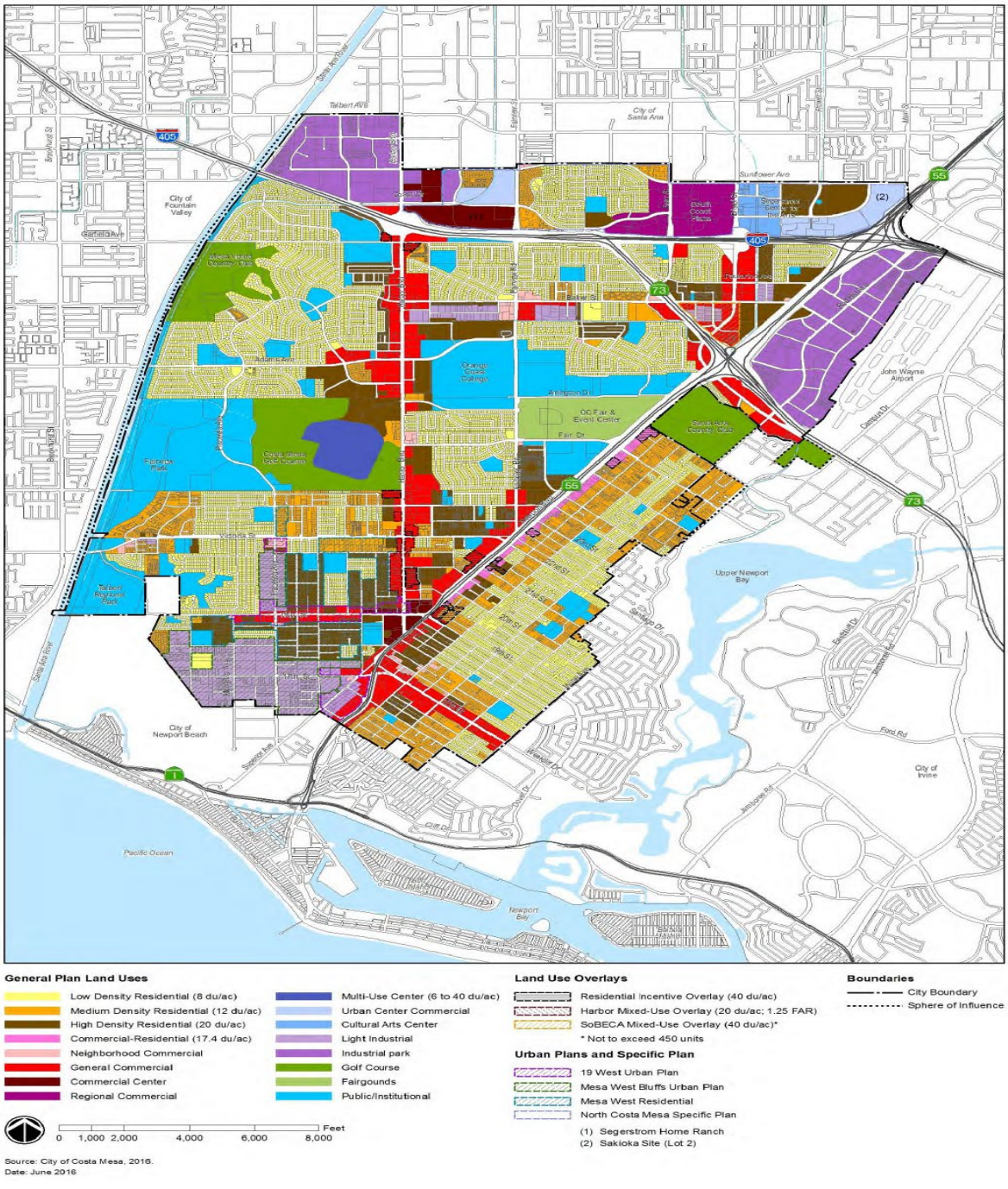
Open Space

In addition to the significant development within the City, Costa Mesa has taken great steps towards open space preservation and enhancement. The City has thirty parks and two community gardens. The City has actively worked to preserve and manage open space resources and understands the value of these assets within the community.

Fairview Developmental Center

Fairview Developmental Center (FDC), located on 114 acres of state-owned land in Costa Mesa, opened in 1959 and served people with developmental and intellectual disabilities. FDC was one of four State-operated facilities within the State of California's Department of Developmental Services (DDS) and was a multi-disciplinary, service-oriented residential facility licensed by the California Department of Public Health. This facility is now closed and no longer supports these populations.

Figure 2-1: Costa Mesa General Plan Land Use Map



Infrastructure Assessment

Infrastructure plays a vital role in mitigating the effects of hazard events. When infrastructure fails, it can exacerbate the extent of certain hazards or create complications for first responders trying to reach victims. For example, fallen utility poles from strong wind events or earthquakes can obstruct roadways and prevent emergency vehicles from reaching affected areas. The following information identifies electrical, fossil fuel, hydrologic, and transportation infrastructure in Costa Mesa.

Electricity

Costa Mesa receives its electrical distribution from Southern California Edison (SCE). Three electrical substations are located within the City, and two additional substations are located in neighboring cities. These substations connect 33 kilovolt (kV) and 92kV powerlines that run east to west and north to south through the City. These powerlines bring electricity to Costa Mesa residents and businesses from power plants throughout the region. While these connections help Costa Mesa access electricity sources, a large regional failure of the power grid would likely disrupt businesses and residents within the City.

Public Safety Power Shutoff

The State's investor-owned utilities have general authority to shut off the electric power to protect public safety under California law. Utilities exercise this authority during severe wildfire threat conditions as a preventative measure of last resort through Public Safety Power Shutoffs (PSPS).

The City has begun preparation for PSPS events by understanding the potential circuits that could be impacted and the needs of special populations that may be affected by these events. These incidents typically occur during high fire threat conditions (i.e., dry conditions and strong winds) and may affect communities far away from any actively occurring fires. There are no identified SCE circuits within the City that could undergo PSPS de-energization; however, impacts in the future could affect residents and businesses depending on the location of future events and the populations that may be affected.

While the City does not anticipate being directly affected at this time, it is anticipated that City resources may be affected if surrounding communities experience PSPS events and re-locate temporarily into the City until the event subsides. Based on these potential effects, the City recognizes the need to prioritize energy enhancements like backup power generation at City facilities to ensure residents, businesses, and visitors can be accommodated if needed.

Fossil Fuel

Petroleum-based infrastructure is prolific throughout southern California. The region's history of oil extraction has led to the development of large refineries and storage sites. The nearest refineries to Costa Mesa are located 21 miles away in the South Bay region of adjacent Los Angeles County. There are six large refineries, all located within 2.5 miles of each other, which include:

- Marathon Petroleum Corp., Carson Refinery
- Chevron U.S.A. Inc., El Segundo Refinery
- PBF Energy, Torrance Refinery
- Phillips 66, Wilmington Refinery
- Valero Energy, Wilmington Refinery
- Valero Wilmington Asphalt Refinery

These refineries have a capacity to process over 1 million barrels per day and are considered some of the most productive in California, having refined, by some estimates, nearly 1.2 trillion barrels of oil since production in the area began in 1932. [6] Kinder Morgan owns and manages a petroleum pipeline within the City that connects the greater LA Basin to the San Diego region.

Natural gas production also occurs in the Southern California region, with multiple transmission pipelines located in and around the City. The Southern California Gas Company (SoCalGas) provides natural gas to Costa Mesa and surrounding jurisdictions. One transmission line crosses the City from east to west, eventually splitting into two high-pressure distribution lines which deliver gas to large portions of the City. [7] If damage to these lines were to occur, interruption of gas deliveries could occur. Since natural gas ignites easily, if the damage involves the rupture of gas lines, properties in the vicinity of the leak could be damaged by either explosion or fire. The presence of this infrastructure creates unique challenges and concerns for emergency management personnel.

Water and Wastewater

Water in Costa Mesa is primarily provided by the Mesa Water District (Mesa), which services 110,000 residents in an 18-square mile service area, including most of the City of Costa Mesa, parts of Newport Beach, and John Wayne Airport. Small areas in the eastern portion of the City are served by Irvine Ranch Water District. The expansion of the Mesa Water Reliability Facility has allowed Mesa to provide one hundred percent of Costa Mesa's overall water supply from local groundwater supplies pumped from Orange County's groundwater basin.

Mesa is committed to the continued investment in and proactive maintenance of its infrastructure, which pumps, treats, and delivers over 5 billion gallons per year of quality drinking water to homes and businesses in its service area. Mesa owns and maintains 317 miles of pipeline, 5,139 mainline valves, 3,383 fire hydrants, two booster pump stations, seven wells, three reservoirs, and the Mesa Water Reliability Facility features nanofiltration technology for water treatment. [8]

Wastewater in Costa Mesa travels through the Costa Mesa Sanitary District (CMSD) collection system to the Orange County Sanitation District Water Reclamation Plant, where it is treated through the reclamation process for use in landscaping and agricultural

[6] United States Geological Survey. 2013. "Remaining Recoverable Petroleum in Ten Giant Oil Fields of the Los Angeles Basin, Southern California." https://pubs.usgs.gov/fs/2012/3120/fs2012-3120.pdf
[7] Gas Transmission Pipeline – SoCal Gas
[8] Orange County Water and Wastewater Multi-Jurisdictional Hazard Mitigation Plan. August 2019. https://www.mwdoc.com/wp-content/uploads/2019/08/J_MesaWaterDistrict_Annex.pdf

irrigation, and other non-potable water uses. The CMSD is a proud member of the Orange County Sanitation District. [9]

Transportation

Much of the transportation infrastructure in Costa Mesa consists of roadways for automobiles, but there are many modes of travel into and out of the City. For non-motorized travel, the City has an extensive network of pedestrian trails and bicycle paths.

One Interstate (I-405) and two State Routes (SR 55 and SR 73) connect Costa Mesa to the greater Southern California region. All interchanges from these facilities connect to major thoroughfares within the City. **Table 2-9** identifies the freeways that connect to the City of Costa Mesa and the City's local transportation network.

Table 2-9: City of Costa Mesa Transportation Infrastructure

Freeways in Costa Mesa	Direction	Exits Serving the City of Costa Mesa
I-405	North | South	Exit 11B, Harbor Boulevard; Exit 11A, Fairview Road; and Exit 10, California 73 (Corona del Mar Freeway) south to the San Joaquin Hills Transportation Corridor
SR-55	North-South	Exit 4, Fair Drive and Del Mar Avenue and Exit 3, 22nd Street and Victoria Street, Southbound California 55, reaches the southern end of the freeway in Costa Mesa. At the end of the freeway, California 55 meets a traffic signal at 19th Street. As California 55 plies through Costa Mesa, it will pass by a variety of traffic signals before entering the city of Newport Beach. Southbound California 55 shifts from the Costa Mesa Freeway onto Newport Boulevard.
SR-73	North-West/South-East	Exit 17B, Bear Street. The next exit is Exit 17A, California 55 south

The Orange County Transportation Authority (OCTA) provides public transportation within Costa Mesa, which provides several bus routes servicing local Costa Mesa neighborhoods and neighboring cities in Orange County.

Although John Wayne Airport is not located inside the City limits, it does border the City, tucked between SR 55, SR 73, and I-405, on the northeast edge of the City. Additionally, the John Wayne Administration Offices are located in Costa Mesa. John Wayne plays a unique and crucial transportation role in Orange County as the only airport that provides commercial passenger and air cargo service and is the primary provider of general aviation services and facilities in Orange County.

[9] Costa Mesa Sanitary District. "Sewer Systems Facts and Statistics." https://www.cmsdca.gov/index.php/wastewater

Chapter 3 – Hazard Assessment

This chapter discusses the types of hazards that might reasonably occur in Costa Mesa. It describes these hazards and how they are measured, where they may occur, a history of these hazards in and around the City, and the future risk they pose. The discussion of future risks includes changes to the frequency, intensity, and/or location of these hazards due to climate change. This chapter also discusses how the Hazard Mitigation Planning Committee (HMPC) selected and prioritized this Plan's hazards.

Hazard Identification

FEMA guidance identifies several hazards that communities should evaluate for inclusion in a hazard mitigation plan. Communities may also consider additional hazards for their plans. The HMPC reviewed an extensive list of hazards and excluded those that do not threaten Costa Mesa. **Table 3-1** lists the hazards considered and explains the reasoning for inclusion/exclusion. For context, this table also shows if a hazard is recommended for consideration by FEMA, if it is included in the 2018 California State Hazard Mitigation Plan (SHMP), and if it is included in the Orange County Hazard Mitigation Plan (OC HMP). This table does not include all potential impacts, the table is based upon FEMA and State guidance, and the impacts that are most probable to occur within Costa Mesa. As a result, some hazard like war or foreign invasion are better addressed at the Federal level.

Table 3-1: Hazard Evaluation for Costa Mesa LHMP

Hazard	Recommended for Consideration	Included in this LHMP?	Reason for Inclusion or Exclusion
Agricultural Pests	SHMP	No	Costa Mesa has minimal agricultural uses within the City that contribute to the economy. Approximately 30 acres of the City are used for agricultural purposes, however concerns regarding agricultural pests are not a significant concern citywide.
Air Pollution	SHMP	No	Air pollution is a state and regional issue that is addressed through plans and regulations administered by the South Coast Air Quality Management District and/or California Air Resources Board. Since the City has little control over regulating air quality, this hazard was not included.
Aircraft Incident	SHMP	Yes	The City is located adjacent to John Wayne Airport. Given this proximity and past incidents associated with aircraft, the HMPC determined that this hazard should be included in the plan.
Aquatic Invasive Species	SHMP	No	There are no major water bodies or riparian environments in Costa Mesa where invasive aquatic species could endanger the community.

Avalanche	FEMA guidance SHMP	No	Costa Mesa is located along the coastal plain of Orange County. There is no potential for avalanches to occur within the City.
Civil Disturbance or Riot	SHMP	Yes	The HMPC determined that civil disturbances of the degree that could endanger property or the life of residents or visitors could occur, especially in locations of the City where large populations visit/congregate (Orange County Fairgrounds, Segerstrom Center of the Arts, The Pacific Amphitheatre, South Coast Plaza, etc.).
Climate Change	SHMP OC HMP	Yes	Climate change is a concern identified by the HMPC and has been included within each hazard profile, where relevant.
Coastal Flooding and Storm	FEMA guidance SHMP	No	Costa Mesa is located within the coastal plain of Orange County; however, the City is several miles from the actual coastline. Based on this distance, coastal flooding and storms are not a concern for the City. The portions of the community closest to the coast are located along an elevated bluff that is not subject to coastal flooding.
Cyber Threats	SHMP	Yes	With the increase in cyber threats occurring throughout California and the nation, the HMPC considers them serious in nature, requiring evaluation.
Dam Failure	FEMA guidance SHMP OC HMP	Yes	Although there are no dams located within the City, the Santiago Creek Dam and Prado Dam are located upstream from the City and have the potential to inundate the City if failure were to occur. Due to this potential, the HMPC identified dam failure as a hazard of concern.
Drought	SHMP OC HMP	Yes	Droughts are a recurring and potentially severe hazard in Costa Mesa and can affect city water supplies. Given the prevalence of droughts within the western US, the HMPC identified drought as a hazard of concern to be addressed in this LHMP.
Energy Shortage	SHMP	Yes	Costa Mesa does not produce its own electricity and relies on Southern California Edison and So Cal Gas for electricity and natural gas, respectively. With the heightened concern over future PSPS events and the potential for electricity shortages during peak demand conditions, the HMPC identified energy shortage as a hazard of concern.
Epidemic, Pandemic, Vector-Borne Disease	SHMP	Yes	Costa Mesa is in Orange County, which has experienced several health-related incidents in the past. It is within proximity to a major airport, major attractions (i.e., Disneyland, etc.), and educational institutions, which have

			the potential to introduce new diseases to the region. The current COVID-19 global pandemic affecting the City has impacted staff and resources, which is why the HMPC identified this hazard for inclusion.
Erosion	FEMA guidance SHMP	Yes	The City has several locations where unstable bluffs have experienced erosion in the past. The presence of these conditions is the reason the HMPC identified the inclusion of this hazard of concern.
Expansive Soil	FEMA guidance	Yes	Soils that have expansion potential have been identified within the City and have been included for discussion within this LHMP.
Extreme Cold	FEMA guidance SHMP	No	Temperatures in Costa Mesa do not fall to a level that would be considered a danger to public safety.
Extreme Heat	FEMA guidance SHMP	Yes	Extreme heat conditions have occurred in the City and are expected to be a future recurring issue.
Fault Rupture	FEMA guidance SHMP OC HMP	Yes	There are no known Alquist-Priolo Special Study Zones located within the City; however, splays of the Newport Inglewood Fault are identified within the City. As a result, the HMPC identifies fault rupture as a potential hazard of concern.
Flooding	FEMA guidance SHMP	Yes	The City is located on the banks and levees of the Santa Ana River and is identified within FEMA flood hazard zones. While significant flooding events have not affected properties within the City, the presence of these flood zones indicates the potential for future hazards.
Fracking	SHMP	No	Fracking does not occur in Costa Mesa.
Hail	FEMA guidance	No	Hail that is severe enough to pose a threat to people and property is not a concern identified by the HMPC.
Hazardous Materials release	SHMP	Yes	Locations that store, manufacture, and dispose of hazardous materials within the City are a concern for the HMPC. In addition, several major transportation routes through the City are used to transport these materials, which could impact properties and people if a release into the environment were to occur.
Hurricane	FEMA guidance SHMP	No	Hurricanes do not occur in Costa Mesa.
Infrastructure Failure	SHMP	No	Infrastructure failure poses a threat to people and property in Costa Mesa. A discussion of infrastructure failure is discussed as a function of other hazards.
Landslide	FEMA guidance SHMP	Yes	Areas with erosion potential within the City may be prone to landslides. As a result, the

			HMPC identified this as a hazard of concern within the plan.
Levee Failure	SHMP	Yes	Levees protect portions of the City adjacent to the Santa Ana River. The HMPC identified flooding and dam failure as concerns, which include levee failure.
Lightning	FEMA guidance	No	Although lightning occasionally occurs in Costa Mesa, it does not pose a significant threat to people or property.
Liquefaction	FEMA guidance SHMP OC HMP	Yes	According to the California Geological Survey, portions of the City are located within liquefaction-prone areas. Based on this mapping, the HMPC identified liquefaction as a hazard of concern.
Methane-containing Soils	OC HMP	Yes	The City is underlain by soils containing peat and other organic compounds that produce methane, which can threaten the public health and safety of residents and businesses. The HMPC identified concerns regarding these soils for inclusion in the plan.
Natural Gas Pipeline Hazards	SHMP	Yes	Natural gas transmission pipelines are located within the City and could pose a danger to people and property if they breach and release their contents into the community. This hazard is discussed in the Hazardous Materials Release profile.
Oil Spills	SHMP	Yes	The City is located in an area of historic oil extraction, and several idle or abandoned oil wells are located throughout the community. Due to the history of oil extraction, the HMPC identified this as a hazard of concern.
Power Failure	SHMP	Yes	Given prior events that have occurred in the City and the threat of future events (especially PSPS events), the HMPC identified this as a hazard of concern. This, along with energy shortage, is discussed within the Human-Caused Hazards profile.
Radiological Accidents	SHMP	No	There are no known major radiation sources in Costa Mesa or the immediate surrounding area that could pose a serious threat to the community.
Sea-level Rise	FEMA guidance SHMP	No	While Costa Mesa is not considered a coastal community, the city's southern portion is located on bluffs less than a mile from the coast. The HMPC did not consider this a hazard of concern.
Seiche	FEMA guidance SHMP	No	There are no major bodies of water in Costa Mesa that could be subjected to seiche.
Seismic Shaking	FEMA guidance SHMP OC HMP	Yes	Costa Mesa is in a seismically active area where shaking can be severe enough to damage property or cause loss of life. For this

			reason, the HMPC determined it should be addressed in this plan.
Severe Wind	FEMA guidance	Yes	Severe Weather includes discussions regarding extreme heat, severe wind, and rain, which are weather-related hazards that are most common in Costa Mesa.
Severe Weather and Storms	FEMA guidance SHMP OC HMP	Yes	Severe Weather includes discussions regarding extreme heat, severe wind, and rain, which are weather-related hazards that are most common in Costa Mesa.
Space Weather		Yes	Space Weather hazards involve the interaction of solar winds with the Earth's atmosphere. These winds carry significant amounts of energy that can affect satellites and electrical infrastructure. This hazard is addressed in the Energy Shortage/Power Failure profile.
Storm Surge	FEMA guidance	No	The HMPC did not identify this as a hazard of concern since the City is located nearly one mile from the California coastline.
Subsidence	FEMA guidance	No	The HMPC did not identify subsidence as a hazard of concern for the City.
Mass-Casualty Incident (Terrorism)	SHMP	Yes	The HMPC identified mass-casualty incidents and terrorism as potential threats of concern. This hazard is addressed in the Human-Caused Hazards section.
Thunderstorm	SHMP	No	Thunderstorms that cause damage and endanger public safety are rare in the Southern California region.
Tornadoes	FEMA guidance SHMP	No	Tornadoes were not considered a hazard that could impact the City as was not included in this LHMP.
Transportation Accidents	SHMP	No	While numerous major transportation corridors are located in and around the City, the HMPC did not identify this hazard as a concern for this plan.
Tree Mortality	SHMP	Yes	The HMPC noted that the City's trees are a significant asset at risk. Tree Mortality is discussed within the Diseases and Pests hazard profile.
Tsunami	FEMA guidance SHMP	No	The HMPC did not identify tsunamis as a hazard of concern due to the lack of inundation zones within the City.
Urban Fire	SHMP OC HMP	Yes	The HMPC identified urban fires as a risk to property and life in Costa Mesa. A discussion of this topic is included in the urban fire hazard profile.
Volcano	SHMP	No	There are no volcanoes near Costa Mesa to reasonably pose a threat.
Wildfire	FEMA guidance SHMP	No	The HMPC did not identify wildfire as a major threat to the City and was not included in this plan.

After hazard evaluation and the organizational changes made by the Committee, this Plan discusses 11 broad hazard types with their respective sub-categories:

HAZARD TYPE	SUB-CATEGORIES
Aircraft Incident	
Diseases and Pests	Epidemic/Vector-Borne Disease Tree Mortality
Drought	
Energy/Power Shortage	Space Weather
Flooding	Flooding Dam/Levee Failure
Geological Hazards	Expansive Soil Erosion Landslide Methane-Containing Soils
Hazardous Materials	Hazardous Material Release Oil Spills Natural Gas Pipeline
Human-Caused Hazards	Terrorism/Mass Casualty Incident (MCI) Civil Disturbance/Riot Cyber Threats
Seismic Hazards	Fault Rupture Seismic Shaking Liquefaction
Severe Weather	Extreme Heat Severe Wind Rain
Urban Fire	

Hazard Scoring and Prioritization

The Committee followed FEMA guidance for hazard mitigation plans and prioritized each of the 11 hazards. In the initial step, it assigned a score of 1 to 4 for each of the hazards for the following criteria:

Probability: The likelihood that the hazard will occur in Costa Mesa in the future.
Location: The size of the area that the hazard would affect.
Maximum probable extent: The severity of the direct damage of the hazard to Costa Mesa.
Secondary impacts: The severity of indirect damage of the hazard to Costa Mesa.

The Committee assigned a weighting value to each criterion, giving a higher weight to the criteria deemed more important, and multiplied the score for each criterion by weighing the factor to determine the overall score for each criterion.

The weighting values were recommended by FEMA:

- Probability: 2.0
- Location: 0.8
- Maximum probable extent: 0.7
- Secondary impacts: 0.5

Table 3-2 shows the Criterion Scoring used to assign a score for each criterion.

Table 3-2: Criterion Scoring

Probability		**Maximum Probably Extent (Primary Impact)**	
THE ESTIMATED LIKELIHOOD OF OCCURRENCE BASED ON HISTORICAL DATA.		THE ANTICIPATED DAMAGE TO A TYPICAL STRUCTURE IN THE COMMUNITY.	
Probability	Score	**Impact**	Score
Unlikely—less than a 1 percent chance each year.	1	Weak—little to no damage	1
Occasional—a 1 to 10 percent chance each year.	2	Moderate—some damage, loss of service for days	2
Likely—a 10 to 90 percent chance each year.	3	Severe—devastating damage, loss of service for months	3
Highly likely—more than a 90 percent chance each year.	4	Extreme—catastrophic damage, uninhabitable conditions	4
Location		**Secondary Impact**	
The projected area of the community affected by the hazard.		The estimated secondary impacts to the community at large.	
Affected Area	Score	Impact	Score
Negligible—affects less than 10 percent of the planning area.	1	Negligible—no loss of function, downtime, and/or evacuations	1
Limited—affects 10 to 25 percent of the planning area.	2	Limited—minimal loss of functions, downtime, and/or evacuations	2
Significant—affects 25 to 75 percent of the planning area.	3	Moderate—some loss of functions, downtime, and/or evacuations	3
Extensive—affects more than 75 percent of the planning area.	4	High—major loss of functions, downtime, and/or evacuations	4

After calculating the total impact score for each hazard (sum of the location, maximum probable extent, and the secondary impact). FEMA guidance recommends multiplying the total impact score by the overall probability to determine the final score for each hazard. A final score between 0 and 12 is considered a low-threat hazard, 12.1 to 42 is a medium-threat hazard, and a score above 42 is considered a high-threat hazard. This final score determines the prioritization of the hazards.

Earthquakes are high priority hazards because they are likely to happen, affect a wide area, and can be very damaging. Source Image: LA Times.

Table 3-3 shows each hazard's individual criterion scores, final score, and threat level based on the above prioritization process.

Table 3-3: Hazard Scores and Threat Level

Hazard Type*	Probability	Impact			Total Score	Hazard Planning Consideration
		Location	Primary Impact	Secondary Impacts		
Seismic Hazards [1]	4	4	4	4	64.00	High
Human-Caused Hazards [2]	4	3	3	4	52.00	High
Energy/Power[3] Shortage	4	3	3	4	52.00	High
Severe Weather [4]	4	3	3	3	48.00	High
Disease and Pests [5]	3	3	3	3	36.00	Medium
Drought	3	3	2	3	31.80	Medium
Flooding [6]	3	1	3	3	26.40	Medium
Geologic Hazards [7]	2	2	3	3	20.80	Medium
Urban Fire	2	2	3	3	20.80	Medium
Aircraft Accident	2	2	3	2	18.80	Medium
Hazardous Materials [8]	2	2	2	3	18.00	Medium

* Climate Change considerations discussed as appropriate within each hazard.

1 Seismic Hazards includes: Fault Rupture, Seismic Shaking, Liquefaction
2 Human-Caused Hazards includes: Mass-Casualty Incidents (Terrorism), Civil Disturbance/Riot, and Cyber Threats
3 Energy/Power Shortage incidents are considered independent events and not related to another hazard incident.
4 Severe Weather includes: Extreme Heat, Severe Wind, Rain
5 Diseases Pests includes: Epidemic/Vector-Borne Diseases and Tree Mortality
6 Flooding includes: Flooding and Dam/Levee Failure
7 Geologic Hazards includes: Expansive Soils, Landslides, Methane Containing Soils, and Subsidence
8 Hazardous Materials includes: Hazardous Materials Release, Oil Spills, and Natural Gas Pipelines

Hazard Profiles

Aircraft Hazards

Description

Aircraft hazards address both aircraft incidents and aircraft accidents. An aircraft incident/accident refers to when an airborne vehicle, such as an airplane, helicopter, or airship, experiences failure to the degree that people on the ground are endangered by the aircraft. This could be the result of human error, inclement weather, deferred maintenance, design flaw, equipment failure, or, in a worst-case scenario, a collision.

Location and Extent

Costa Mesa has no airports within its boundaries, but it is located adjacent to a major international airport serving southern California. In addition, numerous regional and international airports are located within 50 miles of the City. The presence of so many

airport facilities cause a high amount of traffic in the airways above the City. The following are airports near Costa Mesa that create air traffic (distances from the Civic Center):

- John Wayne Airport (SNA), 4 miles, located between the cities of Costa Mesa, Irvine, Santa Ana, and Newport Beach.
- Fullerton Municipal Airport (FMA), 20.1 miles
- Long Beach Municipal Airport (LGB), 20.8 miles
- Los Angeles International Airport (LAX), 39.9 miles
- Ontario International Airport (ONT), 45.8 miles

In addition to the public airports that operate in the region, Joint Forces Training Base Los Alamitos is also located within 20 miles of the City. This facility is actively used for military training purposes; however, the frequency of flights is anticipated to be less than the amount from airports like SNA.

To better understand the differences between an aircraft accident and aircraft incident, which is based on Title 49 of the Code of Federal Regulations Part 830, §830.2:

An **Accident** is an occurrence associated with the operation of an aircraft that:

- Occurs between when the first boarding person enters the aircraft – with the intention of flight –and the last person disembarks.
- Results in death or serious injury, or
- Causes substantial damage to the aircraft.

An **Incident** is an occurrence that does not trigger any of the criteria identified for an accident but affects or could affect the safety of operations.

Past Events

The City of Costa Mesa borders John Wayne Airport, which has suffered numerous accidents/incidents in the past. According to the National Transportation Safety Board (NTSB), John Wayne Airport experienced 62 accidents and six incidents over a 36-year period. **Table 3-4** provides an overview of the past events that have occurred with flights originating or landing at John Wayne Airport.

Table 3-4: John Wayne Airport Aircraft Accident Statistics (1982-2018)

Accident	62	91.2%
Incident	6	8.8%
Fatal Accidents	14	22.6%
Fatality Range	1 to 5	N/A
Aircraft Destroyed	13	N/A
Total Fatal Injuries	37	5.1%
Total Serious Injuries	7	1.0%
Total Minor Injuries	16	2.2%
Total Uninjured	666	91.7%

Source: https://www.ntsb.gov/_layouts/ntsb.aviation/index.aspx

Based on this data, less than 10% of individuals involved in an accident suffered an injury. Based on this dataset, an average of two aircraft accidents/ incidents per year have occurred from John Wayne Airport.

Notable historic aircraft accidents within Orange County include the following:

June 5, 1935: A Stinson SM-6000 Trimotor made an unscheduled landing at a residence on the northeast corner of West Bay Street and Harbor Boulevard. There were no serious injuries.

September 25, 1978: A Boeing 727 from LAX to Lindbergh Field (now San Diego International Airport) collided mid-air with a small, private plane during its final approach to the runway. The collision destroyed the small plane and disabled one of the 727's engines, causing it to veer off course and pitch downward, crashing into a residential area in San Diego's North Park neighborhood. 22 homes were destroyed, and 144 people were killed, which included 135 aircraft passengers and crew, two onboard the small plane, and seven people on the ground. It is considered the deadliest aviation incident in California history. [10]

August 31, 1986: A DC-9 jetliner collided with a smaller aircraft. Neither craft was destroyed in the air, but the operability of both aircraft was compromised, causing them to fall more than 6,000 feet from their flight paths, eventually crashing into a housing tract in Cerritos. Sixteen homes were destroyed, and 15 residents in the area of the impact were killed. [11]

Notable recent aircraft accidents/incidents within Orange County include the following:

June 30, 2017: A small plane crashed on the 405 Freeway in Costa Mesa near John Wayne Airport shortly after takeoff. No injuries or deaths occurred on the ground, but the freeway was shut down for many hours.

August 5, 2018: A small plane seemingly exhausted its fuel reserves and crashed into a strip mall parking lot in Santa Ana, CA, near SNA. No injuries or deaths occurred on the ground, but four parked vehicles were destroyed. [12]

Investigators look over the remains of a Cessna, right, that crashed into a parked car, left, in the parking lot of a shopping center in Santa Ana. (Photo by Mindy Schauer, Orange County Register/SCNG

[10] Lusher, A. September 2018. "PSA Flight 182 crash: how a routine commuter flight turned into an apocalyptic disaster." Independent.https://www.independent.co.uk/news/world/americas/psa-flight-182-crash-san-diego-california-40-years-144-dead-cockpit-recording-transcript-plane-air-a8556676.html

[11] Harrison, S. August 2016. "'Sledgehammer from the sky:' Cerritos air disaster's long shadow." The Los Angeles Times. https://www.latimes.com/local/lanow/la-me-cerritos-crash-retrospective-20160831-snap-story.html

[12] August 2018. "Five Dead in Orange Count Cessna 414 Plane Crash." Baum Hedlund Artistei Golman.https://www.baumhedlundlaw.com/aviation-accident/oc-cessna-414-plane-crash/

February 3, 2019: A pilot of a small plane lost control of the aircraft and crashed into a housing tract in Yorba Linda, CA, destroying two homes and killing four people on the ground. [13]

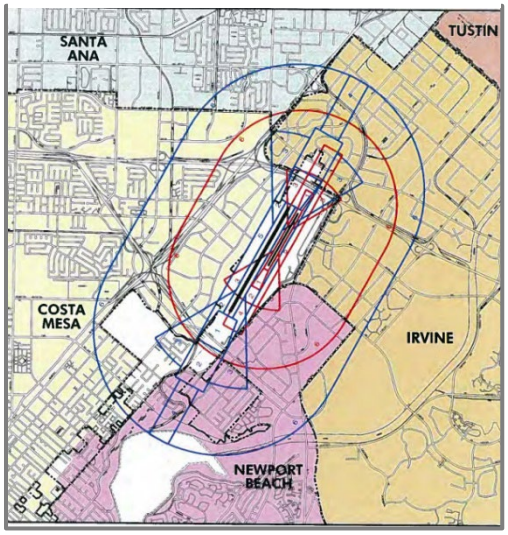
In addition to accidents/incidents associated with John Wayne Airport, **Table 3-5** identifies the aircraft accident and incident statistics for events that have occurred in the City.

Table 3-5 Costa Mesa Aircraft Accident Statistics (1962-2007)

Fatal Accidents	6	67%
Non-Fatal Accidents	3	33%
Fatality Range	1 to 5	N/A
Aircraft Destroyed	3	67%
Total Fatal Injuries	15	N/A
Total Serious Injuries	N/A	N/A
Total Minor Injuries	N/A	N/A
Total Uninjured	N/A	N/A
Source: https://www.ntsb.gov/_layouts/ntsb.aviation/index.aspx		

Risk of Future Events

Figure 3-1: John Wayne Airport Safety Zones



Given the high volume of air traffic in the area, the possibility of an aircraft incident occurring in Costa Mesa will continue to exist. Based on historical events, it is anticipated that future impacts will be similar in nature. A key component to aircraft incident safety is the administration of the Airport Environs Land Use Plan for John Wayne Airport (**Figure 3-1**). This plan identifies the height restrictions and safety zones that require land-use restrictions to minimize potential impacts. Future land-use decisions that adhere to these restrictions and plan accordingly will help reduce future impacts associated with aircraft incidents. While these efforts can assist in reducing impacts on the ground, there is little that can be done to reduce the impacts associated with aircrafts flying overhead under normal flight conditions. The risk associated with these types of hazards is like other parts of Orange County and southern California.

Climate Change Considerations

There is no direct link between aircraft hazards and climate change; therefore, it is not anticipated that future impacts would be affected by changing climatic conditions.

[13] Maxouris, C., Sterling, J., Hackney, D. and Vera, A. February 2019. "4 people killed when plane crashed into Yorba Linda home identified." CNN. https://www.cnn.com/2019/02/07/us/yorba-linda-victims-identified/index.html

Disease and Pests

Disease and Pest hazards discussed in this hazard profile include Epidemic/Pandemic/Vector-Borne Disease and Tree Mortality.

Description

A disease is a serious type of illness that affects an organism (trees, the human body, etc.) to the degree that normal activities can become more hampered, difficult, or even impaired. In serious cases, diseases can result in significant damage or even death. For humans, some diseases only affect the infected person—in which case the disease would be considered non-contagious. For example, a person can be infected with Lyme Disease by interacting with an animal infected with ticks, but the infected person cannot then spread Lyme Disease to another person. Diseases that are spread from one person to the next are described as being contagious. While both non-contagious and contagious diseases can affect residents of the City, contagious diseases are particularly concerning since they can result in multiple cases of the same disease if proper precautions are not taken.

Pests are organisms whose presence is generally considered a nuisance due to the effects on public health and property damage they can cause. Examples of pests include mice, rats, mosquitoes, and invasive insects that cause damage to natural assets (trees). These organisms can be vectors, or transmitters, of disease which can spread between animals and humans. Occasionally, the disease may spread first to an intermediary, like a domesticated animal, where it may evolve into a form that can survive in humans. These kinds of vector-borne diseases are known as zoonoses. Apart from posing risks to public health, pests can also damage property, such as trees or other landscaped areas, either by directly consuming the plant material or spreading infectious diseases. In serious cases, pests can cause the death of the tree or plant specimen they are infesting.

Epidemic/Pandemic/Vector-Borne Disease

There are two general classifications to describe the geographic spread of disease. An epidemic is an infectious disease that spreads beyond a localized area, reaching people throughout a large region. A pandemic is an infectious disease that spreads around the world. When a disease is described as vector-borne, it refers to the medium of infection through a third-party organism (i.e., mosquito) known as a vector. Both epidemic and pandemic diseases can be described as vector-borne if the infection takes place through a vector. The two main factors that influence the spread of disease are the speed at which the pathogen is transmitted from person to person in addition to human behaviors, both individual and societal.

The following are some diseases and pests that could affect the population of Costa Mesa:

COVID – 19 is the common name used for the Novel Coronavirus Disease 2019, first identified in Wuhan, China, in December 2019. The particular coronavirus strain associated with COVID-19 is called SARS-CoV-2. Coronaviruses are a large family of viruses common in people and many different species of animals, including camels, cattle, cats, and bats. A wide range of COVID-19 symptoms have been reported – ranging from mild symptoms to severe illness that can appear 2-14 days after exposure to the virus. Symptoms reported include

coughing, shortness of breath or difficulty breathing, fever, chills, muscle pain, sore throat, and/or new loss of taste or smell. [14]

Influenza (the flu) is a virus that leads to illness in humans. Symptoms of the flu include fever, cough, headache, sore throat, muscle and joint pain, or runny nose. Given that the flu virus is constantly mutating, it is exceptionally difficult to create a vaccine that protects against all strains of the virus. These variations of the flu can occasionally give rise to particularly deadly strains, such as the H1N1 strain that emerged in 2009. Currently, the flu is one of the common diseases around the world, leading to as many as 650,000 deaths per year. [15]

West Nile Virus is a disease originally from Africa that was first reported in the U.S. in 1999. West Nile Virus is a vector-borne disease, with transmission occurring because of mosquito bites from the aedes aegypti. Most people who are infected do not display symptoms or feel sick. Those who display symptoms most often experience high fever, headache, neck stiffness, tiredness, or tremors. More severe symptoms include coma and paralysis. Vulnerable populations, primarily the elderly, may die as a result of their infections. There is currently no vaccine for the virus. [16]

Zika Virus is a disease originally from Uganda that began spreading globally in 2016. Zika is a vector-borne disease that is primarily transmitted from person to person via mosquito bites. Most infected people do not experience symptoms; when symptoms occur, they potentially include fever, headache, or muscle pain. Zika rarely results in death. Researchers have discovered that Zika virus infections in pregnant women can sometimes result in microcephaly, a condition where babies are born with small heads. Babies born with microcephaly may die as a result of their physical condition. [17]

An Asian Tiger Mosquito, which may attack during the day, bites its host. Image from San Diego County News Center.

Mosquitoes are parasitic insects that feed on the blood of mammals, including humans. They use a needle-like part of their mouth, called the proboscis, to breach the epidermis and reach the blood vessels beneath the skin. As mosquitoes withdraw the blood from their host, they can potentially transfer infectious diseases they are carrying to the host. Only certain diseases may be transmitted by mosquitoes. The Human Immunodeficiency Virus (HIV), for example, cannot be transferred from human to human since HIV cannot survive in mosquitoes. The

[14] Coronavirus Disease 2019 (COVID-19) https://wwwn.cdc.gov/nndss/conditions/coronavirus-disease-2019-covid-19/case-definition/2020/08/05/

[15] Hartl, G. December 2017. Up to 650,000 people die of respiratory diseases linked to seasonal flu each year. *World Health Organization.*https://www.who.int/news-room/detail/14-12-2017-up-to-650-000-people-die-of-respiratory-diseases-linked-to-seasonal-flu-each-year

[16] Center for Disease Control and Prevention. December 2018. West Nile Virus: https://www.cdc.gov/westnile/index.html

[17] Center for Disease Control and Prevention. March 2019. Zika Virushttps://www.cdc.gov/zika/about/overview.html

Zika or West Nile viruses, on the other hand, are highly transmissible infections via mosquitoes, and this is the most common form of transmission. [18]

Mice and rats are small rodents that can transmit disease or be a vector for other disease-carrying organisms. The most well-known and historical example of this is the Bubonic Plague. In the 14th Century, mice and rats infested with fleas traveled to Europe from Asia. The fleas carried the Bubonic Plague in their bodies and transmitted the infection to human populations as the fleas left the rats and mice for new human hosts. [19]

Tree Mortality

The entirety of a city's trees is generally referred to as an urban forest. These trees may be publicly owned or maintained, such as trees in a public park or street median, or privately owned, such as the ornamental trees found in a property owner's landscaping. Urban forests represent important assets for a city as they provide shade, which helps keep the community cool. They also provide aesthetic beauty to a community and help humans feel calm and less stressed. Tree mortality refers to the death of numerous tree specimens in a forest, including urban forests. The death of a tree represents a significant loss since trees are expensive and require extensive time and care to be properly raised. Tree mortality may result from numerous causes, including but not limited to extreme heat, uprooting from severe weather, over-or under-irrigation, or chemical contamination. Like other living beings, trees are also subject to vector-borne diseases spread by pests. These diseases can cause the tree to produce misshapen fruit or discolored leaves. The disease can also kill the tree over an extended period. Pests that cause tree mortality are of concern since they may be difficult to detect and quarantine.

Xylella is a plant disease caused by a bacterium called *Xylella fastidiosa*. This disease affects several species of broadleaved trees such as grape, coffee, citrus, and olive trees. The host plant is affected when Xylella invades its water-conducting systems and eventually restricts or blocks water and nutrient movement through the plant. Severe Xylella infections can cause stunting and the eventual death of infected trees. [20]

Pests that are currently afflicting trees in Orange County include the following:

Asian Citrus Psyllid (ACP): Carries a plant disease known as Huanglongbing, or citrus greening disease, which kills citrus trees. Costa Mesa is in the quarantine area for this pest.

[18] Centers for Disease Control and Prevention. March 2016. *NIOSH: West Nile Virus*. https://www.cdc.gov/niosh/topics/outdoor/mosquito-borne/westnile.html
[19] Centers for Disease Control and Prevention. November 2018. History of Plague. https://www.cdc.gov/plague/history/index.html
[20] Forest Research. 2021. https://www.forestresearch.gov.uk/tools-and-resources/pest-and-disease-resources/xylella-xylella-fastidiosa/#:~:text=Xylella%20is%20a%20plant%20disease,and%20many%20herbaceous%20plant%20species.

Gold Spotted Oak Borer (GSOB): Burrow into oak trees, killing the tree over time.

Invasive Shot Hole Borer (ISHB): Burrow into all kinds of native trees in all kinds of settings, including urban areas. These insects carry the Fusarium Dieback fungus, which kills the tree. [21]

Invasive Shot Hole Borer. Image courtesy of Arborjet.com

Location and Extent

Epidemic/Pandemic/Vector-Borne Disease

While any location in Costa Mesa is susceptible to experiencing the spread of disease, locations where many people gather are more likely to facilitate the spread of disease. These include large employment centers, educational institutions, medical facilities, and shopping centers. Costa Mesa has several smaller medical facilities (urgent care, family medicine, etc.) but is located within five miles of several large hospitals (Kaiser, Fountain Valley Regional, and Hoag), where high populations of individuals with infectious diseases could congregate. In addition, large commercial and employment areas like South Coast Plaza, the Orange County Fairgrounds, and various educational institutions are highly trafficked by many different people, which could increase the spread of disease.

Vector-borne diseases can only be spread where there is a link between the pest and the human population that could be infected. Areas where pests gather could pose a greater danger to humans who live nearby or visit regularly. Mosquitoes, for example, are known to congregate around pools of standing water as this is where they lay their eggs. Any pools or other bodies of standing water in Costa Mesa likely pose an increased risk to anyone who regularly spends time near these locations of being bitten by a mosquito and potentially being infected by a mosquito-borne disease.

Zoonoses can be spread in any location where there is regular contact between animals and humans. The most common places for zoonoses to develop are livestock farms or other similar agricultural facilities. While Costa Mesa has limited uses that include livestock, the annual Orange County Fair is an event that could increase the potential spread of diseases since so many visitors come to the City and a high density of livestock is located within the fairgrounds during this event.

Few diseases have a formal measuring scale to evaluate their severity or extent. Influenza, more commonly known as the flu, is measured by the Pandemic Influenza Phases scale established by the World Health Organization (WHO). **Table 3-6** describes the various phases of Influenza infection over time.

[21] OrangeCountyFireAuthority.2018.Ready,SetGo,Newsflash! https://www.ocfa.org/Uploads/SafetyPrograms/OCFA%20Newsflash_Tree%20Pests_3-Page%20Version.pdf

Table 3-6: Pandemic Influenza Phases

Phase	Description
Phase 1	No animal influenza virus is known to have caused infection in people.
Phase 2	An animal influenza virus has caused infection in people. There is a potential pandemic threat.
Phase 3	An animal influenza virus has caused occasional infections or infections in small groups. There may be limited human-to-human transmission, but nothing large enough to sustain community-level outbreaks.
Phase 4	Human-to-human transmission can sustain community-level outbreaks. There is a significantly higher risk of a pandemic.
Phase 5	Human-to-human transmission in at least two countries in the same region. A pandemic is likely imminent.
Phase 6	Human-to-human transmission in at least two countries in the same region and in at least one other country outside of the region. A pandemic is underway.
Post-peak	Transmission levels are declining below peak levels, although second waves may occur, and transmission could return to previous levels or higher.
Post-pandemic	Transmission levels have returned to normal levels for seasonal influenza outbreaks.

Source: World Health Organization. 2019. WHO Pandemic Phase Descriptions and Main Actions by Phase. https://www.who.int/influenza/resources/documents/pandemic_phase_descriptions_and_actions.pdf

Tree Mortality

Any tree has the potential to be infested by pests that could result in the tree's death. This means all areas of Costa Mesa that are landscaped with trees could experience tree mortality. These areas include parks, landscaped parkways, street medians, schools, and private homes or businesses. Trees could also die because of other hazards. For example, an exceptionally severe drought that dramatically reduces the amount of water available for landscaping in Costa Mesa could deprive trees of the irrigation they require for their survival. Non-native or non-drought adapted specimens would most likely be the first trees affected; however, native species could also be affected, depending on the severity of the conditions. Multiple hazards could also combine to cause tree mortality. For instance, a prolonged drought coupled with a significant windstorm could damage or destroy trees if their root systems could no longer withstand the windspeeds exerted.

There is no universally accepted scale for measuring tree mortality, but the U.S. Forest Service identifies a general model that compares the aggregate number of tree deaths in relation to the aggregate number of trees surviving over a specified period. Additionally, a meta-analysis of tree mortality studies reveals that most trees in urban forests have an average lifespan lasting between 19 to 28 years and that the mortality rate among these trees is 3.5 to 5.1 percent per year. If tree mortality rates occur at a higher rate than this or if newly planted specimens are dying before 19 years, it could indicate that the City's trees are afflicted by disease, pests, or other issues. For trees affected by shot hole borer pests, **Table 3-7** identifies the damage rating metrics used by the University of California Integrated Pest Management guidelines.

Table 3-7 UC Integrated Pest Management Guidelines for Shot Hole Boring Pests

Damage	Invasive Pest Quantity
Minor	Under 25 Hits
Moderate	Under 75 Hits
High	76+ Hits

PAST EVENTS

EPIDEMIC/PANDEMIC/VECTOR-BORNE DISEASE

While local information on diseases and pests for Costa Mesa is not available, Orange County has been impacted by localized disease outbreaks. The following are notable instances of diseases and pests that have occurred within Orange County:

H1N1 (Swine flu): The 2009 H1N1 pandemic spread around the world and caused deaths worldwide. Within the context of Orange County, there were 226 cases requiring intensive care and 57 cases where the infection resulted in the patient's death. [22]

Measles: A 2015 localized outbreak of measles began at Disneyland in Anaheim. Patient zero was not discovered, but the most likely cause of the outbreak was a visit to the theme park by a person who was a carrier of measles. This likely leads to measles infections to other visitors who were not vaccinated against the measles virus, most of whom were minors. By the end of 2015, OCHCA reported 35 instances of measles infections within the County. By 2016, all cases had been successfully treated, and the outbreak was eradicated. [23] [24]

West Nile Virus: In 2014, all of California experienced a sudden outbreak of West Nile Virus infections, with most cases occurring within Orange County. By the end of the year, the California Department of Public Health reported more than 263 cases, though Orange County reports an even higher number of 280.[24, 25] One middle-aged man and two seniors died as a result of being infected. The number of cases decreased dramatically in 2015 to 97 cases, though this was still high compared to the rest of the 2013-2017 period. In 2017, the number of cases had decreased further to 38, and by 2018, the number of cases continued to fall to 12, the lowest number of West Nile Virus infections since 2012. [26]

Zika Virus: In 2016, there were 30 reported cases of Zika Virus infections and 12 cases in 2017, an infection rate of 0.9% and 0.4%, respectively. [27] All these cases resulted from residents traveling to foreign countries where the virus was active and then was diagnosed with the

[22] Orange County Health Care Agency. 2009. "Summary Report of the Orange County Health Care Agency." http://www1.ochca.com/ochealthinfo.com/docs/public/h1n1/2009-H1N1-summary.pdf
[23] Center for Disease Control and Prevention. February 2015. Measles Outbreak – California, December 2014-Feburary 2015. https://www.cdc.gov/mmwr/preview/mmwrhtml/mm6406a5.htm
[24] Orange County Health Care Agency. 2017. Reportable Diseases & Conditions by Year, 2013-2017. http://www.ochealthinfo.com/civicax/filebank/blobdload.aspx?BlobID=76272
[25] Westnile.ca.gov. 2014. 2014 WNV by County. http://westnile.ca.gov/case_counts.php?year=2014&option=print
[26] Health Care Agency. 2018. Reportable Diseases & Conditions by Year, 2013-2017. http://www.ochealthinfo.com/civicax/filebank/blobdload.aspx?BlobID=76272
[27] Health Care Agency. 2018. Reportable Diseases & Conditions by Year, 2013-2017. http://www.ochealthinfo.com/civicax/filebank/blobdload.aspx?BlobID=76272

infection upon their return. There has never been any locally acquired Zika infection that occurred within California itself. [28]

COVID-19: In December 2019, COVID -19 was identified in Wuhan, China. As of July, 2022, COVID-19 has spread throughout the globe, with over 574 million confirmed cases and approximately 6.4 million deaths worldwide. There are over 90 million confirmed cases within the United States and over 1 million deaths resulting from the virus.[28, 29] For Orange County, over 688,000 confirmed cases and over 7,000 deaths have been attributed to this virus. [30]

TREE MORTALITY

GSOB and ISHB were first reported active in Southern California in 2012 and quickly spread across several counties. The ISHB first emerged in coastal areas and then spread inland, with the first specimens at the University of California campus, Irvine, identified in 2015. By 2018, ISHB spread throughout all the County.

The ISHB leaves behind small tunnels bored through the trunk of the host tree. Image from Monica Dimson.

The ACP has also been an ongoing risk to citrus trees in Southern California, where more than 500 cases have been reported as of 2018. As of 2019, the California Department of Food and Agriculture maintains a quarantine zone throughout certain sections of Los Angeles and Orange counties for any citrus trees infected with Huanglongbing. The City falls within this quarantine zone. [31] There have also been reports of infection in Santa Ana in private residence citrus trees.

Although advisories are in place, there are no recorded instances of Huanglongbing in Costa Mesa. The current hotspot for this disease is in Anaheim, and Garden Grove, with a combined 446 trees, confirmed positive for the disease. [32]

RISK OF FUTURE EVENTS

EPIDEMIC/ PANDEMIC/ VECTOR-BORNE DISEASE

Costa Mesa is almost certain to continue experiencing influenza-type infections in the future. As this disease has no completely effective vaccine, it is impossible to eradicate the illness from recurring in the City. Other diseases, such as measles, can only be contained as far as the general population continues receiving inoculations against the disease. If residents, workers of, or visitors to Costa Mesa, were to stop receiving vaccinations against

[28] California Department of Public Health. 2019. *What Californians Need to Know: Don't Bring Zika Home.* https://www.cdph.ca.gov/Programs/CID/DCDC/pages/zika.aspx
[29] Johns Hopkins University & Medicine. 2020. "Coronavirus Resource Center". https://coronavirus.jhu.edu/map.html
[30] Orange County Health Care Agency. 2020. "COVID-19 Case Counts and Testing Figures". https://occovid19.ochealthinfo.com/coronavirus-in-oc
[31] California Dept. of Food and Agriculture. 2021. 2021 Huanglongbing Quarantine Map Overview. https://www.cdfa.ca.gov/plant/hlb/regulation.html
[32] FarmProgress. 2020. "Huanglongbing continues to spread across southern California. https://www.farmprogress.com/crop-disease/huanglongbing-continues-spread-across-southern-california

preventable diseases, it could cause a resurgence of such diseases within the City. Recent cultural trends in Southern California suggest that some members of the public are choosing not to vaccinate their children, which corroborates this scenario. [33] While it is impossible to predict whether this anti-vaccination trend will gain traction in Costa Mesa, there are no current indications that significant numbers of people living, working, or visiting the City are not taking the necessary precautions against the threat of preventable disease, including vaccinations.

Vector-borne diseases of concern, like the West Nile or Zika viruses, are not native to California and thus are not expected to gain significant traction in the future. As all cases of Zika Virus infection have occurred among those who have traveled to countries where the risk of infection is high, it can be expected that there will always be some degree of Zika Virus infection in Costa Mesa if its residents, workers, and visitors travel to these countries. West Nile Virus infection rates tend to remain low, but there are periods when infection rates suddenly rise, generally a result of larger mosquito populations. If mosquito control measures are in place and effectively enforced, the infection rates in Costa Mesa are expected to remain low. If large numbers of residents or businesses do not follow proper procedures, the number of West Nile Virus cases could likely rise.

TREE MORTALITY

Given that no known instances of Huanglongbing have been reported in Costa Mesa, it is unlikely that a large outbreak would occur in the City. Citrus trees do not make up a large portion of the City's tree inventory; therefore, any incidents would most likely occur on private property. In Southern California, all cases of the disease have affected only citrus trees on private residences, avoiding commercial groves. It is anticipated that this same pattern would occur in Costa Mesa, with citrus trees located on private residences being affected.

Regarding invasive pests, the City is more concerned about ISHB, GSOB, and Palm Weevil. While the likelihood of a large outbreak is small within the City, it is understood that the only effective mitigation is the removal of severely infected trees and managing and monitoring those that are still considered viable and managing the spread of the infestation.

CLIMATE CHANGE CONSIDERATIONS

EPIDEMIC/ PANDEMIC/ VECTOR-BORNE DISEASE

Climate change generally will lead to the overall warming of the Southern California climate, which may cause insects, pests, and other vectors that carry disease to remain active for an extended part of the year. This possibility increases the threat of exposure to any infectious diseases that these pests carry. Additionally, vectors currently not active in Costa Mesa and Southern California-at-large may migrate into the area due to warmer temperatures. Mosquitoes carrying West Nile Virus and Zika Virus would have an extended range. [34] For

[33] Karlamangla, S. July 2018. "Pushback against immunization laws leaves some California schools vulnerable to outbreaks." *Los Angeles Times*. https://www.latimes.com/local/lanow/la-me-ln-sears-vaccines-fight-20180713-story.html
[34] McKenna, M. April 2017. "Why the Menace of Mosquitoes Will Only Get Worse." The New York Times. https://www.nytimes.com/2017/04/20/magazine/why-the-menace-of-mosquitoes-will-only-get-worse.html

more resources and information on the impact of climate change on vector borne disease read: Climate Effects on Health | CDC .

Tree Mortality

Tree Mortality is expected to increase under climate change conditions. Climate change will increase the likelihood of more severe and frequent episodes of drought, which could reduce the amount of water used for irrigation for Costa Mesa's urban forest. When trees are under-irrigated, they become weaker and more vulnerable to infestation by pests.

In this scenario, trees in Costa Mesa would be more susceptible to infestation by ISHB, increasing the overall mortality rate of trees in the City. [35]

Drought

Description

A drought is a period in which water supplies become scarce. This can occur for various reasons; in California, droughts occur when precipitation is limited for an extended period. The majority of rain arrives in California via atmospheric rivers (channels of moist air located high in the atmosphere). When these atmospheric rivers bring less than usual moisture to California, it can reduce the overall amount of precipitation that falls on the state. Rain also comes to California because of the El Niño Southern Oscillation (ENSO) cycle, a regional meteorological phenomenon in the southern Pacific Ocean consisting of variations in ocean water and air temperature. These variations give rise to two distinct phases known as El Niño, the warm and wet phase, or La Niña, the dry and cold phase. [36] When the La Niña phase is active, it can cause California to receive lower than normal precipitation levels. Drought may also occur when infrastructure connecting communities to long-distance water sources begin to fail. This can occur due to deferred maintenance or may be the result of a natural disaster. For example, many Southern California cities would experience drought conditions should the water sources supplying the State Water Project or Colorado Aqueduct experience drought conditions even if the City is not.

Shasta Lake Reservoir seen during the 1976-1977 drought. Image from Steve Fontanini

Location and Extent

Costa Mesa's location makes the City prone to drought conditions. While many droughts can reduce water supplies in southern California, impacts to the City are considered indirect. The City's water supplies are provided by the Mesa Water District (Mesa). "The expansion of the Mesa Water Reliability Facility has allowed Mesa to provide one hundred percent of Costa Mesa's overall water supply from local groundwater supplies, pumped from Orange

[35] Southern California Oak Woodland Habitats. 2017. Climate change vulnerability assessment for the Southern California ClimateAdaptationProject. http://climate.calcommons.org/sites/default/files/EcoAdapt_SoCal%20VA%20Synthesis_Oak%20Woodlands_FINAL_10Mar2017.pdf

[36] "What is ENSO?" https://www.climate.gov/enso

County's natural groundwater basin and from a deeper, amber-tinted aquifer located in the Mesa Water's service area." [37] Mesa has also instituted water conservation practices and rules for its 110,000+ customers in Costa Mesa (a list of these water conservation requirements can be found HERE). [38] Given the unique characteristics of Mesa and its plentiful groundwater supply, drought conservation requirements, and little if any reliance on outside water sources, Costa Mesa is proactive in its drought prevention/maintenance approach. However, given California's history of drought, the threat of drought is an ever-present potential hazard for Costa Mesa.

The U.S. Drought Monitor Classification Scheme is a common scale used to measure the impact of droughts in different communities across the United States. **Table 3-8** describes the category, description, and possible impacts associated with a drought event.

Table 3-8: U.S. Drought Monitor Classification Scheme

Category	Description	Possible Impacts
D0 *	Abnormally dry	Slower growth of crops and pastures.
D1	Moderate drought	Some damage to crops and pastures. Water bodies and wells are low. Some water shortages may occur or may be imminent. Voluntary water use restrictions can be requested.
D2	Severe drought	Likely crop and pasture losses. Water shortages are common, and water restrictions can be imposed.
D3	Extreme drought	Major crop and pasture losses. Widespread water shortages and restrictions.
D4	Exceptional drought	Exceptional and widespread crop and pasture losses. Emergency water shortages develop.

* D0 areas are those under "drought watch" but not technically in a drought. They are potentially heading into drought conditions or recovering from drought but not yet back to normal.

Source: US Drought Monitor. 2019. *Drought Classification.* https://droughtmonitor.unl.edu/AboutUSDM/AbouttheData/DroughtClassification.aspx

Past Events

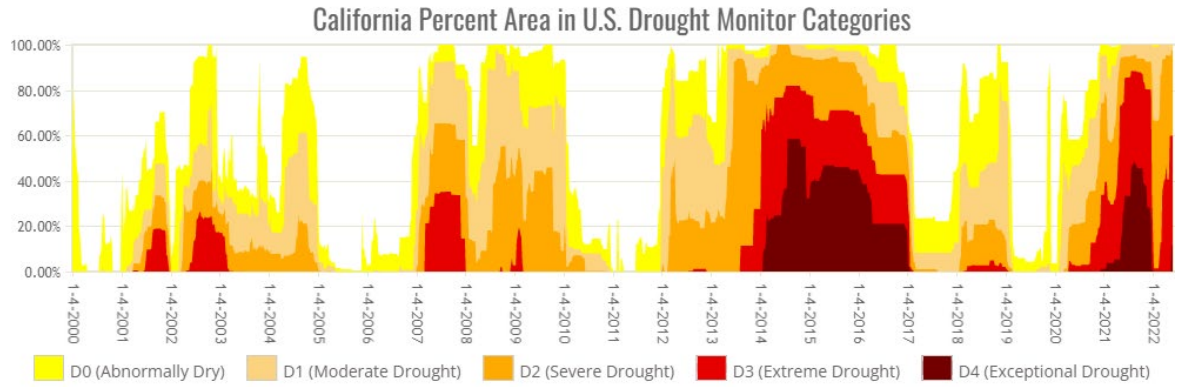
Costa Mesa, like the rest of California, has experienced many drought events throughout its history. Each event has been different, varying in length, severity, and frequency. One of the earliest recorded major droughts in state history is known as the "Great Drought," which occurred in 1863 and 1864. This drought killed 46 percent of the cattle in the state and ultimately led to the decline of cattle ranching in the state. [39] The "Dustbowl Droughts," lasting from 1928 to 1935, caused great impacts on the state's agriculture. The effects of this drought were so severe that it sparked the movement to create some of California's modern water irrigation drought infrastructure, such as the California Aqueduct. Another drought occurred in 1976 and 1977, which lead to agricultural losses estimated at nearly $1 billion. This drought led to water-saving practices that are still in effect today across the state. Further

[37] "Welcome to Mesa Water District" https://www.mesawater.org/
[38] "Water Conservation Ordinance and Watering Rules" https://www.mesawater.org/save-water/conservation-requirements
[39] Crawford, R. June 1991. "The Great Drought: Fickle Weather in 1860s Led to Breakdown of Cattle Industry." *Los Angeles Times*. https://www.latimes.com/archives/la-xpm-1991-06-13-nc-780-story.html

water conservation practices were enacted during a drought lasting from 1987 to 1993, which caused agricultural damages at an estimated $250 million each year. [40]

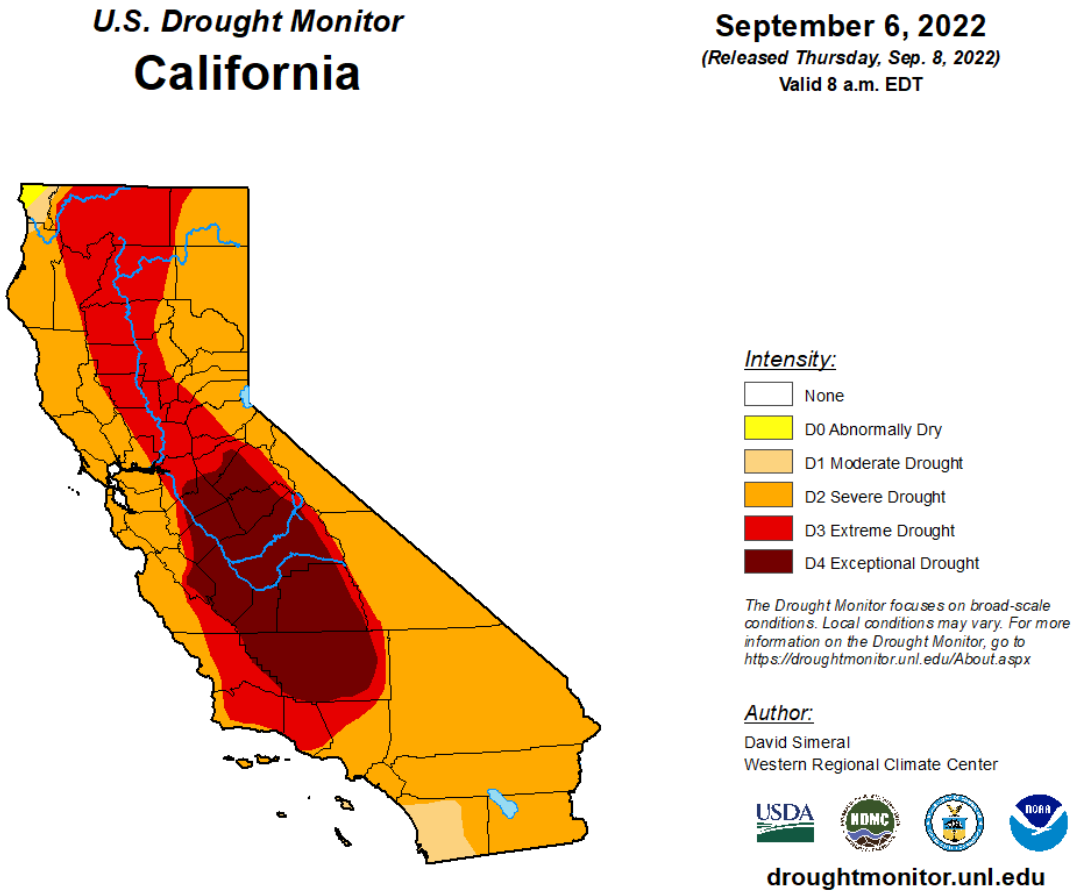
Until 2021, the most recent drought to hit California occurred in 2012 and lasted until 2017. All areas of the state were impacted, and by 2014 it was reported as the most severe drought in 1,200 years. **Figure 3-2** illustrates the severity of the drought conditions experienced over the past 20 years. By the summer of 2014, almost all of California was experiencing D2 (severe drought) conditions. Costa Mesa, all of Orange County, and more than 75 percent of California was reported as experiencing D4 (Exceptional Drought) conditions. By 2015, emergency water-saving mandates were enacted, requiring all jurisdictions to reduce water use by 25 percent. In late 2016 and early 2017, successive heavy rains helped end the drought conditions in the state. The following winter, in late 2017 and early 2018, rains did not return in the same quantity, and slight drought conditions returned across California. This moderate drought was again abated in the winter season of late 2018 and early 2019 when heavy rains ended any existing drought conditions. As of September 6 2022, the entire state is experiencing some form of drought, with approximately 40 percent of California experiencing D3 (Extreme Drought) and D4 (Exceptional Drought) conditions. Costa Mesa and all of Orange County are currently experiencing Severe Drought (D2) conditions, as depicted in **Figure 3-3**.

Figure 3-2: Drought History (2000-2022)



[40] Grad, S. and Harrison, S. April 2015. "3 crippling droughts that changed California." *Los Angeles Times*. https://www.latimes.com/local/california/la-me-california-retrospective-20150413-story.html

Figure 3-3: Statewide Drought Conditions as of September 6, 2022



Risk of Future Events

Drought will continue to be a foreseeable event in the future of California, including Costa Mesa. Since most droughts are almost entirely contingent on global weather phenomena, which vary from year to year, it is impossible to predict the frequency or severity of future drought events in Costa Mesa. Droughts that result from infrastructure failure are equally impossible to predict since the circumstances that lead to infrastructure failure are unique to each situation.

Climate Change Considerations

Climate change is anticipated to abate drought in certain situations; however, projections suggest that future drought events could become more frequent and intense in the future. In some cases, climate change-intensified weather patterns, like ENSO, may bring more rain to California and Costa Mesa, which would abate drought conditions. In other years, climate change may also prolong the La Niña phase of ENSO, which could lead to longer periods with no precipitation in California.

Climate change is also expected to increase the average temperature and cause more frequent and prolonged heat waves in the region. During these events, water supplies may be affected within the City. Hotter temperatures may also lead to increased surface water evaporation, which could lead to greater water consumption. If a drought occurs coupled

with heatwave events, additional strain could be placed on City infrastructure, including water supply.

From a regional perspective, warmer overall temperatures in California are anticipated to reduce statewide water supplies. Much of California's water comes from melted snow in the High Sierra. As the average temperature grows warmer with climate change, the precipitation that falls as snow is expected to shift towards rain. As less snow falls, the amount of melted water from the snowpack in the Sierra Nevada will decrease, reducing the water that will flow into the reservoirs and aqueducts that supply Southern California. While the City does not currently rely on water supplies from MWD, reductions in water availability could strain supplies for neighboring communities that do, impacting the quality and availability of water supplies within the Orange County Groundwater Basin, which could affect future water supplies.

Energy/Power Shortage

DESCRIPTION

An energy/power shortage is an event that occurs within an electric power system when the total real or reactive power of the power plants in the system is insufficient to supply all consumers with electric power of the required quality. These events are considered a lifeline system failure. These shortages or outages can be the primary hazard, or these events can be the direct result of another hazard, such as an earthquake, extreme weather event, or flood. These failures can also be in conjunction with other lifeline system failures such as natural gas, communication, drinking water, wastewater disposal, or transportation. Power shortages can exacerbate and or create detrimental effects on these various operational and lifeline systems. For this hazard profile discussion, energy/power shortage incidents are the primary hazard of concern; however, power failure associated with other hazard events is a concern for many of the other hazards profiled in this plan.

Generally, these power shortage events are the direct result of events beyond the control of the City. These events often occur during a time of extreme demand/need for power, such as an extreme heatwave that creates an enormous strain on the power grid as residents try to stay cool. Most of these energy outages are short-term in duration, but they can last for weeks if the situation is dire. There are three (3) types of power/energy shortages or outages; each of them is categorized based on duration and the actual effect of the shortage/outage event:

Permanent is a massive loss of power typically caused by fault on a powerline; however, power is restored automatically once the fault has been cleared.

Brownout is a sag (or drop) in voltage in an electrical power supply. They can cause poor performance of equipment or various operational systems.

Blackout is a total loss of power in an area and is the worst form of a power outage that can happen. Blackouts can last from a few minutes to multiple weeks, depending on the nature of the causing event and the configuration of the actual electric network.

Another cause for potential grid damage, energy/power outages are solar storms. According to the Department of Homeland Security, "Space Weather" is a naturally occurring phenomenon in which the sun releases solar flares, energetic particles and/or coronal mass ejections (CME). These events are known as solar storms. In particular, if a CME is directed towards Earth, it can interact with the Earth's magnetic field and cause geomagnetic storms. Under these circumstances, extra currents, known as geo-magnetically induced currents (GIC), are created in the ground, impacting the electric grid. These GICs can cause widespread outages in two ways: First, they can cause permanent damage to critical grid components, such as high-voltage power transformers. This is of particular concern as high voltage transformers are not easily replaceable. Second, the GICs can cause voltage instability in the grid and cause the system voltage to collapse, resulting in a widespread but temporary outage.

Permanent damage to the Salem New Jersey Nuclear Plant GSU Transformer caused by the severe geomagnetic storm of March 13, 1989 (Credit: PSE&G).

Protecting the grid with localized GIC forecasting: The Space Weather Prediction Center currently provides regional-level space weather warnings and alerts at the National Oceanic and Atmospheric Administration. To enable more localized and precise GIC forecast levels, a forecasting tool is under development to provide grid owners and operators with actionable information. By providing accurate and tailored forecasts specific to a utility's location and infrastructure, utility operators will be better informed to make operational decisions to mitigate the impacts of solar storms. This can range from canceling maintenance work to temporarily shutting down vulnerable grid components and preventing permanent damage. Utilities will also be informed when it is "all clear" and safe to resume normal operations. [41]

Another potential cause of an energy/power shortage is the detonation of an EMP (Electro-magnetic pulse) device. An EMP is designed to wreak as much havoc as a traditional bomb blast on society, however with less loss of life, since the blast results in power losses that can affect critical functions and facilities. According to researchers at the Foundation for Resilient Societies, the worst-case scenario EMP event would be a high-altitude nuclear detonation. This would create a series of blast waves that would ripple out and impact any electrical equipment on the ground, in the air, even in orbit. Much the same as a solar storm, the resulting EMP blast would send destructive currents raging through the electrical grid, crippling transformers, frying circuit breakers, and substations. [42]

[41] "DHS Science and Technology Directorate: Solar Storm Mitigation" https://www.dhs.gov/sites/default/files/publications/Solar%20Storm%20Mitigation-508_0.pdf

[42] "How We'll Safeguard Earth From a Solar Storm Catastrophe" https://www.nbcnews.com/mach/space/how-we-ll-safeguard-earth-solar-storm-catastrophe-n760021

A Public Safety Power Shutoff (PSPS) is a practice that Southern California Edison (SCE, provider of electricity for Costa Mesa) and other utility companies may use to preemptively shut off power in high fire hazard areas to reduce fire risk during extreme and potentially dangerous weather conditions (hot, dry, and windy). According to the SCE [43], PSPS events are the option of last resort in a line of operational procedures employed to mitigate fire risk when conditions warrant. In considering whether to shut off power to lines in affected areas, SCE considers the following factors, which may include, but are not limited to:

- The National Weather Service has issued Red Flag Warnings* for counties that contain SCE circuits in High Fire Risk Areas.
- Ongoing assessments from the SCE in-house meteorologists regarding the local conditions related to wind speed, humidity, and temperature informed by strategically deployed weather stations.
- Real-time situational awareness information from highly trained personnel positioned locally in High Fire Risk Areas identified as at risk for extreme weather conditions.
- Input from SCE fire management experts regarding any ongoing firefighting efforts.
- Specific concerns from local and state fire authorities regarding the potential consequences of wildfires in select locations.
- Awareness of mandatory or voluntary evacuation orders in place.
- Expected impact of de-energizing circuits on essential services such as public safety agencies, water pumps, traffic controls, etc.
- Other operational considerations to minimize potential wildfire ignitions.

In advance of PSPS events, SCE will meet with local governments to inform them about the PSPS protocol, including the location of circuits in their jurisdictions that may be shut off during an event. Notification is provided to residents 48 hours before the potential PSPS event, with follow-up notification occurring 24 hours before the power is shut off. Communication notifications will be made throughout the outage when power has been shut off and then finally again when it is restored. However, as extreme weather can be unpredictable, sometimes advance notification and coordination do not conform to this protocol. Notification may occur by phone call, text, the SCE.com website, email, and/or social media accounts. [44]

[43] Wildfire and PSPS Fact Sheets. https://www.sce.com/wildfire/psps
[44] "SCE's 2020 Planning for Public Safety Power Shutoffs (PSPS)".https://www.sce.com/sites/default/files/2020-06/SCE%E2%80%99s%202020%20PSPS%20Preparations.pdf

Location and Extent

The entire city of Costa Mesa is vulnerable to energy/power shortages. Most power outage events, as stated earlier, are not necessarily human-caused in nature. An overwhelming demand for power due to accidents, equipment malfunction/failure, weather conditions, or other natural hazards the City is susceptible to can be the catalyst that creates a loss of energy/power. According to the California Energy Commission, electricity is transmitted and distributed to the City through a series of 220-287 kV transmission lines and 110-161 kV distribution lines (**Figure 3-4**).

Figure 3-4: Transmission lines of power for Costa Mesa, originating in the Huntington Beach (AES). Blue Line: 220-287KV, Gold Lines: 110-161KV. Source

Power loss/shortage can occur in only small areas of the city, such as a single location or neighborhood, or the entire grid could fail, causing the entire city to lose power suddenly. Power/energy loss is indiscriminate in who, where, or what it affects; however, locations with older infrastructure or infrastructure located above ground may be more susceptible to weather-related hazards. The duration of these power/energy shortages is completely dependent on the severity of the actual cause for the power loss and what is required to repair the issue or issues.

The electricity industry operated for years through utilities that were "vertically integrated," meaning that they owned generation, transmission, and distribution, which typically had monopolies in their designated service areas. In 1996 the Federal Regulatory Commission issued orders 888 and 889 requiring utilities that own transmission infrastructure to provide nondiscriminatory access to all transmission customers. One way for a utility company to comply with this new requirement was to allow an independent system operator (ISO) to operate their transmission system for them. ISOs do not own the electricity transmitted over the grid, and they allow market participants to transmit electricity at the best available price. In 1998, because of Order 888 and CA state legislation AB 1890, the California ISO was incorporated as a nonprofit public benefit corporation to fulfill this mission. ISOs are often compared to air traffic controllers, as they independently manage the traffic on a power grid they do not own, much like air traffic controllers manage airplane traffic in the airways and on airport runways.

Figure 3-5: All of the ISOs in North America

The California ISO is one of nine independent system operators in North America (refer to **Figure 3-5)**. Collectively, they deliver over 2.2 million gigawatt-hours of electricity each year

and oversee more than 26,000 miles of high-voltage power lines. These independent grid operators serve two-thirds of the United States. [45]

Figure 3-6 identifies the PSPS circuits identified within Orange County. Based on this information, the City of Costa Mesa does not have any circuits that could be de-energized under this type of even. However, these circuits are strategically placed throughout Orange County to help mitigate the potential threat of wildfires in open space and forested areas. Even though no PSPS circuits are located within Costa Mesa, the City needs to anticipate and prepare for potential effects, including power degradation, an influx of people from neighboring communities/cities affected by power loss and/or evacuation and increased calls for service.

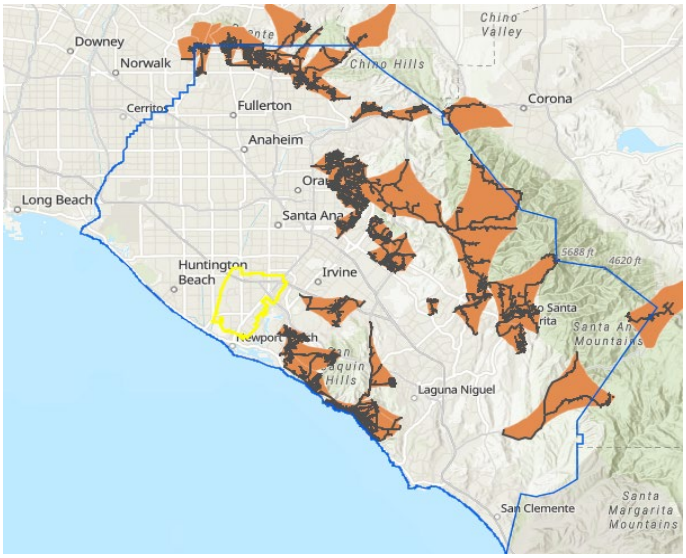


Figure 3-6: Yellow: City of Costa Mesa City Limits, Blue: Orange County Limits, Orange/Black: Area where PSPS circuits are in use.

Past Events

Small-scale power/energy loss frequently occurs throughout southern California due to maintenance and infrastructure failure. Energy shortages and blackouts tend to occur at a larger regional scale, affecting Costa Mesa residents and businesses depending on the failure location. California has experienced some major statewide and regional energy shortages due to various reasons, including:

- December 1982 (near Tracy, California)- Loss of a transmission tower, two (2) 500-kV lines, and a pair of 230-kV lines. Five (5) million people were impacted. (Equipment Failure) [46]
- October 1989 (Loma Prieta Earthquake)- Loss of substations; 1.4 million people impacted (Seismic Event) [47]
- August 1996 (region)- Cascading impacts from loss of power from 1996 North American Blackouts [48]

[45] California ISO website: "ISO History" http://www.caiso.com/about/Pages/OurBusiness/ISO-history.aspx
[46] "The 3 Worst Power Outages in the History of the U.S".https://www.a-1-electric.com/the-3-worst-power-outages-in-the-history-of-the-u-s/#:~:text=On%20December%2022nd%2C%201982,going%20without%20electricity%20for%20hours.
[47] Eguchi, R. T.; Seligson, H. A. (1994), "Lifeline perspectives" Practical lessons from the Loma Prieta earthquake, National Academies Press,
[48] Venkatasubramanian, Mani V. (2003-08-20) "Analyzing Blackout Events: Experience from the Major Western Blackouts in 1996"

- December 1998 (San Francisco)- Loss of substations, impacting 350,000 buildings and 940,000 people. (Infrastructure failure, human error) [49]

- 2000 (statewide)- Power outages due to electricity crisis. [50]

- 2011 (Southwest Blackout)- Cascading impacts from the loss of power from the 23 distinct events that occurred on 5 separate power grids; impacted 1.4 million people. Largest power failure in California history. [51]

- July 2017 (Los Angeles)- Explosion at power plant; causes widespread outages in San Fernando Valley [52]

Recently the City has experienced small-scale power outages that have affected City operations. While these events may have been rare in the past few decades due to the age of infrastructure and other factors, the City has begun to see more frequent events that have affected City operations and functions. In 2021, three small-scale events affected City facilities.

Risk of Future Events

Today, several mechanisms are in place to monitor, manage and adapt to changing conditions and demands to help reduce and/or eliminate energy shortages. California and regional departments (California Independent System Operator- Cal ISO, Federal Energy Regulatory Commission- FERC, Western Electricity Coordinating Council- WECC, North American Electric Reliability Corporation- NERC, California Public Utilities Commission- CPUC, California Energy Commission- CEC) are focused on energy production, use, and management. Each agency plays a role in planning, managing, and coordinating the allocation of energy within the state of California.

Costa Mesa can experience a power/energy shortage at any time and place throughout the year. The probability of it occurring again will always be present, as the City is dependent on electricity to function.

Climate Change Considerations

Projections of changing climatic conditions through the end of the century suggest that the City should address future power/energy shortage concerns. While energy demands are not anticipated to increase significantly throughout the City (due to compliance with updated codes and requirements). However, electricity production occurs outside of the City, reducing opportunities for Costa Mesa to be energy independent. To better address energy/power failure current and future climate change mitigation and adaptation efforts in Costa Mesa should prioritize energy efficiency measures, generate energy locally from

[49] "Technician's error caused 1998outage" https://www.sfgate.com/bayarea/article/Technician-s-error-caused-1998-outage-1-death-2595806.php
[50] Sweeney, James L. (Summer 2002" The California Electricity Crisis: Lessons for the Future"
[51] Medina, Jennifer (September 10, 2011) "Human Error Investigated in California Blackout's Spread to Six Million". The New York Times.
[52] DWP Plant Explosion Causes Massive Power Outage In San Fernando Valley https://laist.com/2017/07/09/dwp_plant_explosion_causes_massive.php

clean and renewable sources and build reliability & redundancy using the latest technologies in energy storage and backup systems.

Flooding (Flood and Dam/Levee Failure)

For this plan, flooding hazards of concern within the City include Flooding and Dam/ Levee Failure.

DESCRIPTION

FLOODING

A flood occurs when land that does not normally have bodies of water becomes suddenly inundated. Flooding can occur after periods of heavy rainfall, whether it occurs as a single extreme episode or as a series of storms. Drainages and stream courses may flood their banks and shores if their capacity is exceeded by rainwater. When heavy rainfall hits an area where the ground is already saturated, the risk of flooding is high. In developed areas, the presence of pavement and other impervious surfaces means that the ground is less able to absorb water. As a result, rainwater must be carried away in storm channels or waterways.

Floods pose several threats to communities and public safety. Flooding can damage properties, destroy homes, and carry away vehicles or other large debris. Topsoil and vegetation can be swept away by floodwaters, leading to erosion. Floodwaters may impede the movement of people fleeing a flood or first responders attempting to reach people in need of help.

DAM FAILURE/LEVEE FAILURE

Dam and levee failure can result from several causes such as earthquakes, rapidly rising floodwaters, and structural design flaws. These hazards can occur instantaneously or very gradually, depending on the source of the failure. Inundation associated with these events has the potential to cause loss of life, damage property, and other ensuing hazards, as well as the displacement of persons residing in the inundation path.

According to the California Division of Safety of Dams (DSOD), a dam falls under their jurisdiction if its height is greater than six feet and impounds more than 50 acre-feet of water, or its height is greater than 25 feet and impounds 15 acre-feet of water. Based on these criteria, 1,537 dams fall under DSOD jurisdiction, 40 of which are located within Orange County.

Levees are human-made structures, usually an earthen embankment designed and constructed with sound engineering practices to contain, control, or divert the water flow to provide protection from temporary flooding. A levee is built parallel to a body of water, typically a river, to protect the lives and properties behind it. Currently, there are thousands of miles of levees across the United States. No levee provides full protection from flooding. [53]

[53] https://www.fema.gov/flood-maps/living-levees

Location and Extent

Flood

Flood events are measured by their likelihood of occurrence. For instance, a 100-year flood is a flood that has a 1 in 100 (1.0 percent) chance of occurring in any given year. A 500-year flood is a flood that has a 1 in 500 (0.2 percent) chance of occurring in any given year. The 100-year flood has been designated as the benchmark for major flood events, and thus 100-year floods are referred to as "base floods."

Floodplains are areas that experience frequent flooding. **Figure 3-7** identifies the flood hazard zones within the City. While areas outside of these designated flood hazard areas can experience flooding, the most likely locations for future flooding are low-lying areas near bodies of water. FEMA is the governmental body responsible for designating which areas of the United States can be classified as floodplains and uses these three common designations:

- Special Flood Hazard Area: The area within a 100-year floodplain.
- Moderate Flood Hazard Area: The area outside of the 100-year floodplain but within the 500-year floodplain.
- Minimum Flood Hazard Area: The area outside of the 500-year floodplain.

Within these three designations, FEMA has multiple floodplain categories for each unique environment. **Table 3-9** shows these detailed floodplain categories.

"Costa Mesa sits alongside the Santa Ana River. This regional water feature presents a potential flooding hazard, as it drains Southern California's largest watershed, originating in the San Bernardino Mountains and draining over 3,000 square miles. Significant flood control improvements have been installed along the river course, with the goal of protecting properties along its route from flooding hazards." [54] Areas within the 100-year flood zone are located along the City's western portion adjacent to the Santa Ana River, and the Greenville Banning Channel (within portions of the Talbert Nature Preserve). Areas within the 500-year flood zone such as the Santa Ana Delhi Channel, are located along the northeastern part of the City adjacent to Santa Ana and Irvine.

The National Flood Insurance Program provides floodplain mapping studies. Costa Mesa participates in the program by adopting FEMA-approved floodplain studies, maps, and regulations. These studies may be funded through federal grants; state, city, and regional agencies; and private parties. The program is designed for flood insurance and floodplain management applications.

[54] Costa Mesa General Plan: Safety Element S-13

Figure 3-7: Flood Hazard Zones

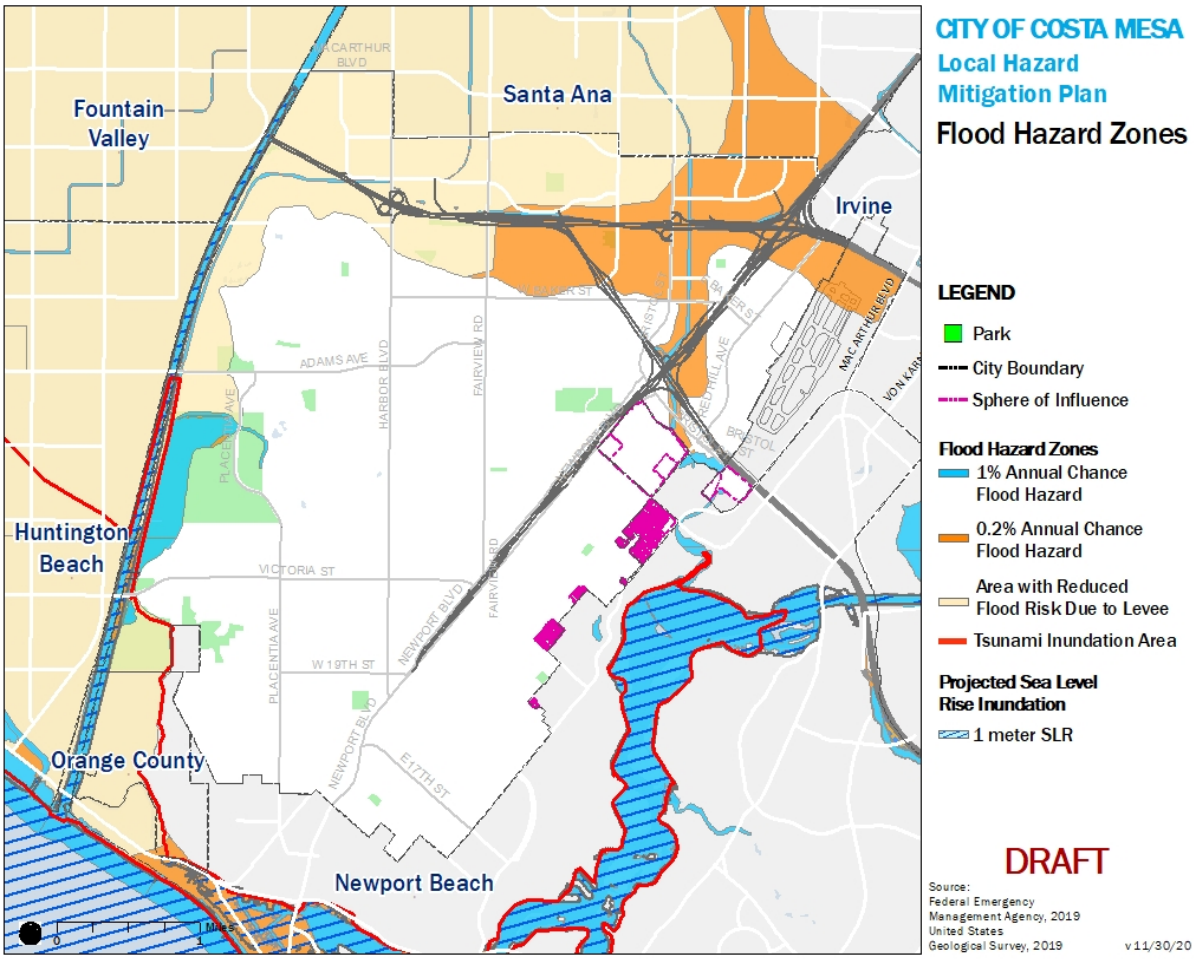


Table 3-9: FEMA Flood Plain Categories

Category	Description
A	Within a 100-year flood plain, but the water height of the 100-year flood is not known
A1-30	Within a 100-year flood plain and the water height of the 100-year flood is known
AO	Within a 100-year flood plain, and the water height of the 100-year flood is between one and three feet but not specifically known
A99	Within a 100-year flood plain, protected by flood protection infrastructures such as dams or levees
AH	Within a 100-year flood plain, and the water height of the 100-year flood is between one and three feet and is specifically known
AR	Within a 100-year flood plain, protected by flood protection infrastructure that is not currently effective but is being rebuilt to provide protection
V	Within a 100-year flood plain for coastal floods, but the water height of the flood is not known
V1-30 or VE	Within a 100-year flood plain for coastal floods and the water height of the flood is known
VO	Within a 100-year flood plain for shallow coastal floods with a height between one and three feet.
B	Within a 500-year flood plain or within a 100-year flood plain with a water height of less than one foot (found on older maps)
C	Outside of the 500-year flood plain (found on older maps)
X	Outside of the 500-year flood plain (found on newer maps)
X500	Within a 500-year flood plain, or within a 100-year flood plain with a water height less than one foot (found on newer maps)
D	Within an area with a potential and undetermined flood hazard
M	Within an area at risk of mudslides from a 100-year flood event
N	Within an area at risk of mudslides from a 500-year flood event
P	Within an area at risk of mudslides from a potential and undetermined flood event
E	Within an area at risk of erosion from a 100-year flood event

Dam Failure/Levee Failure

The Santiago Creek Dam, Villa Park Dam, and Prado Dam provide flood protection for numerous cities within Orange County, including Costa Mesa. **Figure 3-8** identifies the dam inundation areas within the City.

Prado Dam is located at the border of Orange and Riverside Counties, approximately 30 miles northeast of Costa Mesa. Dam construction was completed in 1941, and the U.S. Army Corps of Engineers (ACOE) continues to make phased improvements to the structure. Recent improvements include raising the dam by 28 feet and adding a new intake tower and outlet, which has added 140,000 acre-feet of capacity to the basin and increased the dam's level of protection to 190 years. Dams owned and maintained by the ACOE use the Dam Safety Action Classification (DSAC) rating system, displayed in **Table 3-10**. Prado Dam is classified as a Moderate Urgency of Action dam by the ACOE.

Santiago Creek Dam, located near Irvine, is approximately 15 miles north of the City. Constructed in 1931 by the Irvine Ranch Water District and Serrano Irrigation District, this dam is used for flood control, irrigation, and municipal water use. Dam inundation of downstream locations includes portions of Costa Mesa and several other Orange County Communities, as depicted in **Figure 3-8**. **Table 3-11** identifies the California Division of Safety of Dams Downstream Hazard Potential Classification, identifying Santiago Creek Dam as "extremely high" downstream hazard potential.

Villa Park Dam is located approximately 10 miles northeast of Costa Mesa. This dam was completed in 1963 by Orange County with the primary purpose of controlling flooding. Villa Park Dam has an "extremely high" downstream hazard potential classification, similar to Santiago Creek Dam.

Figure 3-8: Dam Inundation

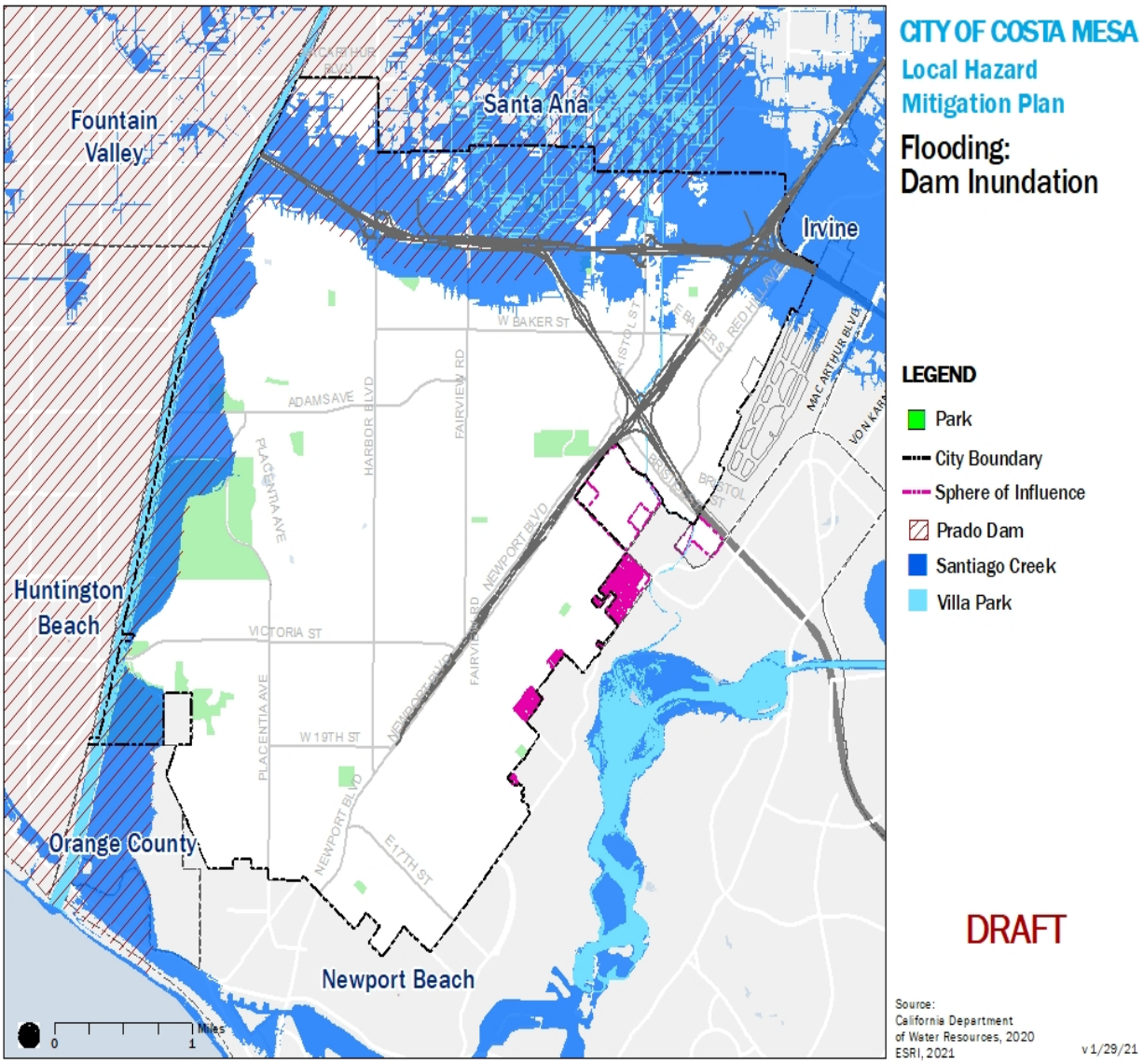


Table 3-10: Dam Safety Action Classification (DSAC) Ratings

URGENCY OF ACTION (DSAC)	ACTIONS FOR DAMS IN THIS CLASS***	CHARACTERISTICS OF THIS CLASS
VERY HIGH (1)	Take immediate action to avoid failure. Communicate findings to sponsor, local, state, Federal, Tribal officials, and the public. Implement interim risk reduction measures, including operational restrictions. Ensure the emergency action plan is current and functionally tested for initiating event. Conduct heightened monitoring and evaluation. Expedite investigations to support remediation using all resources and funding necessary. Initiate intensive management and situation reports.	CRITICALLY NEAR FAILURE: Progression toward failure is confirmed to be taking place under normal operations. Dam is almost certain to fail under normal operations to within a few years without intervention. OR EXTREMELY HIGH INCREMENTAL RISK**: Combination of life or economic consequences with likelihood of failure is very high. USACE considers this level of life-risk to be unacceptable except in extraordinary circumstances.
HIGH (2)	Communicate findings to sponsor, local, state, Federal, Tribal officials, and the public. Implement interim risk reduction measures, including operational restrictions as warranted. Ensure the emergency action plan is current and functionally tested for initiating event. Conduct heightened monitoring and evaluation. Expedite confirmation of classification. Give very high priority for investigations to support the need for remediation.	FAILURE INITIATION FORESEEN: For confirmed and unconfirmed dam safety issues, failure could begin during normal operations or be initiated as the consequence of an event. The likelihood of failure from one of these occurrences, prior to remediation, is too high to assure public-safety. OR VERY HIGH INCREMENTAL RISK**: The combination of life or economic consequences with likelihood of failure is high. USACE considers this level of life-risk to be unacceptable except in extraordinary circumstances.
MODERATE (3)	Communicate findings to sponsor, local, state, Federal, Tribal officials, and the public. Implement interim risk reduction measures, including operational restrictions as warranted. Ensure the emergency action plan is current and functionally tested for initiating event. Conduct heightened monitoring and evaluation. Prioritize investigations to support the need for remediation informed by consequences and other factors.	MODERATE TO HIGH INCREMENTAL RISK**: For confirmed and unconfirmed dam safety issues, the combination of life, economic, or environmental consequences with likelihood of failure is moderate. USACE considers this level of life-risk to be unacceptable except in unusual circumstances.
LOW (4)	Communicate findings to sponsor, local, state, Federal, Tribal officials, and the public. Conduct elevated monitoring and evaluation. Give normal priority to investigations to validate classification, but do not plan for risk reduction measures at this time.	LOW INCREMENTAL RISK**: For confirmed and unconfirmed dam safety issues, the combination of life, economic, or environmental consequences with likelihood of failure is low to very low and the dam may not meet all essential USACE guidelines. USACE considers this level of life-risk to be in the range of tolerability but the dam does not meet all essential USACE guidelines.
NORMAL (5)	Continue routine dam safety activities and normal operations, maintenance, monitoring, and evaluation.	VERY LOW INCREMENTAL RISK**: The combination of life, economic, or environmental consequences with likelihood of failure is low to very low and the dam meets all essential USACE guidelines. USACE considers this level of life-safety risk to be tolerable.

*At any time for specific events a dam, from any action class, can become an emergency requiring activation of the emergency plan.
** INCREMENTAL RISK is used to inform the decision on the DSAC assignment; NON-BREACH RISK is not reflected in this table.
***DSAC 1 and 2 dams with no life loss will be referred to the appropriate business line program and are given lower priority in the dam safety program.

Source: https://www.usace.army.mil/Missions/Civil-Works/Dam-Safety-Program/Program-Activities/

Table 3-11: Criteria for DSOD's Downstream Hazard Potential Classification

Downstream Hazard Potential Classification	Potential Downstream Impacts to Life and Property
Low	No probable loss of human life and low economic and environmental losses. Losses are expected to be principally limited to the owner's property.
Significant	No probable loss of human life but can cause economic loss, environmental damage, impacts to critical facilities, or other significant impacts.
High	Expected to cause loss of at least one human life.
Extremely High	Expected to cause loss of at least one human life and one of the following: result in an inundation area with a population of 1,000 or more; or result in the inundation of facilities or infrastructure, the inundation of which poses a significant threat to public safety as determined by the department on a case-by-case basis.

Division of Safety of Dams. 2019. "Dams Within Jurisdiction of the State of California, September 2019". https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/All-Programs/Division-of-Safety-of-Dams/Files/Publications/2019-Dams-Within-Jurisdiction-of-the-State-of-California-Alphabetically-by-County_a_y20.pdf

Past Events

Flood

Southern California is a semiarid region with inconsistent storm seasons and naturally shallow river channels. It was historically prone to floods that affected the entire region after long periods of rain. The largest flood in the Southern California region occurred in 1938, when several inches of rain fell over three days, causing rivers across the region to overflow. The Santa Ana River overflowed, flooding areas in Fullerton and Anaheim. The Fullerton and Brea dams were constructed in the aftermath of this flood, with money from the Works Progress Administration. Widespread flood-caused destruction across Southern California led numerous local governments to pursue a campaign of concretizing riverbeds, including rivers and creeks in Orange County, to prevent erosion. The following is a list of recorded flood events in Orange County: [55] [56] [57]

- Heavy rains in January 1916 caused 22 deaths, widespread flooding, and the destruction of several boats moored at Newport Beach.
- The most extensive flooding in Southern California history occurred in late January 1916, when 8 to 58 inches of rainfall were recorded in various measuring stations across the region. Numerous dams were breached, resulting in property damage and loss of life. Four people died in Orange County.
- In 1922, heavy rains flooded various rights-of-way across the region, and the Santa Ana River exceeded its normal surface elevation by three feet.
- Heavy rains on New Year's Eve and Day of 1934 impacted cities across Southern California. In total, 45 people lost their lives, and some canyons became inundated with floodwaters 10 feet high.
- A 1937 rainstorm in February produced 4.25 inches of rain in nearby Long Beach. A few people were killed in the ensuing flooding, and some dams failed across the region.
- In 1938, the deadliest flooding event in Southern California history was caused by a tropical storm. Up to 30 inches of rain fell in the mountain areas, including 22 inches at the Santa Ana River watershed point of origin. In Orange County, 45 died, including 43 in Atwood (now part of present-day Placentia).
- In 1939, a tropical storm brought heavy rain to all Southern California, resulting in 45 deaths on land and 48 more deaths at sea.

[55] NOAA. 2018. "Storm Events Database." https://www.ncdc.noaa.gov/stormevents/.
[56] Serna, J., H. Branson-Potts, and R. Lin II. 2015. "Water Rescues, Floods and power Outages as Rain Drenches Parts of Southern California." Los Angeles Times. September 15.
[57] NOAA. 2010. A History of Significant Weather Events in Southern California, Organized by Weather Type. https://www.weather.gov/media/sgx/documents/weatherhistory.pdf

- In November 1963, heavy rains fell on Southern California. More than three inches were recorded in coastal Orange County locations. The flooding injured six people.

- A December 1964 rainstorm caused flooding that killed 40 people across Los Angeles and Orange Counties.

- Heavy storms in November 1965 dropped between 16 and 20 inches of rain in the mountains of Southern California, causing regional flooding and 15 deaths.

- In January and February of 1969, rain fell almost continuously from January 18 to January 25, resulting in widespread flooding. Orange County was declared a national disaster area on February 5. A second storm hit on February 21 and lasted until February 25, bringing rain to the already saturated ground. This second storm culminated in a disastrous flood on February 25. The storm resulted in the largest peak outflow from Santiago Reservoir since its inception in 1933. The reservoir at Villa Park Dam reached its capacity for the first time since its construction in 1963; the dam had a maximum inflow of 11,000 cubic feet. The outlet conduit released up to 4,000 cubic feet, yet the spillway overflowed at 1:30 p.m. and continued for 36 hours. The maximum peak outflow from the dam reached 6,000 cubic feet. Although the dam's safety was never threatened, the outflow caused serious erosion downstream in the cities of Orange and Santa Ana and some parks and golf courses. A Southern Pacific Railroad bridge, water and sewer lines, a pedestrian overcrossing, and three roads washed out. Approximately 2,000 Orange and Santa Ana residents were evacuated from houses bordering Santiago Creek. In January 1995, flooding inundated the region, causing an estimated $55 million in property damage and prompting a federal disaster declaration.

- In February 1998, all Southern California was impacted by heavy rains when 2 to 5 inches fell across the region. Many roads and bridges were washed away, or destroyed, and widespread power outages occurred. Property damage reached $100 million worth, and two people lost their lives.

- In March 2003, 3 to 7 inches of rain fell on Southern California, causing region-wide flooding. Water reached depths of up to three feet on some roadways, causing over 1,000 vehicle collisions.

- In January 2011, California received a Presidential Declaration for the Severe Winter Storms, Flooding, and Debris and Mud Flows that occurred over a nearly three-week period. During this incident, the State of California incurred well over $75 million in damages, of which over $36 million occurred within Orange County. Much of the damage impacted private and public property, as well as critical infrastructure.

- 2017 Winter Storms [58] included three storms over six days inundating southern California. Heavy rains, combined with already saturated soil, produced flash flooding across much of Orange County. Streets flooded with 1 to 3 feet of water in Huntington Beach, Santa Ana, and Newport Beach. The storms resulted in a Presidential Disaster Declaration for 16 counties throughout the state.

- Dec. 6, 2018, Heavy rain from a winter storm passing through Southern California flooded streets and submerged vehicles in Costa Mesa. The worst flooding was reported in a section of the city bounded by 19th and 17th streets to the north and south, and Pomona and Park Avenues to the west and east, respectively, according to a bulletin from the Costa Mesa Police Department. It said that rain had pooled to depths of two to four feet, and photos posted by the department showed trapped vehicles almost completely underwater in low-lying areas.

Dam Failure/Levee Failure

While California's dam infrastructure is recent in the state's history, there have already been major catastrophic dam failure events. One of the earliest in Southern California was the failure of the San Francisquito Canyon Dam. The dam experienced a structural failure because of insufficient geotechnical engineering by the then-Los Angeles Bureau of Water Works and Supply. At midnight on March 13, 1928, the 205-foot-tall structure gave way, unleashing a 120-foot-high wave of water traveling 18 miles per hour down the canyon. By 5:30 AM, the wave had traveled 54 miles from the dam site to the Pacific Ocean, killing at least 438 people, razing towns, and destroying infrastructure. It was reported that victims' bodies were recovered from the ocean as far south as the Mexican border. The disaster is considered one of the worst engineering failures in US history. [59]

The most recent incident in California is the Oroville Dam spillway failure that occurred in February 2017. The failure in the concrete chute caused a 60-foot-deep hole to develop in the lower third of the primary spillway from normal operations undertaken to lower the reservoir in advance of a moderately large storm. A subsequent storm in the days after the initial incident and the inability to fully use the primary spillway led to the filling of the reservoir and the use of its unlined (natural) emergency spillway for the first time. After 2 days of usage causing erosion of the unlined hillside and head cutting (erosion upstream towards the earthen dam), concerns regarding the stability of the emergency spillway caused an evacuation of nearly 200,000 people downstream, prompting both immediate repairs and a re-evaluation of this dam facility and many others throughout the State of California since. [60]

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[58] NCEI. Storm Events Database. https://www.ncdc.noaa.gov/stormevents/eventdetails.jsp?id=676168; and The Orange County Register. January 23, 2017. Flooding, mudslides, power outages follow torrential rainstorm.
[59] Riley, K. March 2018. 90 Years Later, The St. Francis Dam Failure Remains A Vital Safety Lesson. *Association of State Dam* Safety Officials. https://damsafety.org/article/awareness/90-years-later-st-francis-dam-failure-remains-vital-safety-lesson
[60] California Office of Emergency Services. 2018. California State Hazard Mitigation Plan. https://www.caloes.ca.gov/cal-oes-divisions/hazard-mitigation/hazard-mitigation-planning/state-hazard-mitigation-plan

The City of Costa Mesa has not suffered impacts from a dam inundation event. Only a small portion of Costa Mesa is within the Prado Dam inundation area, which is limited to the area closest to Newport Bay. The closest incident to Costa Mesa involved an extensive episode of winter rains in 2005 that caused seepage along Prado Dam, causing the Army Corps of Engineers to release significant amounts of water downstream, forcing evacuations of approximately 3,000 residents close to the dam. The flooding caused erosion along portions of the Green River golf course adjacent to the river. Since this event, the ACOE has made significant improvements downstream of the dam to increase capacity and reduce future flooding impacts. [61]

Risk of Future Events

Flood

There is no indication that the severe rainfall that leads to flooding will decrease in the future, either in Costa Mesa or the southern California region. While Costa Mesa may experience prolonged periods of dry or wet years, flood events will likely continue to impact Costa Mesa. For areas within the 100-year and 500-year flood hazard zones, the likelihood of flooding to occur on an annual basis is 1% and 0.2%, respectively.

Dam Failure/Levee Failure

Due to several dams/levees in and near Costa Mesa, many residents and businesses could be at risk of inundation resulting from a failure. Prado Dam, Santiago Creek, and Villa Park dams could significantly impact portions of the City due to homes and businesses within their inundation areas. Some of the potential consequences of dam failure from these facilities are death or injury, displacement of people from their homes, damage to existing public and private buildings, damage to infrastructure, loss of services from utilities, loss of government services, and economic losses. Both Federal and State agencies overseeing these facilities require periodic evaluation of dam infrastructure based on confirmed or unconfirmed safety issues, probability of failure, and the potential consequences. All dams that may impact Costa Mesa currently meet satisfactory conditions regarding dam safety.

Climate Change Considerations

Flood

Climate change is expected to alter the frequency and intensity of precipitation events throughout California, including Costa Mesa. Intense rainfall is expected to occur more frequently (perhaps twice as often by the end of the 21st century) and potentially increase the intensity of rain events (up to 40 percent more). These projected changes likely mean that Costa Mesa will experience more frequent and intense flooding, potentially leading to erosion, tree mortality, and increased response and recovery activities. In response to this it is recommended that the City designs and builds climate-safe infrastructure by

[61] Army Corps of Engineers. 2020. Prado Dam Project Information Webpage. http://www.spl.usace.army.mil/Pradodam/pradodam.htm

incorporating green infrastructure as well as nature-based solutions (NBS) in public works projects.

DAM FAILURE/LEVEE FAILURE

Climate change could increase the risk of dam failure in the future. More intense rainstorms may increase the likelihood of reservoir infrastructure becoming overwhelmed, including the dams that control floodwaters from inundating Costa Mesa and the rest of Orange County. Indirectly, increased climate change-induced rains may cause more erosion, compromising the structural integrity of dams/levees. For these reasons, monitoring changing precipitation regimes and conditions is recommended to understand future conditions better.

Geologic Hazards (Expansive Soil, Erosion/ Landslide, Methane-Containing Soils)

For the purposes of this plan, geological hazards of concern for the city include Expansive Soil, Erosion, Landslide, and Methane Containing Soils.

DESCRIPTION

EXPANSIVE SOIL

Expansive soil is a soil that can shrink or swell and thus change in volume. Volume increases or decreases result from changes in the moisture content of the soil. These soils will almost always contain some form of expansive clay mineral, such as smectite or vermiculite, which are able to absorb water and swell, increasing in volume. The opposite effect (shrinkage) occurs as the soil dries. The more water absorbed, the greater amount of volume increases. For the most expansive soils, volume changes of 10% are common. The actual amount that the ground will swell or shrink is determined by the water content in the near-surface (active) zone. [62]

Many of our country's largest towns and cities, and therefore their local and residential streets, highways, services, and buildings, are founded on clay-rich soils and rocks. These expansive soils can prove to be a substantial hazard to construction and the design of structures due to the ability of the soils to shrink or swell with seasonal changes in weather and moisture, changes at the site such as leakage from water supply pipes or drains. Even changes to landscaping and how it is drained, or following the planting, removal, or severe pruning of trees or hedges near structures can help to address structural damage associated with expansive soils.

Residential homes and other single-story buildings, pavements, pipelines, and other shallow services such as fiber optics, are especially vulnerable to soil expansion damage. They lack the flexibility of movement that other heavier multi-story structures have. Concrete construction such as driveways, sidewalks, asphalt roadways, or parking lots is also susceptible to damage because of their relatively lightweight nature extended over a

[62] Jones L. (2018) Expansive Soils. In: Bobrowsky P., Marker B. (eds) Encyclopedia of Engineering Geology. Encyclopedia of Earth Sciences Series. Springer, Cham. https://doi.org/10.1007/978-3-319-12127-7_118-1

relatively large area. Most new structures and improvements that adhere to current building standards and requirements incorporate expansive soil mitigation.

EROSION/ LANDSLIDE

Erosion is the general process whereby rocks and soils are broken down, removed by weathering, or fragmented, and then deposited in other places by water or air. The rate of erosion depends on many variables, including the soil or rock texture and composition, soil permeability, slope, the extent of vegetative cover, and precipitation amounts and patterns. Erosion increases with increasing slope, precipitation, and decreasing vegetative cover, including areas where protective vegetation has been removed by fire, construction, or cultivation.

Landslides occur when slopes become destabilized, typically after heavy rains. If precipitation saturates soils, they can become unstable, or landslides can occur when significant erosion from rainfall destabilizes the ground. Slopes that have recently burned face a greater risk from rain-induced landslides, as the loss of vegetation can de-stabilize the earth. Earthquakes may also be a source of landslides as the shaking can destabilize steep hillsides covered in loose soils and weak rock layers.

METHANE-CONTAINING SOILS

Methane (CH4 in chemical notation) is a naturally occurring colorless and odorless gas. Methane, along with butane and propane, are all forms of a group of molecules called hydrocarbons. Methane and other hydrocarbons have various uses, though they are most often utilized as a fuel source. [63] Petroleum products are fuels made from crude oil and hydrocarbons contained within natural gasses (the primary component being methane). As a result, soils containing high methane levels are common in areas with extensive fossil fuel deposits, areas with soils that contain high amounts of organic matter, or in places contaminated by fossil fuel extraction activities. [64] Methane is also quite prevalent in soils found in and around closed landfills. Closed/topped landfills contain an environment deprived of oxygen, which causes the decomposition of organic material. This breakdown of organic material creates methane as a natural byproduct of the decomposition process.

While methane is a useful substance as a fuel source, it can pose a substantial health and safety hazard. In small quantities, methane is non-toxic; however, if large quantities of methane are allowed to displace air, especially in enclosed areas (rooms/buildings), oxygen levels can become low enough that the lack of oxygen can lead to suffocation. [65] The major hazard associated with methane is its extreme flammability and explosive nature in certain

[63] "Hydrocarbon Gases" C. Clayton, in Encyclopedia of Geology, 2005 https://www.sciencedirect.com/topics/earth-and-planetary-sciences/hydrocarbon-gases#:~:text=The%20chemistry%20of%20natural%20gases,(C5H12).
[64] "Oil and petroleum product explained" EIA US Energy Information Administration https://www.eia.gov/energyexplained/oil-and-petroleum-products/#:~:text=Petroleum%20products%20are%20fuels%20made,%2C%20natural%20gas%2C%20and%20biomass.
[65] "Methane and Health Safety" SoCal Gas: https://www.socalgas.com/stay-safe/methane-emissions/methane-and-health-and-safety#:~:text=Methane%20is%20non%2Dtoxic%20and,oxygen%20may%20result%20in%20suffocation.

concentrations. It can explode at concentrations between 5% (lower explosive limit) and 15% (upper explosive limit). These concentrations are much lower than the concentrations at which methane becomes an asphyxiant, where suffocation can occur. [66] Methane in soils can seep to the surface, posing risks to structures on top of these soils. Methane can be trapped under impervious surfaces such as roadways or in enclosed underground areas such as basements, where it can increase to potentially dangerous levels if it is not vented properly.

Location and Extent

Expansive Soil

Figure 3-9: Expansive Soil Index

Expansion Index- Expansive Potential Categorization	
0-20	Very Low
21-50	Low
51-90	Medium
91-130	High
>130	Very High

According to the California Building Code (CBC) Section 1803.5.3, soils that possess an expansive potential of less than 20 are considered "non-expansive," and soils that possess an expansive potential of greater than 20 are considered expansive. The extent to which soil expansion is present in an area or site can be measured relies on the Expansive Soil Index (**Figure 3-9),** which identifies categories ranging from very low to very high.

"The expansion index, *EI*, value is used by engineers and other professionals as an indicator of the soil's swelling potential. It may also be used to determine the suitability of a soil to satisfy requirements set by specifying agencies."

"The EI test is not used to duplicate any particular field conditions such as soil density, water content, loading, in-place soil structure, or soil water chemistry. However, consistent test conditions are used in the preparation of compacted specimens such that direct correlation of data can be made." [67]

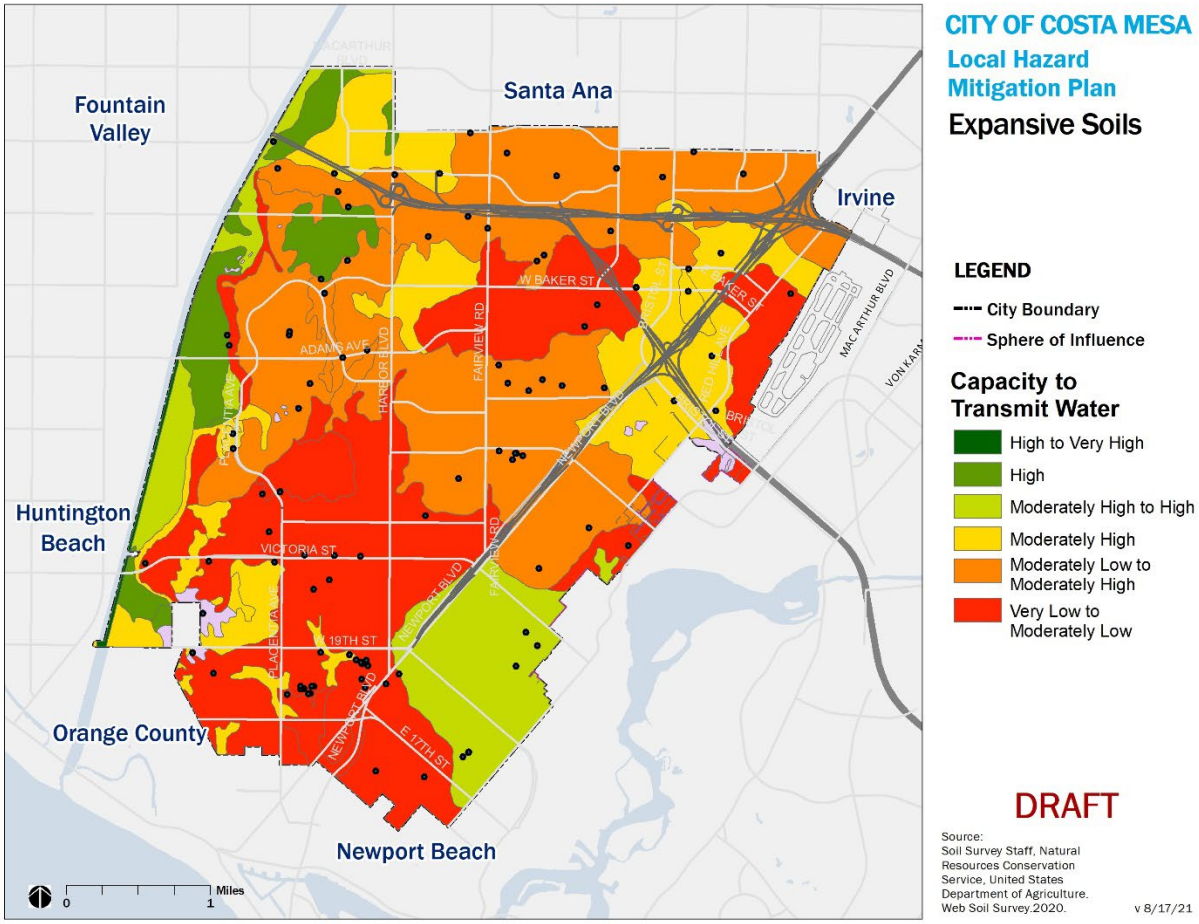
Expansive soils are found throughout the entire world, and the United States is no exception. Every year they cause billions of dollars in damage. According to the American Society of Civil Engineers, roughly 25% of all homes in the US have experienced damage from expansive soils. They estimate that expansive soils cause more damage resulting in financial loss to homeowners than earthquakes, floods, hurricanes, and tornadoes combined. [68]

Figure 3-10 identifies the various soil types present throughout the City based on soils surveys conducted by the US Department of Agriculture. Based on this mapping, several areas of the City are underlain by soils with varying amounts of clay, which affect the capacity of the soil to transmit water. The lower the capacity to transmit water, the greater

[66] "Methane Toxicity: Fire/Explosion Risk: https://aetinc.biz/newsletters/2010-insights/october-2010
[67] ASTM International: "Standard Test Method for Expansion Index of Soils" https://www.astm.org/Standards/D4829.htm
[68] Geology.com "Expansive Soil and Expansive Clay" Hobart M. King PhD: https://geology.com/articles/expansive-soil.shtml#:~:text=How%20Many%20Buildings%20are%20at,damage%20caused%20by%20expansive%20soils

the potential for clay within the soil. Based on this information, the greatest potential for expansive soils includes the areas of the City with very low to moderately low (red) and moderately low to moderately high (orange) capacity to transmit water. This includes the interior portions of the City between the Santa Ana River and the Newport Back Bay.

Figure 3-10: Expansive Soils



Erosion/ Landslides

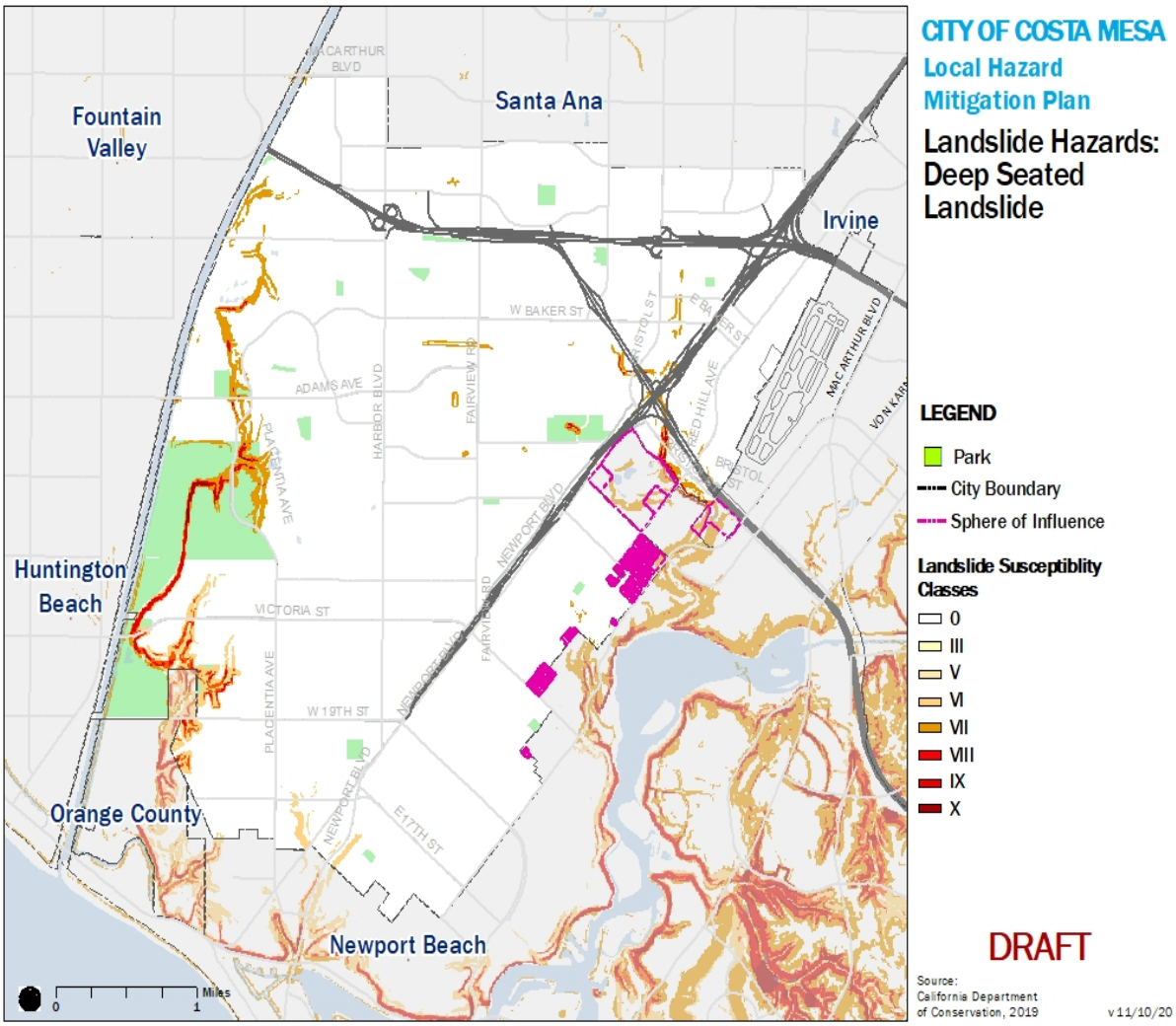
Erosion and landslides were identified as a concern for the City. Areas of potential erosion/landslide include the bluffs located in the southwestern portion of the City. **Figure 3-11** identifies areas mapped by the California Geological Survey (CGS) with Deep Seated Landslide Potential. These are areas of high landslide susceptibility along the bluffs in the western portions of the City. These areas were most likely riverbanks for the historic Santa Ana River, which are now located behind the levees constructed along the current river margin. These areas are susceptible to erosion and landslide, which could be seismically induced if a significant earthquake were to occur.

Methane Containing Soils

The Pacific Avenue Landfill is a closed landfill facility located at 2193-2195 Pacific Avenue. The facility received a Clean Closure Plan approval in 2001, and landfill gas probes to monitor methane levels were installed. According to the Orange County Sanitation District (OCSD),

methane levels have been less than 5% (by volume) since monitoring began in June 2011. [69] In addition to the closed landfill, the City has approximately 24 idle and 123 capped oil wells. These well locations can be potential locations of methane release if they are not capped or secured properly. The City is also underlain by deposits of peat, which are soils that contain high amounts of organic content. The decomposition of these soils can produce methane gases. Additionally, one location within the City has had two reported incidents (2019 and 2021) of methane release, most likely caused by soil decomposition. The location is a multi-family dwelling located in the southwest portion of the City.

Figure 3-11: Deep Seated Landslide Areas



Past Events

Expansive Soils

Given the presence of expansive soils throughout the City, as identified in Figure 3-10, the City and its residents could experience occasional damage to structures caused by these

[69] OCSD: Appendix F: Hazards Assessment https://www.ocsd.com/Home/ShowDocument?id=15357

soils. The most vulnerable structures would be those built before adopting the City's building codes and standards that mitigate the effects of these hazards. While the City is relatively flat and does not experience significant wet periods during the year, exceptionally wet winters followed by dry periods (droughts) could cause soils to expand and contract, affecting structures built within or on top of these locations.

Erosion/ Landslide

Erosion has occurred within the City in the past. One recent example occurred in Fairview Park. The park had to close some hiking trails when the Santa Ana River overflowed, and as a result, a section of the trails was eroded away. A berm was built to help prevent further erosion and trail closures within the park. The major erosion concern the HMPC identified is the risk associated with the bluffs and the homes located there and the potential financial losses or loss of life associated with such events.

The topography of Costa Mesa is generally quite flat, except for the areas along the bluffs in the southwest of the City. As a result of this topography, there have been no major landslides within the City. However, the potential for a landslide does exist.

Methane Containing Soils

While this is a hazard of concern within the City, no records or data of any past events had been archived or reported at the time of this LHMP creation.

Risk of Future Events

Expansive Soils

The community's expansive soils will continue to swell and contract as they are exposed to water, become saturated, swell, and eventually dry out and contract, potentially causing damage as this occurs.

Erosion/ Landslide

The potential for erosion will continue to exist in the city's areas, especially those located along the Santa Ana River to the west and the bluffs in the southwest.

The potential for landslides will continue to exist in areas of the city, especially those located along the bluffs in the southwest.

Methane Containing Soils

The potential for soils to contain and release methane will be present within the City for the foreseeable future. The presence of abandoned or capped wells, old landfills, and peat deposits adjacent to the Santa Ana River and in the vicinity of Upper Newport Bay also offers the opportunity to release gases.

Climate Change Considerations

Expansive Soils

It is possible that expansive soils may be affected by climate change, as climate change is expected to bring about more frequent drought conditions and contribute to more intense

storms, like El Niño. These extreme conditions could further increase the intensity of the expansive soils, physical expansion, and contraction, potentially increasing damage throughout the vulnerable parts of the City.

EROSION/ LANDSLIDE

It is possible that the increase in temperature could lead to longer and more intense periods of drought in southern California. These warmer temperatures could change the soil composition in Costa Mesa, thereby changing the effectiveness of the soil's ability to absorb water as it would normally. Increased temperatures and decreased rainfall can contribute to a decline in ground cover vegetation, growing on banks and hillsides, which reduces the stability of those areas. The possibility of increased frequency and intensity of storms and the rains they bring could increase erosion events.

Due to the wide variety of factors that can lead to landslides, it is possible that climate change could indirectly affect the conditions for landslides. More frequent and more intense storms may cause more moisture-induced landslides. Warmer temperatures and more frequent drought conditions may lead to more fires, destabilizing soils and making future landslide events more likely.

METHANE CONTAINING SOILS

While this is a hazard of concern within the City, there have been only two past events archived or reported at the time of this LHMP creation. Both instances occurred at the same multi-family housing residence located in the southwestern area of the city. The first event occurred in February 2019, and the second event occurred in February 2020.

Hazardous Materials (Hazardous Material Release, Oil Spills, Natural Gas Pipeline)

For the purposes of this plan, hazards associated with the release of hazardous materials include hazardous materials release, oil spills, and natural gas pipelines.

DESCRIPTION

The state of California defines hazardous materials as substances that are toxic, ignitable, or flammable, reactive, and/or corrosive. The state also defines hazardous materials as substances that show high acute or chronic toxicity, are carcinogenic (causes cancer), have bio accumulative properties (accumulates in the body's tissues), are persistent in the environment, or are water-reactive. The primary concern associated with a hazardous materials release is the public's short and/or long-term effects from exposure to the hazardous material.

HAZARDOUS MATERIAL RELEASE

Hazardous materials release refers to a hazard event whereby harmful concentrations of hazardous or toxic substances are released into the environment. This occurs when storage containers of hazardous materials leak or fail. This can happen due to industrial accidents, vehicle crashes, as a direct result of other disasters (e.g., a flood or earthquake), or as a deliberate act.

The threat that hazardous materials pose to human health depends on the type of material, frequency, and duration of exposure, and whether chemicals are inhaled, penetrate the skin, or are ingested, among other factors. Exposure to hazardous materials can result in short- or long-term effects, including major damage to organs and systems in the body or death. Hazardous waste is any material with properties that make it dangerous or potentially harmful to human health or the environment and is no longer of use requiring disposal. Hazardous materials can also cause health risks if they contaminate soil, groundwater, and air, potentially posing a threat long after the initial release.

Oil Spills

An oil spill is the release of a liquid petroleum hydrocarbon into the environment, especially the marine ecosystem, due to human activity and is a form of pollution. Refined petroleum products such as diesel and gasoline also qualify as oil spills. The term is usually given to marine oil spills, but spills may also occur on land and are a hazard of concern for Costa Mesa.

Natural Gas Pipeline

Natural gas pipelines primarily serve to move gas from the point of origin (production/storage well) to the point of consumption. Inter- and intrastate pipelines are used to transport natural gas produced from gas fields, either onshore or offshore facilities through gathering systems to commercial, residential, industrial, and utility companies. The pipelines are usually constructed of carbon steel and varying in size from 2 inches (51 mm) to 56 inches (1400 mm) in diameter, depending on the type of pipeline.

Location and Extent

Hazardous Materials Release

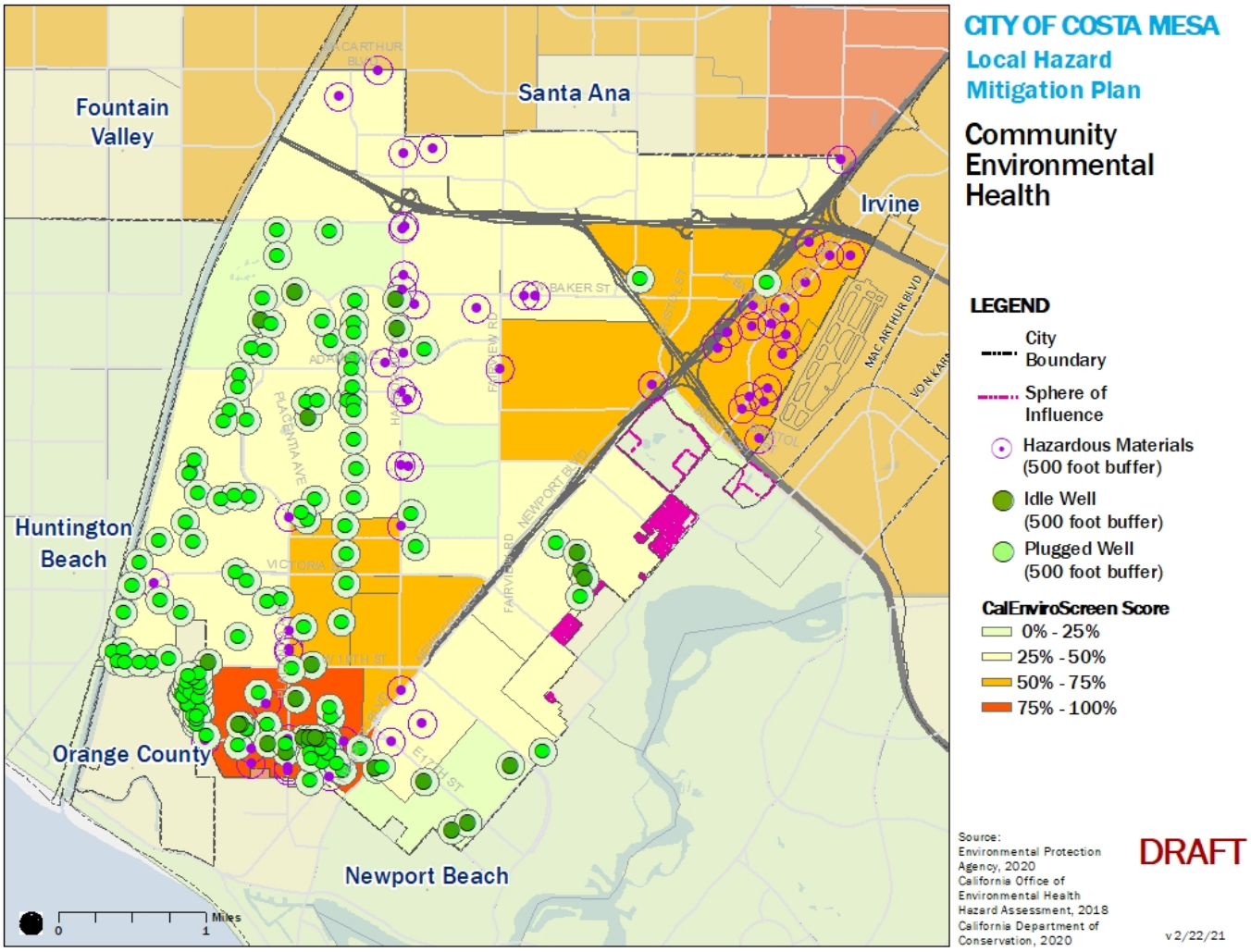
Hazardous materials and chemicals are used daily in households and businesses throughout Costa Mesa. In addition to the locations of large industrial uses, sources of hazardous materials can originate from seemingly harmless places such as gas stations, auto repair shops, dry cleaners, medical centers, and almost any industrial business. Hazardous waste can take the form of liquids, solids, contained gases, or sludge and can be the by-products of manufacturing processes or simply discarded commercial products, like cleaning fluids and pesticides.

In severe situations, Costa Mesa may also be at risk of hazardous materials release events on a regional level. With the right prevailing wind conditions, airborne toxic material could spread to and impact various parts of the air basin, including areas of Costa Mesa.

Figure 3-12 identifies stationary hazardous materials locations within Costa Mesa that store, use, or produce hazardous materials regulated by the state. While these locations are fixed, roadways throughout the community are commonly used to transport hazardous materials and waste. These facilities are common locations for spills and releases. While there is no extent scale for hazardous materials release, the probability of an incident is anticipated to be occasional (less than 10% chance of occurrence) each year. Currently, the City has 36 sites

in need of evaluation and or clean-up, and there is one site that is no longer in operation (Fairview State Hospital).

Figure 3-12: Hazardous Materials Locations



Oil Spill

According to Cal OES, most incidents within the City originate from repair shops, petroleum transportation, accidental spills from citizens, gas stations, and utility companies such as So Cal Edison or Southern California Gas Company. These incidents are reported, logged, and cleaned up accordingly.

Natural Gas Pipeline

A large natural gas pipeline enters the western portion of the City close to the Santa Ana River. Southern California Gas Company maintains transmission lines and high-pressure distribution lines within the City as well. Most of the streets and roads within the City have natural gas lines within them. Based on the location of this infrastructure, any portion of the City has the potential for natural gas pipeline breaks that could expose businesses and residents to potential harm.

Past Events

Hazardous Materials Release

Costa Mesa has experienced an average of 11 hazardous materials spills reported annually to the Cal OES Spill Release Reporting database **(Table 3-12)**. Most of these incidents involve the release of sewage and petroleum products.

Table 3-12: Hazardous Materials Release Reporting

Year	Reported Releases
2010	8
2011	12
2012	16
2013	10
2014	12
2015	11
2016	8
2017	15
2018	7
2019	15
2020	6
Annual Avg	10.91

Source:https://www.caloes.ca.gov/cal-oes-divisions/fire-rescue/hazardous-materials/spill-release-reporting

Oil Spill

California has experienced some severe oil spills throughout its history. Five of the largest spills in California history include:

1969 – Santa Barbara Oil Spill- 3 million gallons of oil are dumped off the coast of Santa Barbara, creating an oil slick that stretched for 35 miles. Inadequate safety precautions caused this spill. One article called it the spill that sparked "The Green Revolution" in California.

1988 – Shell Oil Martinez Refinery Spill- a storm water release valve left open caused 400,000 gallons of crude oil to be dumped into the San Francisco Bay from a 12.5-million-gallon storage tank. The company paid $19.75 million in the cleanup.

1990 – Huntington Beach Spill- An oil tanker was pierced by its own anchor and dumped 400,000 gallons of crude oil into the beaches of Huntington Beach, killing wildlife and costing over $35 million to clean up.

2007 – Bay Bridge Spill- The pilot of a container ship crashed into a tower of the Bay Bridge and dumped 60,000 gallons of heavy bunker fuel into the bay.

2015 – Santa Barbara Oil Spill- A series of "preventable errors" was blamed as the cause of a disastrous pipeline spill that dumped over 126,000 gallons of oil into the waters off the coast of Santa Barbara. [70]

2021 – Huntington Beach Oil Spill - A pipeline connected to an oil rig located off the coast of Huntington Beach broke and leaked approximately 126,000 gallons of crude oil into Orange County coastal waters.[71]

[70] "5 oil spill disasters that California will never forget". San Diego Tribune https://www.sandiegouniontribune.com/opinion/the-conversation/sd-oil-drilling-in-california-coast-and-the-biggest-oil-spills-20180104-htmlstory.html

[71] City of Huntington Beach. 2021 Orange Count Oil Spill Response. https://www.huntingtonbeachca.gov/residents/oil-spill-response/

According to Cal OES, no massive oil spills have been reported within the City. The closest has been the 1990 Huntington Beach spill, approximately 5 miles northwest. There have been minor spills from home auto repair/oil changes, transportation, utility companies, and vehicle repair shops. Some of the most recent incidents reported to Cal OES within the City involved diesel fuel, hydraulic oil, and sewage (generally the most common type of incident).

NATURAL GAS PIPELINE

According to the NTSB database, there have been two natural gas pipeline explosions/leaks of major relevance in California:

- In 2010, the City of San Bruno experienced a huge explosion when one of Pacific Gas and Electric Company's natural gas pipelines exploded and caused an enormous fire. Eight people were killed from the explosion. [72]

- The Aliso Canyon gas leak, called the Porter Ranch gas leak, was a massive natural gas leak in Aliso Canyon (near Los Angeles). A leak in an underground storage facility was caused by a 7-inch well casing rupture due to microbial corrosion from the outside from contact with groundwater. Almost 100,000 tonnes of methane and over 7,000 tonnes of ethane were released into the atmosphere. [73]

RISK OF FUTURE EVENTS

HAZARDOUS MATERIALS RELEASE

Most of the release events within Costa Mesa have occurred due to human error, malfunctioning equipment, or as a deliberate act. Given this, it is anticipated that future events within Costa Mesa will include minor incidents like the past occurrences identified above. Activities to prevent future releases, as well as response strategies, should take this into consideration.

OIL SPILL

Given the proximity to the coast, John Wayne Airport, fuel refineries, major freeway systems (CA-55, I-405, CA-73, and the CA-1 Pacific Coast Highway), the transportation of oil and petroleum products through and within the City, means that the risk of future incidents will be ever-present. Activities to prevent future releases, as well as response strategies, should be taken into consideration.

NATURAL GAS PIPELINE

The City and its residents rely on natural gas as a major means of heating and cooking within the home. As long as the use of natural gas continues to occur within the City, risk potential will remain. Regular maintenance and inspections of these pipelines will be the best way to minimize the possibility of future release incidents. Activities to prevent future releases, as well as response strategies, should be taken into consideration.

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[72] Gonzalez, Sandra (September 11, 2010). "Search for bodies in deadly San Bruno PG&E gas line explosion ends". San Jose Mercury News. Retrieved September 11, 2010

[73] "LA County declares state of emergency over Porter Ranch gas leak" Wilcox, Greg, LA Times: https://www.dailynews.com/2015/12/15/la-county-declares-state-of-emergency-over-porter-ranch-gas-leak/

Climate Change Considerations

Hazardous Materials Release

Climate-related natural hazard events, such as increase precipitation and subsequent flooding, could cause an increase in hazardous materials release. Some of these incidents could result from transportation crashes (due to poorer road conditions) or damage to storage containers or vessels containing these substances. Climate-related hazards could also exacerbate the effects and impacts of such events. For example, heavier rains could lead to more runoff from a contaminated site with hazardous materials. These issues should be monitored during the five-year implementation period of this plan.

Oil Spills

Given the dependence on petroleum products to power the majority of the United States' vehicles, boats, planes, and trains, the risk of oil spills will always be present. The transportation, production, and distribution of oil and petroleum products only contribute to the potential of an accident. As Costa Mesa, the United States, and the rest of the world move towards cleaner and more sustainable energy sources, electrification of transportation through the use of hybrid and electric vehicles will likely decrease the reliance on fossil fuel, leading to the reduction of oil spills and other dangerous chemicals into the environment.

Natural Gas Pipeline

Releases from natural gas pipelines are not anticipated to be affected directly by climate change. The location of this physical infrastructure is predominately underground within streets and easements throughout the City. Based on this location, the most likely impact from climate change would be the exposure of this infrastructure because of some other type of event. The most likely event would be erosion or some other type of event that could expose these facilities.

Human-Caused Hazards (Terrorism/Mass Casualty, Civil Disturbance/Riot, Cyber Threat)

The Human-Caused Hazards profile discusses terrorism/mass casualty incident (MCI), civil disturbance/riot, and cyber threats.

Description

Terrorism/Mass Casualty Incident

Terrorism is the use or threat of force to achieve a particular social or political outcome. The goals of terrorism may sometimes be the overturning of a government, the reversal of a public policy, the release of political prisoners, and other such motives. Acts of terror may overlap with acts of war or hate crimes. Generally, terrorism involves an attempt to kill or seriously harm people or disrupt civil society by destroying property or infrastructure, attacking government operations at all levels, interrupting essential public services, creating chaos, or a combination of some or all these goals. Firearms and explosives are the most common weapons used among terrorists. In extreme situations, terrorists may gain access to weapons of mass destruction, including bioweapons, chemical agents, radioactive materials, or high-yield explosives. It should be noted that these events are very rare. While incidents of terror caused by foreign individuals or groups receive significant media and

public attention, most acts of terror in the United States have been caused by domestic terrorists.

A mass casualty incident describes an incident within the United States in which emergency medical service resources, such as personnel and equipment, are overwhelmed by the number and severity of casualties. The more commonly recognized events of this type include building collapses, train and bus collisions, plane crashes, earthquakes, and other large-scale emergencies. The most common types are generally caused by terrorism, mass-transportation accidents, or natural disasters. Events such as the Oklahoma City bombing in 1995 and the September 11 attacks in 2001 are well-publicized examples of mass casualty incidents.

Civil Disturbance/Riot

A civil disturbance is an event when the normal operations of the city are either threatened or temporarily interrupted by violent protests, riots, shootings, and armed standoffs. Civil disturbances can occur at a single time or be a string of related events. Property damage to businesses, government facilities, or homes can occur during these events. In extreme situations, death and injury may result from civil disturbances.

A riot is defined as a noisy, violent public disturbance caused by a group or a crowd (three or more people) usually protesting another group's actions or government policy in the streets. This can lead to the destruction of private and public property, looting, arrests, and in extreme cases, even assault, injury, or death.

Cyber Threat

Cyber threats are when an individual or a group threatens or attempts to disrupt the operations and functioning of the computer systems belonging to private citizens, religious groups, educational institutions, government agencies, or businesses. These threats take the form of online harassment, hacking, or in-person tampering with electronic equipment. Successful cyber threats can lead to service disruptions, infrastructure damage, theft and may cause injury or death in severe instances.

Location and Extent

Terrorism/Mass Casualty Incident

Mass Casualty Incidents can occur anywhere, although public spaces and locations where many people congregate (parks, schools, places of worship, government facilities, shopping centers, and areas of public gathering) are most common. Key locations in Costa Mesa may be large shopping centers (i.e., South Coast Plaza), governmental facilities (i.e., City Hall), universities (i.e., Vanguard University, Orange Coast College), schools, medical facilities (i.e., College Hospital), parks (i.e., Fairview Park), and large employers such as the OC Fair and Event Center.

Acts of terrorism may be located at the locations listed above; however, the perpetrators may also choose high-value targets such as electric substations, water treatment plants, levees or reservoirs, airports, highways, and other facilities that could impact governmental services.

Mass Casualty Incidents and acts of terrorism are typically measured by the fatalities, injuries, and destruction they cause, but no universal scale is used to measure these events.

Civil Disturbance/Riot

Civil disturbances/riots can arise at any time and place for a variety of reasons. There are, however, some places where such events are more likely to emerge, including local, state, and federal government centers, jails, police stations, major businesses, university campuses, and places of public assembly. Many of the locations listed in the Terrorism/Mass Casualty Incident description above would be locations for these types of incidents as well.

No definitive scale for measuring civil disturbance events exists, but several metrics may be used individually to determine a civil disturbance event's impact. These measures include:

- Number of facilities affected
- Number of fatalities
- Monetary loss
- Interruptions to communications infrastructure
- Number of people protesting
- Impacts to certain socioeconomic groups [74] [75]

Cyber Threat

Since computers are so ubiquitous, a cyber threat could appear in virtually any part of the City. In extreme circumstances, a threat could impact the entire city. Cyber threats vary in their length and severity in impact. A minor threat could cause computer systems to slow down for a few minutes and not behave as responsively. On the other hand, a major cyber threat could cause a complete shutdown of critical systems, including those used by banks, healthcare institutions, universities, major businesses, and city governments.

Cyber threats are not measured on any scale, but they can be assessed by determining:

- The type of incident (website defacement, denial of service, unauthorized surveillance)
- The use of malicious software
- The level of security countermeasures that failed in preventing the cyber threat

[74] Renn, O., et al. 2011. "Social Unrest." Organization for Economic Co-operation on Development. 14 January.
[75] Cal OES (California Office of Emergency Services). 2018. 2018 State of California Multi-Hazard Mitigation Plan. https://www.caloes.ca.gov/cal-oes-divisions/hazard-mitigation/hazard-mitigation-planning/state-hazard-mitigation-plan

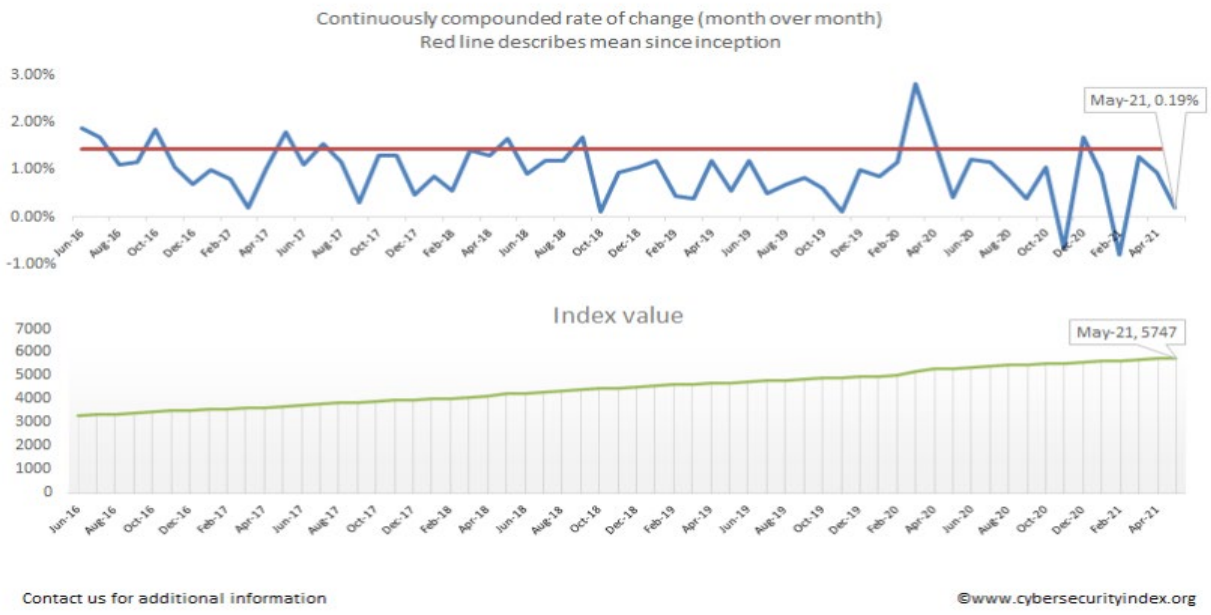
- The duration of the cyber threat (a few hours, a few days, several weeks, etc.) [76]

Globally, cyber threats are increasing and becoming more sophisticated. The most common types of attacks include:

- Phishing
- Ransomware
- Intellectual Property Theft
- Spyware/Malware
- Unpatched Software

To understand the status of cyber threats, the Index of Cyber Security (**Figure 3-13)** can be referenced, which identifies the measure of perceived risk. Since 2015 this index has trended upward and appears to have doubled in this timeframe.

Figure 3-13: Index of Cyber Security



Past Events

Terrorism/Mass Casualty Incident

The following mass casualty incidents/ terrorism events have occurred within Costa Mesa, or its vicinity, that may be relevant to the community:

[76] Mateski, M., C. Trevino, C. Veitch, J. Michalski, J. Harris, S. Maruoka, and J. Frye. 2012. "Cyber Threat Metrics." *Sandia National Laboratories*. https://fas.org/irp/eprint/metrics.pdf.

- A 1970 bombing of the Stanford Research Institute facility, which caused approximately $500,000 in property damage. No injuries or deaths occurred during this incident. [77]

- A 1970 bombing of a Bank of America Branch, which caused approximately $500,000 in property damage. No injuries or deaths occurred during this incident. [78]

- In April 1995, Timothy McVeigh detonated a bomb outside the Alfred P. Murrah Federal Building in Oklahoma City, OK. The blast was so powerful that the Federal Building was destroyed, and more than 300 nearby buildings were damaged or destroyed. The bombing killed 168 people, including 19 children. Timothy McVeigh's motive for bombing the Federal Building was that he hoped to inspire a revolution against the federal government.[79]

- On September 11, 2001, terrorists hijacked four commercial airliners. The hijackers flew two of the planes into the twin towers at the World Trade Center in New York City and one into the Pentagon in Arlington, VA. The fourth plane crashed in a field in rural Pennsylvania. The attacks on 9/11 killed 2,976 people and injured thousands more.[80]

- On April 15, 2013, two bombs detonated near the finish line of the Boston Marathon. The explosion killed 3 spectators and wounded more than 264 other people. Police captured 19-year-old Dzhokhar Tsarnaev in connection with the bombing; the second suspect, Tamerlan Tsarnaev, died following a shootout with law enforcement. Investigators concluded that the Tsarnaev brothers planned and carried out the attack on their own and were not connected to any specific terrorist group.[81]

- In 2014, a teenager who had reportedly threatened terrorist action against the U.S. Open of Surfing event attendees was arrested. [82]

- In May 2015, two Anaheim-based men were arrested at a Transportation Security Administration checkpoint at the Los Angeles International Airport, who had reportedly sworn allegiance to the Islamic State of Iraq and Syria (ISIS). One of these men, Muhanad Badawi, was a student at Fullerton College. [83]

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[77] Global Terrorism Database. 2020. "1970-10-18". https://www.start.umd.edu/gtd/search/IncidentSummary.aspx?gtdid=197010180001
[78] Global Terrorism Database. 2020. "1970-10-26". https://www.start.umd.edu/gtd/search/IncidentSummary.aspx?gtdid=197010260001
[79] Federal Bureau of Investigation. Famous Cases and Criminals. https://www.fbi.gov/history/famous-cases/oklahoma-city-bombing
[80] Federal Bureau of Investigation. Famous Cases and Criminals. https://www.fbi.gov/history/famous-cases/911-investigation
[81] History.com Editors. June 2019. Boston Marathon Bombing. https://www.history.com/topics/21st-century/boston-marathon-bombings
[82] Connelly, L., and S. Emery. 2014. "Teen Arrested for Terrorist Threats Toward US Open." Orange County Register. July 26.
[83] Winton, R. 2016. "Two O.C. Men Convicted of Conspiring to Fight with Islamic State." Los Angeles Times. June 21.

- In December 2015, a mass shooting and terrorist attack committed by a married couple who had reportedly sworn allegiance to ISIS killed 14 people at a medical facility in San Bernardino. [84]

- In October 2017, Stephen Paddock opened fire on the Route 91 Harvest Festival concert, from an elevated position at the Mandalay Bay Hotel. The attack resulted in 58 people killed and 851 injured. Paddock shot and killed himself before responding officers reached him. The FBI Behavioral Analysis Unit determined that there was no clear motivation for the attack. Although this attack did not occur in California, many California residents were affected by the event as more than half the 58 people killed were from California.[85]

- In December 2019, a man, and girl were arrested after a social media post made possible threats against Costa Mesa's Estancia High School. Police identified two posts, one that showed what appeared to be a rifle with a caption that read, "don't go to school tomorrow." The second post indicated that there would be a mass shooting at the school. Police searched both homes and found the rifle, which was a BB gun. It was determined that there was no credible threat to the school. This led to heightened police presence at the school and more patrols in the surrounding area. [86]

Civil Disturbance/Riot

The following is a list of recent civil disturbances/riots:

- April 28th, 2016, a rally for Donald Trump was held at the Orange County Fairgrounds during his presidential race of 2016. A group of anti-Trump protestors confronted the attending crowd. It became violent. The protestors began to smash car windows, tried to flip a police cruiser, and one Trump supporter suffered a bloody gash to the face. Further down the street, protestors were jumping on police cars, climbing streetlights, throwing rocks at police lines, and scuffling with supporters leaving the event. Traffic was backed up for hours, and at least 20 people were arrested for multiple infractions of the law. [87]

- On May 31, 2020, Costa Mesa City Manager Lori Ann Farrell Harrison declared a local emergency and ordered a curfew beginning at 8 pm PST to be lifted the following day, June 1, 2020, at 5 am PST. This was issued in response to the growing civil unrest in neighboring cities over the killing of George Floyd by a Minneapolis, Minnesota, police officer on May 25th, 2020. There was a fear that these protests and riots could potentially reach Costa Mesa. The Costa Mesa Police Department had learned of

[84] Global Terrorism Database. 2020. "2015-12-02." https://www.start.umd.edu/gtd/search/IncidentSummary.aspx?gtdid=201512020012
[85] Los Angeles Times Staff. "Las Vegas Shooting Victims: Portraits of the Fallen." October 2017. https://www.latimes.com/projects/la-na-las-vegas-shoot
[86] Costa Mesa police investigate 'potential threat' against Estancia High School; 2 arrested, BB gun confiscated. Jessica De Nova and ABC7.com staff https://abc7.com/2-arrested-after-potential-threat-against-costa-mesa-school/5731455/
[87] Protest Turns Violent at Donald Trump Rally in Costa Mesa, Calif., Kenny, Steve NyTimes: https://www.nytimes.com/2016/04/30/us/donald-trump-rally-protest-costa-mesa.html

multiple social media posts about plans to congregate in the City merely to loot and vandalize businesses. [88]

- June 1, 2020, Costa Mesa Police Department instituted a second overnight curfew, following further reports of a planned protest at South Coast Plaza. The curfew began at 7 pm PST and would end June 2, 2020, at 5:30 am PST. It included closures of off-ramps near South Coast Plaza and surrounding streets. Costa Mesa Police Department, the Santa Ana Police Department, and California Highway Patrol formed a perimeter around the shopping center. Despite the issued curfew, at least 100 protestors gathered to voice their opinions over racial injustice. It nearly became violent after several tense standoffs; however, it remained peaceful and dissipated around 11:30 pm PST. The Costa Mesa Police Department was praised for a commendable job avoiding any violence. [89]

CYBER THREAT

The City of Costa Mesa has not experienced cyber incidents directly. However, several jurisdictions in southern California and across the country have. Several recent incidents local to the City include:

- On December 24, 2019, the City of Seal Beach was the victim of a ransomware attack that affected City computer systems. The attack was targeted at the City's Information Technology service provider, which allowed the hackers to encrypt City computers with the malware, primarily impacting city email and voicemail functions.

- On December 4, 2019, the Cucamonga Valley Water District disclosed a data breach that occurred between August 26, 2019, and October 14, 2019. The breach occurred on a server used to accept one-time credit card payments from customers.

- On March 11, 2019, the Orange County Sanitation District was the victim of a phishing data breach. Over 1,000 employee records were accessed as part of the breach through the District deferred compensation plan.

In addition to these, recent, notable cybersecurity events in the US include the Colonial Pipeline incident, JBS (the world's largest meatpacker), and the Washington DC Metropolitan Police Department. These attacks have resulted in the shutdown or delay in critical services and functions that have increased the cost of goods/services, financial losses, and operational delays.

RISK OF FUTURE EVENTS

TERRORISM/MASS CASUALTY INCIDENT

Given that mass casualty incidents and acts of terrorism stem from a variety of factors: economics, societal pressures, mental health, global geopolitics, warfare, and religion, etc.—

[88] Costa Mesa Police Department: https://twitter.com/costamesapd/status/1267281445266939905?lang=en
[89] "Fears of anticipated civil unrest postpone Monday's reopening at South Coast Plaza" Cardine, Sara: https://ca-times.brightspotcdn.com/d1/07/fb9d2aaa4b07a37736b9f019d567/paper.pdf

it is impossible to predict when an incident occurs. While Costa Mesa does not feature critical national or state facilities, future incidents would likely originate domestically and are less likely to attract the attention of international terrorist groups. Incidents of these types are more likely to be conducted by smaller organizations or individuals aligned with greater-known organizations, although the effects may be no less significant.

Civil Disturbance/Riot

While civil disturbance events may be rare, there is still a possibility that they could occur in the future. Given that several recent civil disturbance events have occurred in the city, it is safe to say that locations like the Orange County Fairgrounds may be areas where such events could emerge in the future. Other locations may include the South Coast Plaza, Segerstrom Center of the Arts, and the Pacific Amphitheater, anywhere large groups of people tend to congregate.

Cyber Threat

Due to the integrated nature of technology into the everyday lives of Costa Mesa's residents, businesses, and government operations, it is possible that a cyber threat could emerge in the future. While no cyber threats are publicly known to have disrupted the City's normal operations in the past, the likelihood of a cyber threat affecting the residents, businesses, and/or governmental operations in the future is increasing.

Climate Change Considerations

Terrorism/Mass Casualty Incident

The link between mass casualty incidents/terrorism and climate change is not well understood. However, it has been suggested that the impacts of a changing climate may exacerbate existing social, political, religious, and ethnic tensions. For example, longer, more intense droughts may restrict food supply or limit economic growth for cities, regions, or even whole countries. Nevertheless, the likelihood of climate change impacting mass casualty incidents/acts of terrorism in Costa Mesa is negligible since these changes are more likely to impact developments on the national or international level.

Civil Disturbance/Riot

Climate change is not likely to impact future civil disturbances in Costa Mesa.

Cyber Threat

Climate change is not likely to impact cyber threats in the future within Costa Mesa.

Seismic Hazards

Potential seismic hazards that may affect the City include fault rupture, liquefaction, and seismic shaking.

Description

Fault Rupture

The shifting and movement of the Earth's tectonic plates are responsible for seismic events. These tectonic plates can pull away from, move toward, or pass by each other. As they do,

these plates sometimes lock together. This creates tension, and eventually, the built-up tension is released like a springboard, then dissipates into the Earth's crust.

The location where two tectonic plates join is called a plate boundary, which is considered a fault line. Fault lines are sometimes visible on the Earth's crust as sudden rifts or anomalies in the continuity of the landscape. California's major north-south fault line is the San Andreas Fault—where the North American and Pacific Plates meet. However, constant friction between the two plates over the millennia has caused the areas where the two plates intersect to become fragmented, creating new, smaller faults.

The area near a fault line is at risk of damage due to the potential for a fault rupture—the deformation or displacement of land on either side of the fault, which may move a few inches to several feet in opposite directions. Any buildings or infrastructure situated around, on top of, or across a fault line could be severely damaged or destroyed. The direction of the fault rupture depends upon the fault type: dip-slip faults produce vertical shearing, strike-slip faults produce horizontal shearing, and oblique-slip faults produce both vertical and horizontal shearing. The fourth kind of fault, called a "blind" thrust fault, produces virtually no visible displacement of land.

Some faults have emerged recently in geologic history. Quaternary faults are faults that have developed any time between the Holocene Era and the present (within the last 1.8 million years). These faults are especially concerning since they are the most likely to be active and cause future earthquakes.

The Alquist-Priolo Earthquake Fault Zoning Act enables the California State Geologist to designate zones surrounding active faults as Alquist-Priolo Special Study Zones. These zones require additional study and analysis to determine the location of the fault and the limits of the area prohibited from surface construction on top of the known location of an active fault.

SEISMIC SHAKING

Seismic shaking is the shaking felt on the surface caused by an earthquake. In most cases, earthquakes are not powerful enough for the shaking to be felt. Particularly powerful earthquakes, however, can generate significant shaking, causing widespread destruction resulting in property damage.

LIQUEFACTION

Liquefaction occurs when seismic energy shakes an area with low-density, fine grain soil, like sand or silt, that is also saturated with water. When the shaking motion reaches these areas, it can cause these loosely packed soils to suddenly compact, making the waterlogged sediment behave more like a liquid than solid ground. During liquefaction events, the liquified soil can lose most of its stability, which can cause damage to buildings and infrastructure built upon it. In severe cases, some buildings may completely collapse. Pipelines or other utility lines running through a liquefaction zone can be breached during an event, potentially leading to flooding or the release of hazardous materials.

Location and Extent

Fault Rupture

Splays of the Newport-Inglewood Fault are located within the City; however, the State has not identified any active Alquist-Priolo Special Study Zones. Several regional faults within Alquist-Priolo Special Study Zones are located near the City (in neighboring Huntington Beach and Newport Beach) that could result in fault rupture. **Figure 3-14** identifies the faults located within the City, most of which are not considered active (shown movement at the surface in the past 13,000 years). Regardless, these faults should be accounted for in future development decisions.

Seismic Shaking

The intensity of seismic shaking occurs in relation to the amount of energy discharged by the seismic event, which is dictated by the length and depth of the fault. The longer and nearer the surface the fault movement is, the greater the seismic shaking. In most cases, areas nearest to the fault movement experience the greatest seismic shaking, while areas further away experience less shaking. Seismic shaking can damage or destroy structures leading to partial or even total collapse. The shaking of the ground can also damage or destroy underground utilities or pipelines, potentially leading to releases of hazardous materials and flooding if water lines are breached.

Southern California, including Costa Mesa, is a seismically prone area because of the major active faults that run through the region. The intensity of seismic shaking is usually measured with the Modified Mercalli Intensity (MMI) scale, which is based on the amount of observed damage. The MMI scale has replaced the Richter scale, which is no longer used since it loses effectiveness when measuring larger earthquakes. Since the degree of shaking, and consequently damage, generally decreases as the seismic energy travels further away from the earthquake's point of origin, different sections of a city or region can report different MMI measurements in different locations. Given Costa Mesa's size, it is likely that different sections of the City would report different MMI measurements. The MMI scale depicted in **Table 3-13** uses Roman numerals on a 12-point scale to measure each degree of shaking intensity.

Another scale for measuring seismic shaking is the moment magnitude scale (MMS, denoted Mw or simply M). The MMS measures the energy released by the earthquake beginning at 1.0 and increases as the earthquake's energy grows. The MMS is a logarithmic scale, meaning that the difference between numbers on the scale multiplies as they increase. For example, a 5.0M earthquake is approximately 1.4 times greater than a 4.9M event, 32 times greater than a 4.0M event, and 1,000 times greater than a 3.0M event.

Seismic shaking can also be measured in relationship to the force of Earth's gravity (g). This is typically identified as a percentage (X% g). This method is useful for geographically displaying areas of seismic shaking potential. Percent g is computed by determining the acceleration of the earthquake's motion relative to the force of gravity. The acceleration of gravity is 980 centimeters per second, so if, for example, an earthquake's acceleration is measured at 765 centimeters per second, the shaking is modeled as 765/980, or .781 g (78.1%

g). **Figure 3-15** shows the predicted intensity of seismic shaking in Costa Mesa using percentages. Darker shaded areas depicted on this map are anticipated to feel earthquakes more intensely than lighter areas. Overall, the City and surrounding areas can expect shaking between .55% g and .75% g.

LIQUEFACTION

Soils must be saturated with water for liquefaction to occur. Areas with high water tables generally have saturated soil since the distance between the shallowest aquifer and the surface is minimal. Areas with alluvial soils—soft sands, silts, and clays—are also susceptible to liquefaction as these soils are fine grain and generally do not bond together well.

Liquefaction events do not have a scale of measurement; however, other factors can be used to assess the extent of damage associated with a liquefaction event, such as:

- Soil type
- Strength of seismic shaking in the area of liquefaction
- Size of the affected area
- Degree of destruction because of the liquefaction

Liquefaction caused by the 1964 Niigita, Japan earthquake caused these apartment blocks to experience severe leaning. Image from the University of Washington.

According to the California Geological Survey, parts of Costa Mesa are in a liquefaction potential zone **(Figure 3-16)**. This is due to the types of soils in this area, shallow groundwater beneath the City, and proximity to active earthquake faults capable of generating large earthquakes. In this area of the City, the soils are predominantly sandy alluvial soils. The zones of concern are concentrated along the western and northern parts of the City that border the Santa Ana River and 55 Freeway. Small, isolated areas west of John Wayne Airport are also susceptible to liquefaction, which connect to the Newport Bay east of the City. The largest contributor to these conditions is the depth to groundwater, which in some areas is as shallow as 10 feet beneath the ground surface. [90]

[90] Orange County Water District. June 2015."Groundwater Management Plan 2015 Update." https://www.ocwd.com/media/3503/groundwatermanagementplan2015update_20150624.pdf

Figure 3-14: Fault Rupture Zones in Costa Mesa

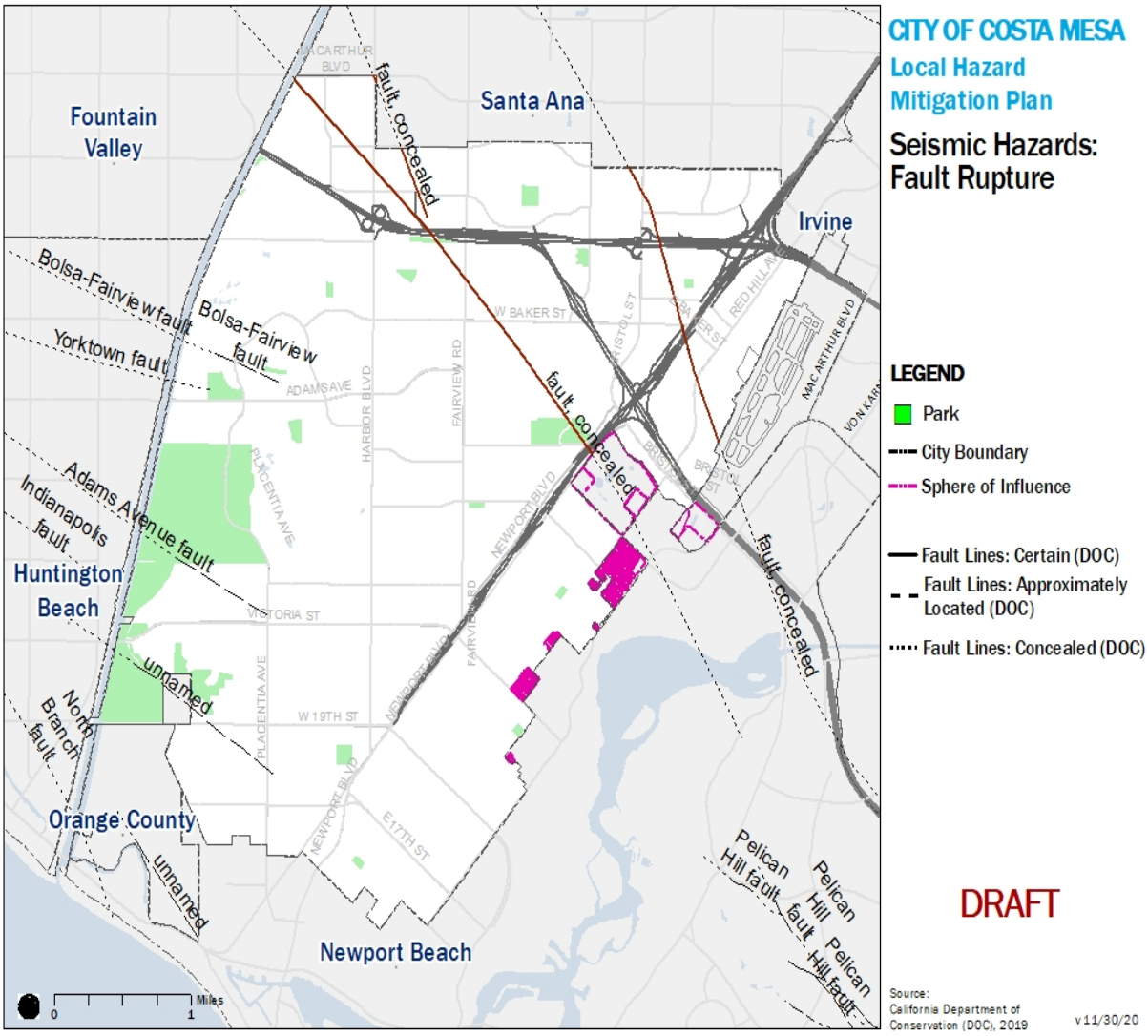


Table 3-13: Modified Mercalli Intensity Scale

Intensity	Description	Description
I	Instrumental	Felt only by a very few people, under especially favorable conditions.
II	Feeble	Felt only by a few people at rest, especially on the upper floors of buildings.
III	Slight	Noticeable by people indoors, especially on upper floors, but not always recognized as an earthquake.
IV	Moderate	Felt by many indoors and by some outdoors. Sleeping people may be awakened. Dishes, windows, and doors are disturbed
V	Slightly Strong	Felt by nearly everyone, and many sleeping people are awakened. Some dishes and windows broken, and unstable objects overturned.
VI	Strong	Felt by everyone. Some heavy furniture is moved, and there is slight damage.
VII	Very Strong	Negligible damage in well-built buildings, slight to moderate damage in ordinary buildings, and considerable damage in poorly built buildings.
VIII	Destructive	Slight damage in well-built buildings, considerable damage and partial collapse in ordinary buildings, and great damage in poorly built buildings.
IX	Ruinous	Considerable damage in specially designed structures. Great damage and partial collapse in substantial buildings, and buildings are shifted off foundations.
X	Disastrous	Most foundations and buildings with masonry or frames are destroyed, along with some well-built wood structures. Rail lines are bent
XI	Very Disastrous	Most or all masonry structures are destroyed, along with bridges. Rail lines are greatly bent.
XII	Catastrophic	Damage is total. The lines of sight are distorted, and objects are thrown into the air.

Source: United States Geological Survey. 2019. *The Modified Mercalli Intensity Scale.* **https://earthquake.usgs.gov/learn/topics/mercalli.php**

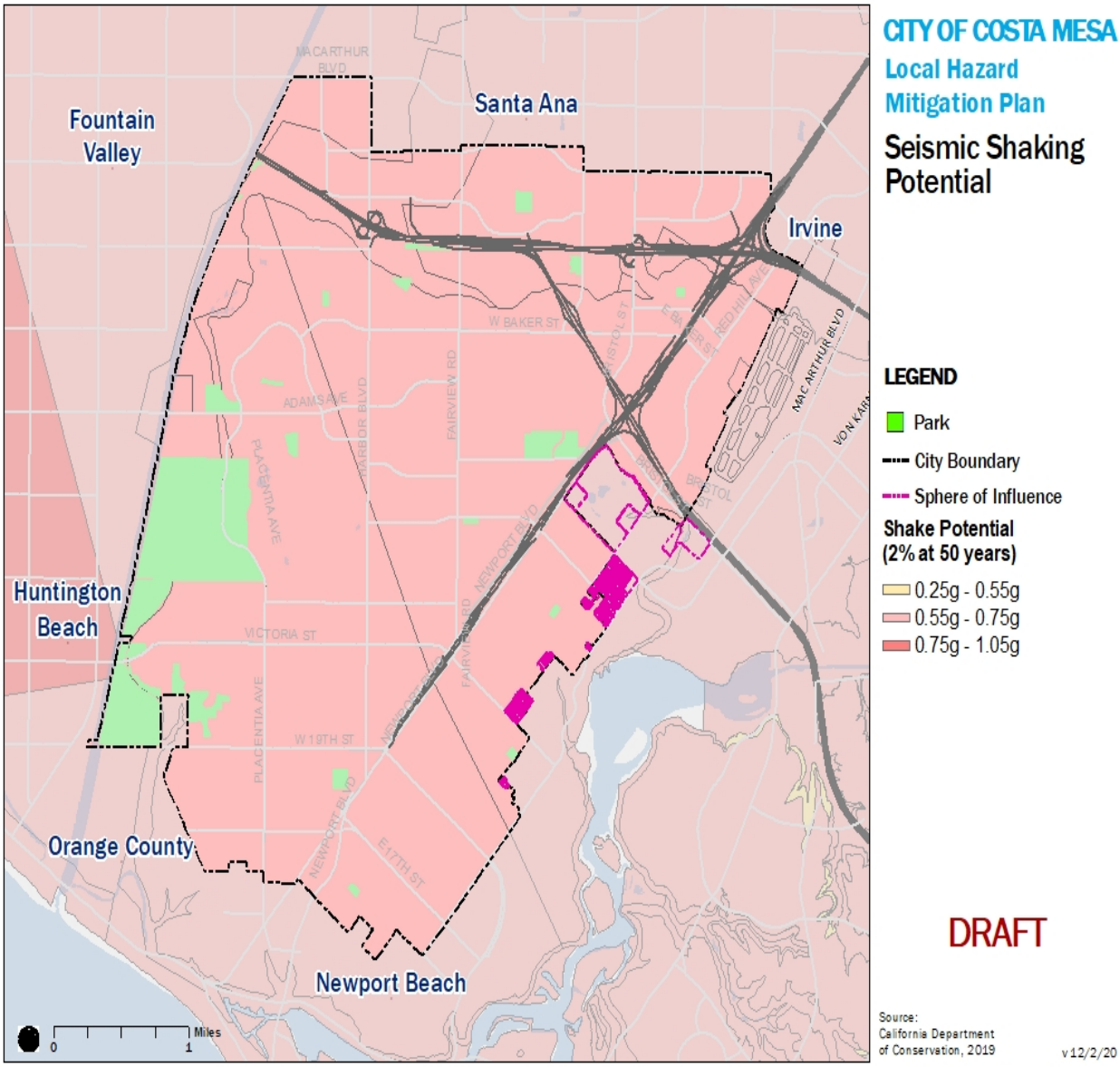
Past Events

Fault Rupture

The largest recent fault rupture near Costa Mesa was the 1994 Northridge earthquake, a 6.7 Mw event approximately 56 miles from Costa Mesa and the most destructive earthquake in the United States in nearly 100 years. This event killed sixty people, injured more than 7,000, left 20,000 people homeless, and damaged more than 40,000 buildings in Los Angeles, Ventura, Orange, and San Bernardino Counties. Damage to Angel Stadium occurred from this event. [91] More recently and closer to the City, a 5.1 Mw earthquake occurred in La Habra in 2014.

[91] United States Geological Survey. 2020. M 6.7-1km NNW of Reseda, CA (Northridge Earthquake) Overview. https://earthquake.usgs.gov/earthquakes/eventpage/ci3144585/executive

Figure 3-15: Seismic Shaking Potential

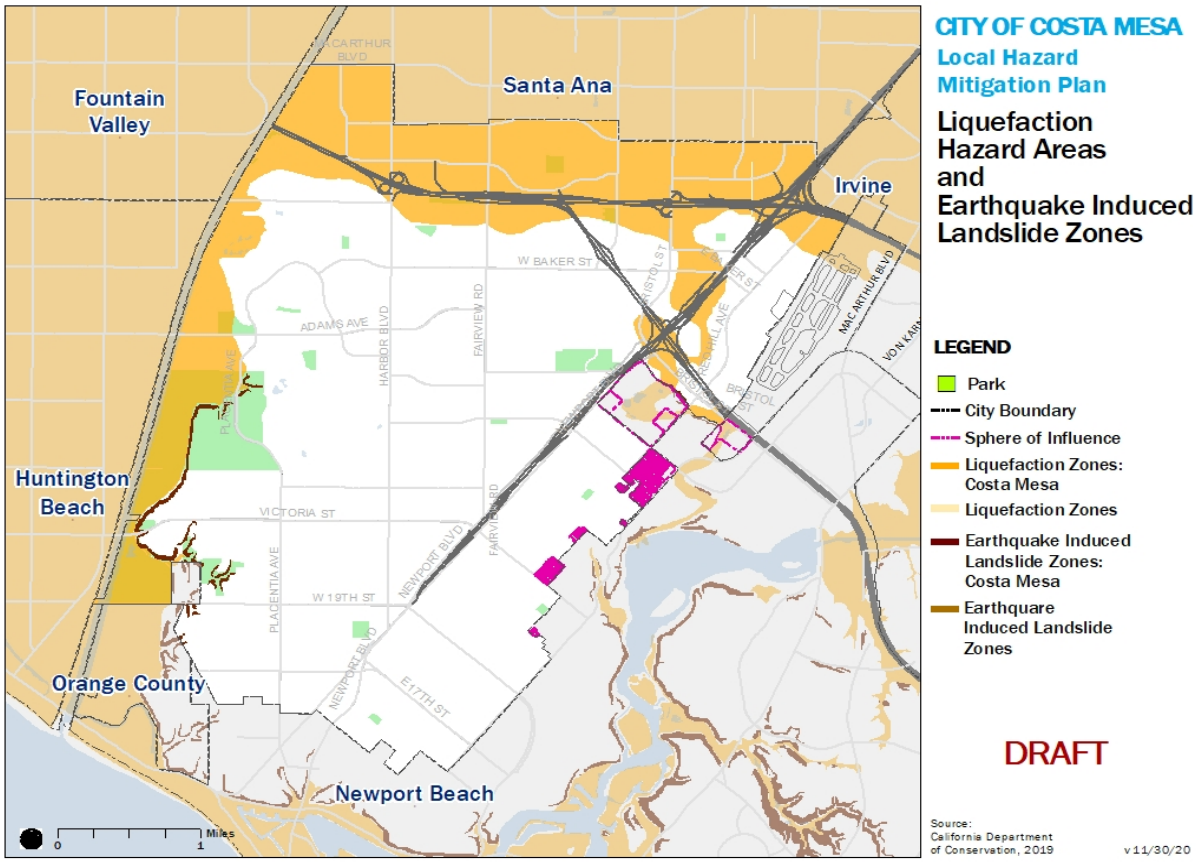


This event caused fault rupturing adjacent to but not directly on the Puente Hills and Whittier faults. [92] Most recently, a significant swarm of earthquakes in the Ridgecrest area occurred on July 4th and 5th, 2019. Three tremors ranging from 5.4 to 7.1 Mw occurred within the Eastern California shear zone, a region of distributed faulting associated with motion across the Pacific-North America plate boundary, and an area of high seismic hazard. [93]

[92] Graves, R., et al. n.d. "What We Know (and Don't Know) about the M5.1 La Habra Earthquake." http://nsm.fullerton.edu/fracking/images/Frack/Graves_-_USGS.pdf
[93] United States Geological Survey. 2020. M 7.1 - 2019 Ridgecrest Earthquake Sequence Overview https://earthquake.usgs.gov/earthquakes/eventpage/ci3144585/executive

The Newport-Inglewood Fault is defined as one of the most active faults in California; however, the fault splays located within the City have not experienced surficial fault rupture in the past 13,000 years.

Figure 3-16: Liquefaction Hazard Areas and Earthquake Induced Landslide Zones



Seismic Shaking

Compton Union High School in Long Beach after the 1933 Earthquake. Photo Courtesy, Fred Turner. Researchgate.net

While no significant earthquake has originated within Costa Mesa or Orange County within the last 100 years, Costa Mesa has undoubtedly felt the shaking of regional earthquakes. The nearest earthquake event to Costa Mesa that caused significant damage throughout the Southern California region was the 1933 Long Beach earthquake. The actual epicenter for the quake was in the City of Huntington Beach; however, most of the damage occurred in areas north of the epicenter. The event

caused more than $50 million in property damage and resulted in the deaths of 120 people. [94] Since Costa Mesa (the City, incorporation was 6/29/1953) did not exist during the earthquake and given that the area was sparsely populated, it is unknown whether residents experienced any property damage from the event. Most of the deaths and damage from the 1933 Long Beach Earthquake occurred because of collapsing, unreinforced masonry buildings.

Other strong, regional earthquakes have occurred in the Southern California region, but their epicenters have been so distant from Costa Mesa that seismic shaking generated by the earthquake did not cause significant property damage or harm to the City. **Table 3-14** shows significant earthquakes—magnitude 6.0 M_w or greater—within 100 miles of Costa Mesa since the beginning of the 20th century. Although there was no substantial damage in Costa Mesa from either earthquake, authorities made disaster declarations in Orange County for the 1994 Northridge Earthquake and 1987 Whittier Narrows Earthquake. [95, 96]

LIQUEFACTION

There has been no recorded historical occurrence of past liquefaction events in Costa Mesa. Since these events occur in conjunction with strong earthquakes, the nearest and most recent liquefaction event would have occurred near the mouth of the San Gabriel River at Alamitos Bay from the 1933 Long Beach Earthquake. It was reported that pavement buckled, cracks appeared in the ground, and "mud volcanoes" erupted in the Los Alamitos area. [97]

Table 3-14: Significant Earthquakes (6.0+Mw) Within 100 Miles of Costa Mesa

Event Name	Distance (Miles)*	Magnitude
Ridgecrest Earthquake (2019)	138 (Greater than 100 miles, large event)	7.1
Northridge Earthquake (1994)	65	6.7
Whittier Narrows (1987)	32	6.0
San Fernando (1971)	64	6.6
Long Beach (1933)	22	6.4

*Distance between the epicenter and Costa Mesa.
https://www.conservation.ca.gov/cgs/Pages/Earthquakes/Earthquakes-Significant.aspx

[94] Southern California Earthquake Data Center. 2011. Significant Earthquakes and Faults, Long Beach Earthquake. http://scedc.caltech.edu/significant/longbeach1933.html
[95] Federal Emergency Management Agency. 2003. California Earthquake, Aftershocks (DR-799). https://www.fema.gov/disaster/799
[96] Federal Emergency Management Agency. 2017. California Northridge Earthquake (DR-1008). https://www.fema.gov/disaster/1008
[97] California Geological Survey. 1998. "Seismic Hazard Zone Report for the Los Alamitos 7.5-Minute Quadrangle, Los Angeles and Orange Counties, California." http://gmw.conservation.ca.gov/SHP/EZRIM/Reports/SHZR/SHZR_019_Los_Alamitos.pdf

Risk of Future Events

Fault Rupture

Given the presence of faults within the City, it is likely that fault rupture could occur in the future. However, without further study of the fault segments within the City, it is difficult to estimate the potential probability of this occurrence.

Seismic Shaking

Costa Mesa is in a seismically active region, with several faults located within the City and surrounding area. The known faults running through Costa Mesa are the Newport-Inglewood and the San Joaquin Hills faults. The Newport-Inglewood fault, considered the most active in California, roughly parallels the coastline from the Santa Monica Mountains until just south of Newport Bay, where it heads offshore for an unknown distance. The Newport-Inglewood-Rose Canyon Fault Zone is a branch of the fault that is seismically active and approximately 3.5 miles wide within the City. This fault zone was the zone that triggered the deadly 1933 Long Beach earthquake with a magnitude of 6.3 (Richter Scale). The San Joaquin Hills fault runs just north of the San Joaquin Hills. If an earthquake were to occur on this blind-thrust fault, the rupture (which could be as high as M 7.3) would most likely occur underground, reducing the risk to surface structures. Of course, there would still be a danger posed by any seismic shaking that could damage buildings or infrastructure.

Several other regional faults near the City could potentially trigger a seismic shaking event; these include the San Andreas Fault, San Jacinto Fault, Elsinore (Glen Ivy) Fault, Puente Hills Fault Whittier Fault, and Palos Verdes Faults. It is almost inevitable that an earthquake will occur along one of these faults, causing a major seismic event. The Third Uniform California Earthquake Rupture Forecast (UCERF3) was released in 2015 and is the most recent assessment of the probability of a major earthquake occurring between 2015 and 2044 along faults throughout California. **Table 3-15** identifies the probability of an earthquake of at least M 6.7 occurring along these faults during this period.

In addition to UCERF3 forecasts, which project the odds of a major earthquake on local and regional faults, the U.S. Geological Survey forecasts the severity of seismic shaking in different locations for various plausible earthquake scenarios. **Table 3-16** shows the anticipated shaking in Costa Mesa from some of these scenarios.

The U.S. Geological Survey scenarios show that the Newport-Inglewood and San Joaquin Hills faults could cause the strongest seismic shaking in Costa Mesa. However, the largest magnitude events are anticipated to come from the more distant San Jacinto and San Andreas faults, which could cause earthquakes that have an overall higher magnitude than these closer faults (Newport-Inglewood or San Joaquin Hills). Due to the former faults' distance from Costa Mesa, the shaking intensity felt in Costa Mesa would be reduced compared to the shaking felt nearer the earthquakes' epicenters. The overall magnitude of potential earthquake scenarios along the Newport-Inglewood and San Joaquin Hills faults is

lower than some of the more regional faults, but their proximity to Costa Mesa means that the City would be subjected to high intensity shaking from these earthquakes. In other words, these lower magnitude earthquake scenarios may be more destructive in Costa Mesa than higher magnitude earthquake scenarios that are more distant. As noted in Table 3-15, however, the likelihood of a powerful earthquake occurring along these local faults within the next 25 years is low.

Table 3-15: Earthquake Probabilities for Key Faults near Costa Mesa (2015-2044)

Fault	Distance (Miles)*	Probability			
		6.7+ M_w	7.0+ M_w	7.5+ M_w	8.0+ M_w
San Joaquin Hills	2.3	0.44%	0.41%	0.24%	Negligible
Newport-Inglewood	3.5	0.92%	0.88%	0.43%	Negligible
Puente Hills	14	0.95%	0.65%	0.19%	Negligible
Palos Verdes	14.5	3.08%	2.80%	0.09%	Negligible
Whittier	18	1.45%	1.26%	0.66%	<0.01%
Elsinore (Glen Ivy)	23	3.19%	1.68%	0.89%	<0.01%
Sierra Madre	35	0.93%	0.90%	0.61%	0.03%
San Jacinto	46	5.06%	5.06%	5.01%	2.76%
San Andreas†	50	22.34%	19.38%	16%	6.70%

* Distance between Costa Mesa Civic Center and the nearest point of the fault. All distances are approximate.
† Southern California segments only.
Note: UCERF3 results consist of two individual models (3.1 and 3.2), each of which provides rupture probabilities for each segment of the fault. This table shows the maximum probability for a section of the fault in either model.

Table 3-16: Selected Shaking Scenarios for Costa Mesa

Fault	Magnitude	Distance to Epicenter (Miles)*	MMI in Costa Mesa
San Joaquin Hills	7.02	8.5	VIII (Destructive) - IX (Ruinous)
Newport-Inglewood	7.15	20	VIII (Destructive) - IX (Ruinous)
Puente Hills	7.08	25	VIII (Destructive) - IX (Ruinous)
Palos Verdes	7.38	14.5	VIII (Destructive) - IX (Ruinous)
Whittier	6.98	22	VIII (Destructive) - IX (Ruinous)
Elsinore (Glen Ivy)	7.25	22.5	VIII (Destructive) - IX (Ruinous)
Sierra Madre	7.16	38	VIII (Destructive) - IX (Ruinous)
San Jacinto	7.31	44.5	VIII (Destructive) - IX (Ruinous)
San Andreas†	7.91	48.5	IX (Ruinous)

*Distance between Costa Mesa Civic Center and the epicenter (the point on the surface above where the fault rupture began).

Liquefaction

Due to the types of soil in Costa Mesa and the surrounding area, shallow depth to groundwater, and proximity to active earthquake faults, portions of the City will be perpetually at risk of liquefaction. Since liquefaction events are triggered by seismic shaking, the probability of a liquefaction event occurring depends on the likelihood of an earthquake. However, the likelihood of one of these local faults experiencing an earthquake powerful enough to trigger a liquefaction event within the next 25 years is low. Table 3-15 identifies the probability of a major earthquake greater than M 6.7 occurring and their distance to Costa Mesa.

Regional faults, like the San Andreas or San Jacinto, are more likely to experience a significant earthquake within the next 25 years but may be too distant from Costa Mesa to generate significant shaking intensity to trigger a liquefaction event. As a result, it is only possible to say that liquefaction could occur in the City, but it is impossible to say with certainty when and or where liquefaction may occur.

Climate Change Considerations

Fault Rupture

Generally, there is no known direct connection between fault rupturing and climate change. Some evidence suggests that greater oceanic pressure on tectonic plates from melting land ice could influence the behavior of seismic events, but there is little to indicate that this would play a major factor in any seismic event, including fault rupturing.

Seismic Shaking

There is no direct link between climate change and seismic activity that could impact Costa Mesa, so climate change is not expected to cause any changes to the frequency or intensity of seismic shaking. Some research indicates that climate change could result in "isostatic rebounds," or a sudden upward movement of the crust as a result of reduced downward weight caused by ice sheets/ glaciers. As glaciers are known to melt when overall global temperatures increase, climate change could indirectly increase seismicity.

Liquefaction

Climate change is anticipated to change the usual precipitation patterns in Southern California. Periods of both rain and drought are anticipated to become more intense and frequent. This could translate into greater amounts of precipitation during rainy periods and reduced amounts during droughts. These changes in frequency and intensity of precipitation could change the groundwater aquifer beneath Costa Mesa and Orange County as a whole. Increasing groundwater levels could expand areas of potential liquefaction susceptibility during wetter periods and the opposite during drier periods. Therefore, depending on the circumstances, climate change could either increase or decrease the future risk of liquefaction in Costa Mesa.

Severe Weather (Extreme Heat, Severe Wind, Severe Storms)

The severe weather hazard profile includes discussions of extreme heat, severe wind, and severe storms.

DESCRIPTION

EXTREME HEAT

Extreme heat is a period when temperatures are abnormally high relative to a designated location's normal temperature range. There are generally three types of extreme heat events: [98]

Extreme Heat Days: a day during which the maximum temperature surpasses 98 percent of all historic high temperatures for the area, using the time between April and October from 1961 to 1990 as the baseline.

Warm Nights: a day between April to October when the minimum temperature exceeds 98 percent of all historic minimum daytime temperatures observed between 1961 to 1990.

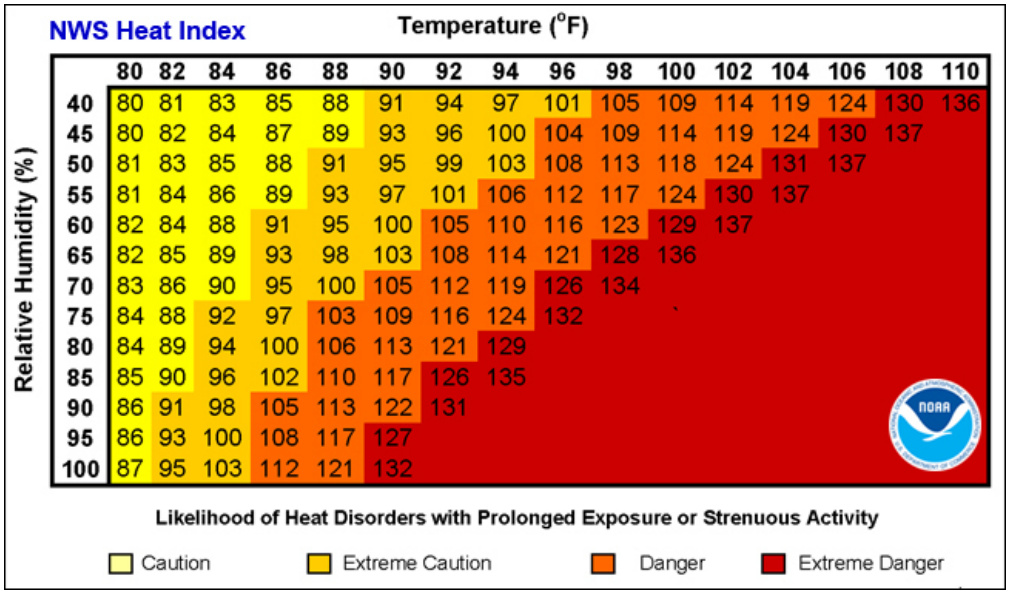
Extreme Heat Waves: a successive series of extreme heat days and warm nights where extreme temperatures do not abate. While no universally accepted minimum length of time for a heatwave event exists, Cal-Adapt considers four successive extreme heat days and warm nights to be the minimum threshold for an extreme heatwave.

Extreme heat events will feel different from region to region since different areas have different historic high temperatures. For example, an extreme heat day on the coast will feel different from that in the High Desert. The reason for this is how humidity plays a factor in the perceived heat that people feel. Humid conditions will make a day feel hotter than non-humid conditions, even though the temperature may be the same. The difference between the perceived temperature and the actual temperature is known as the "heat index." To illustrate the effect of the heat index, a 90-degree day with 50 percent humidity feels like 95°F, whereas a 90°F day with 90 percent humidity feels like 122°F. **Figure 3-17** shows the National Oceanic and Atmospheric Administration (NOAA)'s National Weather Service Heat Index.

Extreme heat poses several dangers to public health. The human body is vulnerable to long periods of high temperatures and will eventually enter a state of heat exhaustion and dehydration if exposure to heat is extended. If exposure to high temperatures is particularly prolonged to the point that internal body temperature surpasses 105°F, heatstroke may occur, and organ failure and even death may soon follow without intervention.

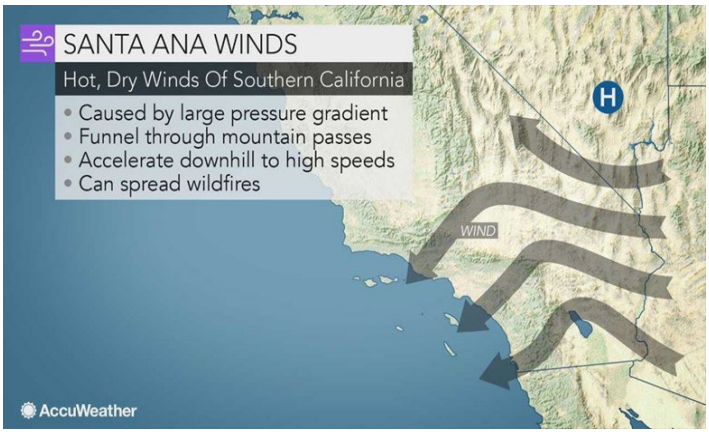
[98] Cal-Adapt. 2020. Extreme Heat Days & Warm Nights. https://cal-adapt.org/tools/extreme-heat/

Figure 3-17: NOAA National Weather Service Index



Severe Wind

Wind is simply the movement of air caused by differences in atmospheric temperature. High-pressure air will naturally move to areas of low pressure. Usually, the distance between these high- and low-pressure zones is far; however, on occasion, these low- and high-pressure zones may be near one another. When this happens, air will flow dramatically, creating high-speed winds. The most common wind events in southern California are the "Santa Ana" wind conditions that typically occur in the fall and winter.



Santa Ana Wind Events

When winds are fast enough, they can cause property damage to homes, public facilities, utilities, and other infrastructure. They can also uproot or topple mature trees or pick up debris and send it careening through the air. This debris can injure or even kill bystanders who may find themselves stranded outside. High-speed winds can also deposit this debris in the middle of rights-of-way, such as roads, freeways, and railways, blocking exit routes for would-be evacuees or impeding access to first responders trying to reach wounded people.

Severe Storms

During severe weather events such as strong storms, rain can fall at such a high rate that it cannot drain away fast enough. The resulting heavy rain can cause flooding, leading to inundation and potential damage to buildings, road networks, public areas, utilities, and

other critical pieces of infrastructure. In California, heavy rainfall events are often short, intense bursts of rain, but in some cases, heavy rain can persist for multiple days.

Location and Extent

Extreme Heat

Extreme heat events are not limited to any part of the City. They occur with the same intensity and duration at the same time across all locations in Costa Mesa. According to Cal-Adapts' website, [99] the minimum threshold for an extreme heat day in Costa Mesa is 89.4°F. The minimum threshold for a warm night in Costa Mesa is 67.6°F. These thresholds are based on a 2% probability event.

Severe Wind

In Southern California, the most common type of severe wind event is called the Santa Ana winds. During the fall and winter months, high pressure over Nevada and Utah forces air down from the high desert toward the ocean. As the winds descend, they heat up and increase in speed, sometimes carrying particulate matter and aggravating the respiratory health of those who have allergies. [100]

Costa Mesa is often affected by Santa Ana winds blowing through the Santa Ana Mountain range. Santa Ana winds are a leading cause of wildfires in California.

Generally, winds are measured using the Beaufort scale, developed in 1805, categorizing wind events on a force scale from 0 to 12 using their speed and impacts. Any wind that is classified as force nine or above is generally considered a severe wind event. **Table 3-17** shows how the Beaufort scale classifies wind events in detail.

Severe Storms

The location and size of a rain event vary depending on regional geography and regional and global weather events. For example, small precipitation events may occur in only one section of Costa Mesa. In contrast, a large rain event could inundate a majority of Orange County and other parts of southern California.

California's precipitation varies from year to year, depending on how much moisture the state receives from atmospheric rivers. Atmospheric rivers are corridors along which wet air travels from the tropics to continents. When the moisture arrives in California, it may precipitate as rain or snow. One of California's most known atmospheric rivers is the "Pineapple Express," which brings moist air from the ocean surrounding Hawaii to California. An immense amount of moisture may be transported along the atmospheric rivers that cross over California during certain years, leading to severe rains. [101]

Another weather phenomenon influencing rainfall in southern California is "El Niño," officially referred to as the "Southern Oscillation" or "El Niño-Southern Oscillation (ENSO)." ENSO can cause increased rainfall, particularly during the winter months, caused by warming of the surface of the eastern tropical Pacific Ocean, leading to the evaporation of

[99] https://cal-adapt.org/tools/extreme-heat/
[100] UCSD (University of California, San Diego). 2016. "Santa Ana." http://meteora.ucsd.edu/cap/santa_ana.html
[101] "What are atmospheric rivers?" https://www.noaa.gov/stories/what-are-atmosphericrivers

warm, moist air into the atmosphere. Winds bring this moisture to the eastern Pacific and the American continents, where it falls as rain. ENSO does not always lead to increased rainfall by default, but in general, it can increase the chances of winter with higher-than-usual precipitation. [102, 103]

Table 3-17: Beaufort Scale

Force	Speed (mph)	Description
1	0 to 1	Calm: Smoke rises vertically, and the sea is flat
2	1 to 3	Light air: The direction of wind is shown by smoke drift, but not wind vanes
3	4 to 7	Light breeze: Wind is felt on the face, leaves rustle, and wind vanes are moved. Small wavelets appear on the ocean, but do not break
4	8 to 12	Gentle breeze: Leaves and small twigs are in motion, and light flags are extended. Large wavelets appear on the ocean, and crests begin to break
5	13 to 18	Moderate breeze: Dust and loose paper become airborne, and small branches are moved. Small waves appear on the ocean
6	19 to 24	Fresh breeze: Small trees begin to sway and moderate waves form
7	25 to 31	Strong breeze: Large branches are in motion, and using an umbrella becomes difficult. Large waves begin to form
8	32 to 38	Near gale: Whole trees are in motion and walking against the wind can be hard. Foam from breaking waves is blown in streaks
9	39 to 46	Gale: Walking is difficult, and twigs break off trees
10	47 to 54	Severe gale: Slight structural damage. Crests of waves begin to topple
11	55 to 63	Storm: Trees are uprooted and considerable damage to structures. Very high waves form in long, overhanging crests
12	63 to 72	Violent storm: Widespread damage. Exceptionally high waves form, and the ocean is completely covered in foam

*Source: **https://www.weather.gov/mfl/beaufort**.

Rain events are usually measured by the amount of precipitation that falls. [104] **Table 3-18** categorizes rain events by the amount of precipitation per hour.

Table 3-18: Measuring Heavy Rain Events

Rain Type	Description
Heavy Rain	More than 4 mm per hour but less than 8 mm per hour
Very Heavy Rain	Greater than 8 mm per hour
Moderate Shower	Greater than 2 mm, but less than 10 mm per hour
Heavy Shower	Greater than 10 mm per hour, but less than 50 mm per hour
Violent Shower	Greater than 50 mm per hour

Source: **https://water.usgs.gov/edu/activity-howmuchrain-metric.html**
mm = millimeter

[102] NOAA. 2014. "What Is the El Niño–Southern Oscillation (ENSO) in a Nutshell? https://www.climate.gov/news-features/blogs/enso/what-el-ni%C3%B1o%E2%80%93southern-oscillation-enso-nutshell
[103] NOAA. 2016. "El Niño and La Niña: Frequently Asked Questions." https://www.climate.gov/news-features/understandingclimate/el-ni%C3%B1o-and-la-ni%C3%B1a-frequently-asked-questions.
[104] https://www.climate.gov/enso

Past Events

Extreme Heat

Local data from within Costa Mesa is generally available using the Tustin, Irvine Ranch and the Santa Ana Fire Station, National Weather Service Cooperative Network stations. The data indicates that the average maximum temperature for the area from all years between 1902 and 2016 is 84.7°F, occurring in August. [105] Given that the minimum threshold for an extreme heat day in Costa Mesa is 93°F, it is rare that the temperature exceeds this threshold regularly. Still, extreme heat events have occurred in the region, which occasionally impact the City as well. Some significant historic extreme heat events include:

In September 1963, the temperature reached 113°F at the now defunct El Toro Air Force Base, and the surrounding region was also hot, including coastal areas. Temperatures in Carlsbad and Oceanside reached 108°F. School children and employees were sent home due to the heat, and some agricultural crops were destroyed.

In April 1989, daily high-temperature records were set for all weather monitoring stations in Southern California. Los Angeles and Riverside set records at 106°F and 104°F, respectively. [106]

In September 2020, Costa Mesa experienced three consecutive days of temperatures that exceeded 99°F, requiring the City to open a cooling centers.

More recent extreme heat events have also affected the greater region surrounding Costa Mesa:

- Throughout July 2018, extreme heat waves occurred throughout Southern California, including Costa Mesa. The hottest day of the heat waves occurred on July 6 when temperatures reached 114°F in Santa Ana, CA (adjacent to Costa Mesa). A second but less intense extreme heatwave occurred on July 25, where regional temperatures went above 100°F in places like Burbank. While local temperature data for Costa Mesa is not available, the weather monitoring station at nearby Long Beach Airport indicates that the temperature reached 95°F that day. [107]

- On October 23, 2017, Southern California experienced two extreme heat days. The weather monitoring station at Long Beach Airport indicated that temperatures reached 105°F that day. [108]

Severe Wind

There have been several strong wind events recorded in and around Costa Mesa: [109]

[105] https://wrcc.dri.edu/cgi-bin/cliMAIN.pl?ca7888
[106] National Oceanic and Atmospheric Administration. May 2017. "A History of Significant Weather Events in Southern California." https://www.weather.gov/media/sgx/documents/weatherhistory.pdf
[107] Climate Signals. December 2018. *Southern California Heat Wave July 2018.* https://www.climatesignals.org/events/southern-california-heat-wave-july-2018
[108] Weather Underground. 2019. Long Beach Airport, California – October 2017. https://www.wunderground.com/history/monthly/us/ca/long- beach/KLGB/date/2017-10
[109] National Oceanic and Atmospheric Administration. May 2017. "A History of Significant Weather Events in Southern California." https://www.weather.gov/media/sgx/documents/weatherhistory.pdf

- In November 1957, Santa Ana winds exacerbated wildland fires, endangered air traffic, and triggered sandstorms in the Fontana area.

- In April 1962, strong Santa Ana winds howled throughout the region, uprooting trees, causing property damage, and interrupting customer power transmission.

- In November 1996, Santa Ana winds blew at 35 to 45 miles per hour throughout most of southern California, although winds were recorded close to 100 miles per hour in certain areas. In December 1996, gusts were recorded in Fremont Canyon near Tustin at 111 miles per hour. Injuries were recorded in Huntington Beach when a 60-foot tree was uprooted by the winds and fell on top of people.

- In October 1997, a fire caused by scrap metal was carried by 45-mile-per-hour Santa Ana winds throughout the Santa Ana Mountains, causing widespread property damage in eastern Orange County.

- In October 1998, a thunderstorm sent destructive winds through Orange County. Trees everywhere were uprooted and blown onto vehicles and buildings. A power outage affected more than 18,000 utility customers across Los Alamitos, Rossmoor, Cypress, Tustin, Santa Ana, and Garden Grove.

- In October 2007, winds up to 85 miles per hour blew through Fremont Canyon near Tustin. These winds caused extensive damage to structures and vehicles. The winds also exacerbated existing wildland fires, causing widespread evacuations and burning more than 49,000 acres.

- In November 2008, strong Santa Ana winds exacerbated and spread the Freeway Complex Fire, one of the most destructive fires in Southern California history. More than 30,000 acres were burned.

Severe Storms

Costa Mesa and Orange County have experienced heavy rain events that have inundated many communities. Some significant historical events include: [110]

- 1861-1862 - Epic floods caused by rain over 30 days in succession. The Santa Ana River in Anaheim ran 4' deep and spread in an unbroken sheet to Coyote Hills, 3 miles beyond (present Fullerton). Twenty people died in Orange County due to this event.

- 1997 - A stationary line of thunderstorms brought the heaviest rain in 70 years to portions of Orange County. Rainfall totals ranged from 4 inches to 10 inches in some parts of the southland. Newport Beach and Laguna Beach reported respective rainfall totals of 6.00 inches and 5.50 inches, both all-time records by more than an inch for a single day. Widespread flooding in Orange County. Mudslides and coastal erosion.

[110] National Oceanic and Atmospheric Administration. May 2017. "A History of Significant Weather Events in Southern California." https://www.weather.gov/media/sgx/documents/weatherhistory.pdf

- 1998 - Up to 3" of rainfall fell over Southern California, causing catastrophic and widespread flooding, especially in Newport Beach and Irvine. Significant property damage occurred in south Orange County, requiring evacuations and swift water rescues. Impacts from this event included landslides, mudslides, sinkholes, and damage to roads, bridges, and railroads.

- 2008 - Heavy rain from thunderstorms was produced by a very cold and unstable storm from the north, causing several debris flows. In the Santiago burn area of eastern Orange County, damage was done to homes and businesses.

Risk of Future Events

Extreme Heat

Extreme heat events occur annually in Costa Mesa a few times each year. All expectations are that the probability they will occur again in the future is highly likely and anticipated to increase in the future.

Severe Wind

Given Costa Mesa's history of severe wind events, it is very likely that wind events will continue to impact the city. The most probable source of wind events in the future will likely originate from the Santa Ana winds or extreme storms. All expectations are that the probability they will occur again in the future is highly likely.

Severe Storms

There is no indication that rainfall or severe rain hazards will abate either in Costa Mesa or the greater region of Southern California in the future. While Costa Mesa may experience prolonged periods of dry or wet years, all expectations are that the probability they will occur again in the future is highly likely and anticipated to increase in the future.

Climate Change Considerations

Extreme Heat

The primary effect of climate change is warmer average temperatures. The warmest decade on record is 2011-2020, with the warmest three years on record occurring in 2016, 2019, and 2020. [111] As climate change accelerates in the 21st century, it is anticipated that extreme heat events will become more frequent and intense in California, including Costa Mesa. In Costa Mesa specifically, the projected average number of extreme heat days per year could increase from 4 to 12, assuming global greenhouse gas emissions peak around 2040, then decline. If global greenhouse gas emissions continue to rise until 2100, the number of extreme heat days could increase to as many as 28 days per year. The number of warm nights could increase from 4 to 37, assuming an emissions peak and decline in 2040 but could increase to as many as 86 if emissions continue to rise until 2100. [112]

[111] World Meteorological Organization. January 15, 2021 2020 was one of the three warmest years on record. https://public.wmo.int/en/media/press-release/2020-was-one-of-three-warmest-years-record
[112] https://cal-adapt.org/tools/extreme-heat/

SEVERE WIND

It is anticipated that the atmospheric rivers that deliver storms to Southern California may intensify because of climate change. While the average number of storms in Southern California will remain the same, storms are expected to increase in strength by 10 to 20 percent (Oskin 2014). This increase in storm intensity may also bring more intense winds to the Southern California region, including Costa Mesa. It is not yet known if climate change will affect the frequency or intensity of Santa Ana wind events.

Regarding Santa Ana winds, however, studies indicate that these events may be affected in varying ways. According to one study that examined two global climate models, there is a projected increase in future Santa Ana events. However, other studies have found that the number of Santa Ana events may decrease by about 20% in the future.[113] Given the anticipated increases in temperatures throughout the region, future events are anticipated to become more severe in some cases, even if the number of events decreases.

SEVERE WEATHER

Climate change is expected to alter rainfall patterns in southern California, including Costa Mesa. As the climate warms, rain events are predicted to become more intense. Costa Mesa will likely experience more rain inundation events that lead to flooding and erosion and increase the threat of dam failure, tree mortality, and other potential hazards.

Urban Fire

DESCRIPTION

An urban fire is a fire that causes damage to buildings or infrastructure in an urbanized area. In some minor situations, the fire prompts the evacuation of the building's occupants, and the fire is contained within a short amount of time by firefighting teams or the building's fire suppression systems. In severe cases, the fire leads to the complete destruction of the building and can spread to other surrounding properties. Common causes of urban fires include stoves that are accidentally left on, short-circuited electrical equipment, or mishandling of household tools. Larger urban fires may be caused by breaches in gas pipelines, large transportation accidents, or downed electrical transmission wires. Fires can also be intentionally started by arsonists.

LOCATION AND EXTENT

Most of Costa Mesa's buildings consist of wooden-frame construction, which is susceptible to catching fire. Even structures that do not have wooden frames, such as large medical facilities or office towers, are at risk of urban fires. These locations contain furniture, papers, plant material, textiles, and other objects that can be ignited. Given that nearly all of Costa Mesa is developed, urban fires can occur at any location in the City since any one of these structures can burn.

[113] Hall, Alex, Neil Berg, Katharine Reich. (University of California, Los Angeles). 2018. Los Angeles Summary Report. California's Fourth Climate Change Assessment. https://www.energy.ca.gov/sites/default/files/2019-11/Reg%20Report-%20SUM-CCCA4-2018-007%20LosAngeles_ADA.pdf

Fires are also likely to occur where there are major pieces of infrastructure, such as gas pipelines, power lines, or highways. SoCalGas operates a large high-pressure gas pipeline underneath Fair Dr and Joann St. If this pipeline were to breach and the released gas ignites, any structures located along the extent of the breach would likely catch fire. SoCal Edison owns and operates above-ground, high-voltage transmission lines strung from poles on a right-of-way through the City. While there are no structures directly beneath the utility poles in most cases, there are still adjacent trees, vehicles, and yards that could ignite if a downed power line encountered them. If any of these landscaped spaces or vehicles caught fire, it could spread to surrounding homes and buildings if hot cinders from the fire came in contact with the buildings. State Route 55 also runs through the City and carries thousands of vehicles every day. If a major transportation accident were to occur on the freeway, it could potentially cause a fire. Given that the freeway and sound walls are non-flammable, it is anticipated that a fire that begins on the freeway would most likely be contained to the freeway. There are some portions of the freeway where no sound walls separate the landscaped easement from the freeway traffic. It is possible that an intense fire in these sections of the freeway could spread to the easement and properties adjacent to the freeway (Ex: OC Fair Grounds).

A fire can only ignite as there are three elements present: heat, fuel, and oxygen. If any one of these elements is removed, the fire will extinguish itself. In Costa Mesa, there is abundant fuel given the thousands of structures and flammable objects contained in each of them, and oxygen is nearly always present in most situations. Activity that creates intense heat that is unmonitored or unregulated may lead to the ignition of a fire. The National Institute of Fire and Technology has developed a scale that measures the increase of temperature and the kind of fire response that develops. **Table 3-19** shows the progression of temperature relative to fire response.

Once a fire has been ignited, it could conceivably grow to an indefinite size if abundant fuel and oxygen are available. For example, a fire that ignites in one house could hypothetically continue to expand and even spread to other adjacent houses if there was enough fuel to link the structures together. Fires in confined spaces may occasionally burn so intensely that they consume all the oxygen available to them and burn out before expanding.

Past Events

While there is no information available indicating that specific fires have occurred in Costa Mesa, other cities in the surrounding area in Orange County have experienced urban fires. Some examples are included below:

- Fullerton, CA: An unknown serial arsonist started a series of 15 fires in trash bins and dumpsters throughout Fullerton across a five-month period from 2016 to 2017. Nobody was injured, and no significant property was destroyed, though some of the containment sheds for the dumpsters were burned. [114]

[114] CBS Los Angeles. February 2017. 4 Early Morning Fullerton Fires Likely Linked to Arson Spree, Policy Say. https://losangeles.cbslocal.com/2017/02/07/4-early-morning-fullerton-fires-likely-linked-to-arson-spree-police-say/

Table 3-19: Fire Susceptibility Based on Temperature Increase

Temperature (°F)	Response
98.6 °F	Average normal human oral/body temperature.
101 °F	Typical body core temperature for a working fire fighter.
109 °F	Human body core temperature that may cause death.
111 °F	Human skin temperature when pain is felt.
118 °F	Human skin temperature causing a first-degree burn injury.
130 °F	Hot water causes a scald burn injury with 30 s exposure.
131 °F	Human skin temperature with blistering and second degree burn injury.
140 °F	Temperature when burned human tissue becomes numb.
162 °F	Human skin temperature at which tissue is instantly destroyed.
212 °F	Temperature when water boils and produces steam.
482 °F	Temperature when charring of natural cotton begins.
>572 °F	Modern synthetic protective clothing fabrics begin to char.
≥752 °F	Temperature of gases at the beginning of room flashover.
≈1832 °F	Temperature inside a room undergoing flashover.

Source: National Institute of Fire Technology. July 2018. *Fire Dynamics*

- Seal Beach, CA: The retirement community of Leisure World has experienced numerous fires within the last ten years. A carport caught fire in 2017, destroying eight vehicles and resulting in property damages worth $220,000. In 2014, five homes in the community caught fire and caused damages worth an estimated $1 million. In both instances, there were no fatalities. [115]

- Buena Park, CA: In 2017, An OCFA fire station near the theme park of Knott's Berry Farm caught fire in the early morning resulting in the destruction of firefighting equipment worth $1.5 million, including a 100-foot fire engine, an SUV, and two swift-water emergency vehicles. Nobody was harmed by the fire. The cause of the fire was uncertain, but it is suspected that the building's age was a contributing factor. [116]

An Orange County Fire Authority station in nearby Buena Park, CA is seen here ablaze in an unexplained 2017 urban fire. Image from Kevin Warn

[115] Fausto, A. July 2017. "Fire at Leisure World in Seal Beach destroys 7 cars 1 golf cart." OC Register. https://www.ocregister.com/2017/07/03/fire-at-leisure-world-in-seal-beach-destroys-7-cars-1-golf-cart/

[116] Sudock, J. and Whitehead, B. January 2017. "Fire at fire station near Knott's destroys 4 fire vehicles, including $1 million aerial truck. OC *Register*. https://www.ocregister.com/2017/01/13/fire-at-fire-station-near-knotts-destroys-4-fire-vehicles-including-1-million-aerial-truck/

- Anaheim, CA: In April 1982, numerous homes and multi-family housing units caught fire, causing damages worth $18.5 million and displacing 1,288 residents. The fire ignited in a palm tree after it repeatedly encountered a power line. The blaze eventually spread to surrounding buildings because of intense Santa Ana winds. [117]

Risk of Future Events

If the conditions for an urban fire exist in Costa Mesa, the City will forever be at risk for experiencing an urban fire event. It is impossible to predict the precise likelihood of an urban fire emerging in the City, given how each fire event has unique origins. Some areas, however, are at an increased risk of an urban fire igniting, such as the buildings and homes along the SoCalGas pipeline's course through the City. Given that there have been no records of significant urban conflagration incidents in Costa Mesa, the overall likelihood of an urban fire starting in Costa Mesa is exceptionally low.

Climate Change Considerations

While climate change has been linked to a potential increase in wildfire events, it is not clear exactly how climate change could influence the ignition or behavior of urban fires in Costa Mesa.

[117] Murphy, K. September 1985. "Anaheim Settles with Victims of 1982 Firestorm." Los Angeles Times. https://www.latimes.com/archives/la-xpm-1985-09-12-me-21107-story.html

Chapter 4 – Threat and Vulnerability

The threat assessment process looks at the harm that each hazard event discussed in Chapter 3 may cause in three different areas: the physical threat to key facilities, the threat to vulnerable populations, and the threat to any other community assets.

Threat Assessment Process

The threat assessment process looks at the harm that Costa Mesa may experience from a hazard event but does not consider its likelihood, so it gives equal consideration to hazards that are more likely (e.g., earthquakes, flood) as well as hazards that are less probable (e.g., aircraft incident, dam failure).

The threat assessment examines three aspects of each hazard: the physical threat to Critical Facilities (CFs) and Facilities of Concern (FOC), the social threat to vulnerable populations, and the threat to any other assets that may be affected.

Critical Facilities and Facilities of Concern

Critical facilities consist of properties and structures that play important roles in government operations and their services to the community. Examples of CFs include local government offices and yards, community centers, public safety buildings like police and fire stations, schools, and any other properties a city has deemed essential for its operations. CFs may also serve dual roles if a city designates them as public assembly points during an emergency. The City often owns CFs, but many are also owned and operated privately, such as some utilities and telecommunication infrastructure.

The Hazard Mitigation Planning Committee identified 89 CFs or FOC in Costa Mesa that fall into 6 different categories based on their function or characteristics. **Table 4-1** shows the number of CFs and FOC in each category, the total estimated value of the facilities in each category, and examples of the facilities in each. **Appendix D** has a complete list of the CFs and FOC.

The potential loss value is the total insured value of the CFs that fall within the hazard zone. It is intended to provide the ballpark estimate of replacement cost if the property is completely or severely damaged. The actual costs of repair could be smaller or larger than the provided estimate. The data relies on the City's Insured Asset Values, and therefore, information for facilities not owned by the City are not shown (e.g., bridges, private buildings). In some instances, replacement cost information was not made available. Where this occurs, "N/A" has been used within the table.

Based on the available data provided by the City, there is a minimum of $153,537,534 worth of City-owned assets. Due to data limitations, the total potential loss value of all City-owned and non-City-owned assets is much higher but unknown. The greatest potential for loss among the City-owned assets comes from the Bridges category, including underpasses and overpasses throughout the City. The next category with the greatest potential for loss is the

City Vital Operations category, including the Civic Center Complex, Civic Center Annex, Police Station, and Fire Stations. To better understand the magnitude of impacts, this plan identifies representative percentages of potential impact based on the total valuation of City assets. For planning purposes, we identified different tiers of the impact that could happen. It is reasonable to assume that impacts would not exceed 50% of the total asset value city-wide. The following are parameters to help understand how much a proposed investment/improvement compares to the existing assets within the City:

- 1% Impact - $1,535,375
- 5% Impact - $7,676,877
- 10% Impact - $15,353,753
- 20% Impact - $30,707,507
- 50% Impact - $76,768,767

The likelihood that all facilities are completely damaged at the same time is extremely remote. Most impacts are anticipated to be isolated to certain locations based on the hazard. This estimate does not include the value of underground infrastructure and surface drainage facilities owned and operated by the City.

Table 4-1: Critical Facilities and Facilities of Concern

Category	Number of Facilities		Examples	Potential Loss
	CRITICAL	CONCERN		
City Vital Operations	12	0	City Hall, Police Station, Fire Station, Operations Support	$104,827,174
City Community Centers	4	0	Community Centers	$20,840,840
City Resident Services	0	13	Senior Center, Animal Shelter, Bridge Shelter, Daycares, Other Community Facilities, Homeless Shelter	$19,720,950
City Recreation Support	1	16	Parks, Recreation Amenities, Sports Complexes, and support facilities	$8,148,570
Bridges	13	0	Overpasses and underpasses within the City	-
Schools**	0	25	Newport-Mesa Unified School District and OC Department of Education Facilities	-
HazMat Locations	0	5	Site previously contaminated or undergoing clean up	-
Total	**30**	**59**	**---**	$153,537,534

* Potential loss data are estimates only, as replacement values for some facilities were not available. Actual losses may be greater than the estimate presented in this table.

**** In addition to the number of schools listed above, there are 24 private schools and pre-schools in the city.**

Vulnerable Populations

Factors such as age, physical and/or mental condition, socioeconomic status, access to key services, and many other factors affect the ability of people to prepare for and protect themselves and their property from a hazard event. Even though some hazard events may impact all parts of Costa Mesa equally, different people may experience the impacts differently. Higher-income households, for instance, are likely more able to afford the cost of retrofitting their homes to resist flooding or move to a location that is less prone to flooding than a lower-income household. As a result, the higher-income household is less likely to experience significant damage during a flood event than the lower-income household, even if the same amount of rain falls on both.

A social threat analysis examines the ways hazard events are likely to impact different demographic populations in Costa Mesa and where these different demographic populations live in the City. This includes assessing whether the people in an area of an elevated hazard risk are more likely than the average person to be considered a threatened population. The social threat analysis uses the following criteria to assess the threat to vulnerable populations:

- **Disability status:** Persons with disabilities may often have reduced mobility and experience difficulties living independently. As a result, they may have little or no ability to prepare for and mitigate hazard conditions without assistance from others.

- **Income levels:** Lower-income households are less likely to have the financial resources to implement mitigation activities on their residences. They may also struggle with having the necessary time to find and access educational resources discussing hazard mitigation strategies. Furthermore, lower-income households are less likely to be able to afford to move to areas that are safer or less at risk of being impacted by a hazard. The national poverty limit standard for the U.S. for a four-person family is approximately an income of $26,200 or less. For Orange County, the FY 2020 Low-Income Limits for a four-person family, according to Housing and Urban Development (HUD), is $102,450.

- **Seniors (individuals at least 65 years of age):** Seniors are more likely to have reduced mobility, physical and/or mental disabilities, and lower-income levels, all of which may decrease their ability to prepare for and mitigate a hazard event.

Table 4-2 shows the amounts of people in Costa Mesa who meet at least one of the criteria for threatened, vulnerable populations. For more detailed demographic information, please refer to **Chapter 2**.

Table 4-2: Costa Mesa Threatened-Population Metrics [118]	
Threatened Population Metric	**Community-Wide Data**
Population	112,943
Households	40,896
Median household income	$82,096
Renter Households	59.6%
Percentage of households with at least one person living with a disability	16.2%
Percentage of households living under the poverty limit	11.4%
Percentage of households with one member aged 65+	20.9%
*****Population estimates rely on US Census ACS data integrated into the ArcGIS Business Analyst tool. Any differences from other population estimates in this document may be related to how the data is analyzed within the software. .**	

The social threat analysis also shows the threat other populations may encounter, such as persons experiencing homelessness or persons without access to lifelines (vehicles or communication networks). Since data for these groups are not readily available, there is no definitive way to determine the amount of these persons in areas of elevated risk, so this assessment will discuss how these other threatened groups may also be affected on a general level.

Data Limitations and Notes on Vulnerability Tables

Due to data limitations, the data comparing the hazard zone population with the Citywide population comes from two separate sources. The Citywide data comes from the US Census Bureau's American Community Survey, and the hazard zone population data comes from ESRI's Business Analyst reports. As a result, there may be minor discrepancies in comparing the two data sets. The data that should be considered correct for this plan is the ACS data reported in Chapter 2.

Other Assets

In addition to the City's designated inventory of CFs/FOC and vulnerable populations, hazard events could threaten other important assets to Costa Mesa. These assets may include services, artistic or cultural landmarks, or local economic activities. The threat assessment describes the potential harm to these other assets based on available information.

[118] US Census Bureau, American Community Survey, 2013-2017 5-Year Estimates. 2017. "Table DP03: Selected Economic Characteristics in the United States." https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_17_5YR_DP03&prodType=table

Threat Profiles

Aircraft Accident

Physical Threat

All structures within the John Wayne Airport AELUP planning boundary are at an elevated risk to aircraft incidents, predominantly associated with landing, take-off, and approach activities. Beyond this planning area, the risk associated with aircraft incidents is limited to flyover activities above the City. All these incidents can send the bodies of the aircraft crashing down on any structures or physical assets lying below. Even if the aircraft does not crash within the City, it is possible that falling debris could land on and damage structures in the City. An aircraft incident may be an act of terrorism, in which case the target of the terrorists would likely be a government building or a place where many people are gathered. Please refer to the Human-Caused Hazards section for more information on the threats of terrorist attacks in Costa Mesa.

Social Threat

An aircraft incident may threaten all persons in Costa Mesa. Typically, populations located near John Wayne Airport would have a higher probability of being impacted versus populations located in the southern and western portions of the City. Developments located within the John Wayne Airport AELUP planning boundary should have taken the use intensity recommendations and development standards of this plan into consideration to ensure the density of residents/employees and building heights are consistent with FAA guidance, reducing potential exposure to these hazards.

Residents and employees in the impacted area of an aircraft incident may experience property damage or loss and/or emotional distress resulting from losing family or friends in the crash or having witnessed the event or its aftermath. If future events occur in Costa Mesa, it is assumed that lower-income persons may not recover as easily (afford to repair the damage to their homes, purchase new automobiles to replace any destroyed, etc.). The Bridge Shelter is a 75-bed facility serving an already vulnerable population, making an aircraft incident that affects this location a difficult recovery for these individuals. Additionally, any private schools and preschools and residential care and skilled nursing facilities located in this area are at risk of being impacted.

Other Threats

Depending on the severity of the aircraft incident, some services in the City could be temporarily disrupted. For example, falling debris from an aircraft incident could damage or destroy the infrastructure (roads, electrical lines, etc.), affecting residents and businesses. Debris could also fall onto a roadway and obstruct the normal flow of traffic through Costa Mesa. A more severe aircraft incident, in which an entire aircraft crashes into a section of the City, would likely ignite a blaze impacting the area where the plane went down. Any transmission wires or pipelines in the crash site would likely be affected to some degree, resulting in partial or complete outages of utility services to areas of the City. A severe aircraft incident that occurs at a major employment center in the City would almost certainly result in the closure of the employers located in the crash area until authorities deem it safe to repopulate. This would result in a loss of economic activity in the City.

Disease and Pests

Physical Threat

Epidemic/Pandemic/Vector-Borne Disease

Since diseases only affect the human body, an epidemic, pandemic, or vector-borne disease could not directly threaten physical assets in Costa Mesa.

Tree Mortality

A serious outbreak of pests, such as the Gold Spotted Oak Borer, Invasive Shot Hole Borer, or Asian Citrus Psyllid, in Costa Mesa could threaten the City's urban forest leading to an episode of intense tree mortality. The City's tree inventory includes identifying impacted trees that require monitoring and/or removal, which occurs during regularly scheduled trimming. The City regularly replaces trees that are damaged due to diseases and pests; however, if not done in a timely manner, the threat to healthy trees increases. If dead trees located within the City are not felled immediately, they may threaten other physical assets when compounded with other hazards. For example, dead trees are more prone to dropping limbs or falling over during severe weather events, causing damage to any structures or property in their path.

Social Threat

Epidemic/Pandemic/Vector-Borne Disease

To some degree, diseases affect everyone in Costa Mesa, whether the impact is a mild inconvenience or death. There is no universally applicable social threat from diseases and pests since each disease affects the body differently. Generally, however, seniors, infants, pregnant women, and people with weakened immune defenses experience the greatest risk. Lower-income persons may also be more threatened than others by diseases since they may not be able to afford medical treatment. Persons with disabilities or those who live alone may experience greater vulnerability to illness since they may be unable to access treatment. Pregnant women in Costa Mesa are especially threatened by the Zika virus since the virus may cause their infants to be born with *microcephaly*, which is shown to cause health problems for infants, including death.

Tree Mortality

Decreased property values may potentially threaten Costa Mesa residents who experience tree mortality on their property. Healthy trees add aesthetic beauty to homes and businesses and dying, or dead trees may detract from the property's worth. Higher-income property owners in Costa Mesa may be able to absorb the costs of tree loss and afford to replant any lost trees. On the other hand, lower-income property owners are less likely to be able to afford the cost of replanting lost trees without assistance. Tree mortality also reduces the amount of shade in each area, potentially increasing the impacts of the urban heat island effect. As a result, groups that are threatened by higher heat levels may be impacted by an onset of tree mortality. Such groups include seniors, children, families with pets, and laborers who spend long periods of time outside. Lower-income households who turn to active cooling methods, such as air conditioning, may be burdened by increased energy costs.

Other Threats

Epidemic/Pandemic/Vector-Borne Disease

A major outbreak of disease could overwhelm the capacity of medical facilities in Costa Mesa and in the surrounding area, potentially leading to greater inaccessibility of medical services and a shortage of medical personnel. A major outbreak could also be expected to incapacitate large amounts of the City's and region's workforce, inhibiting the regional economy of Orange County and Southern California. Services such as telecommunications, utilities, recreation, and commerce may become restricted or even entirely unavailable for a period. Since March 2020, the City and the rest of the world has been dealing with the COVID-19 pandemic incident that has impacted the state and many cities and counties. As a new unknown disease, it has been critically important during these past few months to effectively communicate the risk of infection and procedures to obtain medical help effectively.

Tree Mortality

Urban forestry has been demonstrated to increase mental health and reduce levels of depression and anxiety among residents. [119] [120] If large sections of Costa Mesa's urban forest disappeared (due to drought, invasive pests, disease), residents and employees could experience higher stress and anxiety levels.

Drought

Physical Threat

Since the primary threat from drought is reduced water supply and availability, there are no foreseeable threats to any of the physical assets in the City. Most of the City's water comes from local groundwater sources, which are drought resilient. It is possible that any water delivery infrastructure is not used or used less than usual may fall into some degree of disrepair if maintenance is deferred. Lower water pressures may cause some aged water pipes to release rust particles into the water supply.

Social Threat

Droughts are unlikely to cause serious social threats to households in Costa Mesa, though residents and business owners in the City may experience financial impacts associated with water conservation efforts. Those with less access to financial resources, such as low-income households or seniors, could be harder hit if higher water rates or additional fees are imposed during a severe drought event.

Other Threats

An exceptional drought may lead to restricted water use for residents or businesses in the City. Trees that are not properly adapted to lower irrigation levels could perish, which would alter the City's aesthetic appearance. The implementation of drought-tolerant landscaping can create debris and sediment flowing offsite into City streets and storm drains. Flooding in areas where natural vegetation has been replaced with granite, dirt, and drought resistive

[119] Clayton, S., Manning, C. M., Krygsman, K., & Speiser, M. (2017). *Mental Health and Our Changing Climate: Impacts, Implications, and Guidance*. Washington, D.C.: American Psychological Association, and ecoAmerica. https://www.apa.org/news/press/releases/2017/03/mental-health-climate.pdf

[120] Daniel T. C. Cox, Danielle F. Shanahan, Hannah L. Hudson, Kate E. Plummer, Gavin M. Siriwardena, Richard A. Fuller, Karen Anderson, Steven Hancock, Kevin J. Gaston, Doses of Neighborhood Nature: The Benefits for Mental Health of Living with Nature, *BioScience*, Volume 67, Issue 2, February 2017, Pages 147–155, https://doi.org/10.1093/biosci/biw173

plants causes streets to be filled with debris. For more specific information on tree health, please refer to Tree Mortality discussion under Diseases and Pests. Any open spaces with extensive lawns may start to die, turning brown in color, which could discourage residents from using these parks and open spaces. Protected species like the burrowing owl, least bell's vireo, southern tar plant, and fairy shrimp that reside in Fairview Park may also become vulnerable should a drought occur.

Energy/Power Shortage

Physical Threat

Power shortages throughout the City can affect any CF or FOC at any time. Traffic control infrastructure, communications networks, and emergency services are just a few of the critical services/infrastructure that can be disrupted during a power outage. Facilities such as police stations and fire stations are equipped with backup generators to ensure continuity of operations in the event of power outages; however, generators can sometimes fail. In addition, physical damage to systems could result from intermittent or unexpected power loss that damages electrical and computer equipment. These events could result from maintenance, isolated power outages due to equipment failure, or loss of power from infrastructure (powerlines, powerplants, transformers, sub-stations) failure.

Social Threat

Persons with health issues are more vulnerable to this hazard since they may rely on medical equipment that requires the use of power. Vital medical treatments such as dialysis are at risk of being canceled or postponed if a medical facility does not have enough backup generator power to conduct appointments. If the power outage occurs during the warmer months, young children, the elderly, or people suffering from serious medical conditions are more vulnerable to heat-related complications if they are unable to relocate to a cooler location. Additionally, lower-income residents may be affected if the power outage lasts for an extended amount of time, as they may not be able to afford to replace the food spoiled from the loss of refrigeration. Additionally, any private schools and preschools and residential care and skilled nursing facilities located in this area are at risk of being impacted.

Other Threat

Older structures, electrical wiring and outlets may not meet current building code requirements, which could become damaged during power surges or damage the devices connected to them. In addition, many businesses and residents may not use proper equipment to help prevent power surges or power loss, which can impact the functions and operations of businesses, City services, or affect residents in negative ways. Given the potential for future power loss events, protective measures (improved outlets, ground fault circuit interceptor outlets, surge protectors, and backup battery (uninterruptible power supply) technologies should be promoted in any retrofits and improvements within the City. Current and future climate change mitigation and adaptation efforts in Costa Mesa should prioritize energy efficiency measures, generate energy locally from clean and renewable sources, and build reliability & redundancy using the latest technologies in energy storage and backup systems.

Flooding

Physical Threat

Flooding

Portions of the City are located within the 100-year flood zone (1.0% Annual Chance of Flooding) and the 500-year flood zone (0.2% Annual Chance of Flooding). Any physical assets located within these mapped boundaries can expect to be inundated if enough precipitation were to fall, exceeding the storm drain infrastructure design capacity in these areas. Electronic or mechanical equipment on the ground could become waterlogged and nonfunctional. The City has several key underpasses beneath major freeways that, if flooded, could impact circulation throughout the City. **Table 4-3** identifies the physical assets in Costa Mesa located within the 100-year flood zone. Assets include eight bridges and one City Recreation Support facility. Potential losses associated with this flood zone could amount to over $100,000, based on available information. In addition, **Table 4-4** identifies the additional assets located within the 500-year flood zone, which account for two CFs and three FOC that account for over $4 million in additional assets exposed to flooding within the City.

Table 4-3: Critical Facilities and Facilities of Concern (100-year Flood)

Category	Number of Facilities		Potential Loss**
	Critical	Concern	
City Vital Operations	0	0	-
City Community Centers	0	0	-
City Resident Services	0	0	-
City Recreation Support	0	1	$112,566
Bridges*	8	0	-
Schools	0	0	-
HazMat Locations	0	0	-
Total	**8**	**1**	**$112,566**

* Replacement Values Unavailable
** Based on the City of Costa Mesa insured replacement values

Table 4-4: Critical Facilities and Facilities of Concern (500-year Flood)

Category	Number of Facilities		Potential Loss**
	Critical	Concern	
City Vital Operations	1	0	$3,922,995
City Community Centers	0	0	-
City Resident Services	0	0	-
City Recreation Support	0	2	$265,208
Bridges*	1	0	-
Schools*	0	1	-
HazMat Locations	0	0	-
Total	**2**	**3**	**$4,188,203**

* Replacement Values Unavailable
** Based on the City of Costa Mesa insured replacement values

Dam Inundation

Various factors, such as the amount of water released, the distance between the dam failure site, and the topography of the surrounding land, all influence the extent to which physical assets in Costa Mesa are threatened. All three dams of concern to the City have large storage capacities that could lead to widespread inundation of large areas of northern and eastern Costa Mesa if the reservoir waters are released due to a dam breach. **Table 4-5** identifies the physical assets in Costa Mesa that are threatened by the potential failure of the following dams:

- Prado Dam
- Santiago Creek Dam
- Villa Park Dam

If any of these dams were to fail at maximum capacity and release the water in their reservoir, it would threaten a variety of CF and FOC in Costa Mesa. Based on this analysis, dam inundation would affect 22 facilities within the City, potentially causing over $6 million in damage, based on available information.

Table 4-5: Critical Facilities and Facilities of Concern (Dam Failure)

Category	Number of Facilities		Potential Loss**
	Critical	Concern	
City Vital Operations	1	0	$3,922,995
City Community Centers	1	0	$1,459,809
City Resident Services	0	0	-
City Recreation Support	0	7	$1,029,468
Bridges*	11	0	-
Schools*	0	2	-
HazMat Locations	0	0	-
Total	**13**	**9**	**$6,412,272**

* Replacement Values Unavailable
** Based on the City of Costa Mesa insured replacement values

Social Threat

Flooding

The threat of a flood will primarily affect those residents living within the 100-year and 500-year flood zones. Floodwaters in these areas are anticipated to rise to more than a maximum of one foot. Flooding of this type would likely inundate curb cuts as well as sidewalks to some extent. Any people in Costa Mesa who walk or bike as their primary form of transportation may encounter greater difficulties with their mobility if they do not have access to an alternative means of transportation. Seniors, persons with disabilities, and low-income persons are those most likely to be threatened. **Table 4-6** shows the proportions of Costa Mesa's vulnerable populations likely to face a greater threat from a flood event in the City. Based on the analysis in **Table 4-6**, median household income in the 100-year flood zone is slightly lower than the citywide average. In addition, there are no households with one member aged 65+ and no households with at least one person living with a disability residing in the 500-year or 100-year flood zones. The demographics for the 500-year flood zone are

like the 100-year flood zone statistics. They are lower than the citywide averages, except the median household income is significantly higher than the overall city household income. Any private schools, preschools, residential care and skilled nursing facilities located in this area are at risk of being impacted.

Additionally, persons who are experiencing homelessness may be caught outside during flood conditions without any shelter. Though floodwaters in Costa Mesa are not expected to exceed a depth of one foot, even a floodwater depth of six inches may render any makeshift structures uninhabitable during the flood event. Possessions such as sleeping bags or electronic devices may be damaged or swept away by the floodwaters.

Dam Inundation

Dam failure hazards in the City would impact a variety of downstream properties. **Table 4-7** identifies dam impacts from the three dams of concern to the City. Populations impacted by all three dams have a higher median household income than the citywide population. In addition, all dams would impact a higher percentage of populations living with a disability and a higher percentage of households with one member aged 65+.

Table 4-6: Flood Hazard Threatened Populations

Threatened Population Metric	Flood Hazards (1%)	Flood Hazards (.2%)	City of Costa Mesa
Population	**514**	**10,863**	**112,943**
Households	335	4,489	40,896
Median household income	$77,076	$99,597	$82,096
Percentage of households with at least one person living with a disability	0.0%	8.8%	16.2%
Percentage of households living under the poverty limit	5.4%	8.0%	11.4%
Percentage of households with one **member** aged 65+	0.0%	15.5%	20.9%

Table 4-7: Dam Inundation Hazard Threatened Populations

Threatened Population Metric	Prado Dam	Santiago Creek	Villa Park	City of Costa Mesa
Population	9,888	14,673	640	112,943
Households	3,364	5,314	232	40,896
Median household income	$119,616	$116,093	$117,361	$82,096
Percentage of households with at least one person living with a disability	21.6%	17.2%	19.0%	16.2%
Percentage of households living under the poverty limit	9.4%	8.4%	12.1%	11.4%
Percentage of households with one member aged 65+	31.8%	27.7%	29.7%	20.9%
Parts of Costa Mesa potentially inundated (acres)	1,948	2,226	166	--

Other Threats

Flooding

Flooding may temporarily stop any type of transportation in the City. Debris carried by floodwaters can block roadways, hinder access for vehicles, and potentially affect emergency response services. Rushing water only one foot deep is enough to carry small vehicles. A severe flood situation where the maximum anticipated flood depth of one foot is realized may prevent people who own smaller vehicles from driving to work, leading to reduced economic activity. Severe flooding that causes serious damage to homes and businesses may also reduce economic activity until repair work is completed.

Dam Inundation

Dam failures are often triggered by other events (seismic shaking, intense rainstorms, etc.). Often when these events occur, there would almost certainly be service disruptions in Costa Mesa. Floodwaters would quickly inundate downstream portions of the City, disrupting utilities, such as water, power, and heating, and other services such as communications or transportation infrastructure, especially since most of the vulnerable facilities are bridges within the City. Residents may find that street lighting and traffic signals may be temporarily disabled if the inundation area interferes with the electronic systems that control them. The rapid inundation of water would sweep up any debris, which could block roads, impeding traffic flow. Water would most likely inundate roadways and other low-lying, flat areas, such as parking lots, open spaces, and schoolyards. People's mobility in these areas would likely be restricted or even impossible in severe scenarios. Any unprotected or unhoused mechanical or electronic equipment that is not properly elevated would become waterlogged and inoperable until crews can conduct repairs or replacement, if necessary.

Geological Hazards

Physical Threat

Expansive Soil

Expansive soils can cause structures such as sidewalks and driveways to buckle and crack. The structure and foundation of buildings can become compromised by the swelling and shrinking behavior of these soils. There are 8 CFs and 31 FOC that are located within the high-risk expansive soil areas.

Erosion

The physical impacts of erosion would be limited to the southwest portion of the City and unstabilized portions of the Santa Ana River. While there are no CFs or FOC in these erosion hazard areas, homes located along the bluffs are of concern.

Landslide

Landslides pose a threat to a variety of City facilities. **Table 4-8** identifies the facilities located within the mapped landslide hazard zone. Many of these areas are located in the western portion of the City, characterized by steep slopes, which can trigger a landslide during long periods of rainfall. In total, deep-seated landslides could cause over $6 million in losses based on the 4 CFs and 7 FOC located in this zone.

Methane-Containing Soils

Locations affected by methane-containing soils vary throughout the City.

Social Threat

Expansive Soil

Lower-income residents and renters may be more vulnerable to this hazard, as they may be unable to retrofit their residences or businesses to counteract the effects of expansive soils.

Table 4-8: Critical Facilities and Facilities of Concern (Deep Seated Landslide)

Category	Number of Facilities		Potential Loss**
	Critical	Concern	
City Vital Operations	0	0	-
City Community Centers	1	0	$1,459,809
City Resident Services	0	0	-
City Recreation Support	0	7	$4,837,568
Bridges*	3	0	-
Schools*	0	0	-
HazMat Locations	0	0	-
Total	**4**	**7**	**$6,297,377**

* Replacement Values Unavailable
** Based on the City of Costa Mesa insured replacement values

Erosion

Generally, erosion would affect any vulnerable groups living in the bluff community in the City's southwest area. Lower-income residents and renters living in these areas may be more vulnerable to the effects of erosion, as they may be unable to retrofit their homes or rebuild their homes in the event of a landslide caused by erosion.

Landslide

As shown in **Table 4-9**, there are 10,658 people and 4,139 households living within the deep-seated landslide hazard zone, which is approximately 10% of the city's population. The median household income and percentage of households living under the poverty limit for this population are roughly the same as the City overall. However, households with at least one person living with a disability and the percentage of households with one member aged 65+ is slightly higher than the City overall. Additionally, any private schools, preschools, and residential care and skilled nursing facilities located in this area are at risk of being impacted.

Methane-Containing Soils

Lower-income residents in areas with methane-containing soils may not have the financial ability to install countermeasures in their homes to help protect against this hazard.

Table 4-9: Deep Seated Landslide Hazard Threatened Populations

Threatened Population Metric	Deep Seated Landslide Zones	City of Costa Mesa
Population	10,658	112,943
Households	4,139	40,896
Median household income	$84,417	$82,096
Percentage of households with at least one person living with a disability	17.6%	16.2%
Percentage of households living under the poverty limit	11.3%	11.4%
Percentage of households with one member aged 65+	22.3%	20.9%

Other Threats

Erosion

Erosion generally occurs slowly over time and can be the underlying cause of long-term disruptions to various infrastructure, roadways, levees, streams and riverbanks, or slopes, to name but a few. These physical threats and damage can be the beginning of longer-reaching effects. Traffic circulation can be temporarily or even permanently disrupted until roadway infrastructure can be repaired. The slow erosion of streams or riverbanks can cause the permanent alteration of waterways, leading to flooding in areas where it previously did not exist, damaging homes and structures creating economic burdens. As discussed in the next section, many of these other threats caused by erosion can also result from landslides.

Landslide

Landslides may block roadways causing long-term disruptions to the roadway network, infrastructure systems, and city capabilities. Underground utility lines in slide-prone areas or above-ground lines built on or above them can be damaged in a landslide, causing service outages. Landslides could affect sensitive ecological areas around the community, causing localized harm to the region's ecosystem, although widespread disruptions are unlikely. Homes and businesses are typically damaged or destroyed by landslides. In addition to potentially causing significant injuries or fatalities, this can cause economic harm and create a need for long-term emergency sheltering and temporary housing until these buildings can be reconstructed. Utility lines, such as power lines or water pipes, may be broken by a landslide, interrupting important services.

Methane-Containing Soils

Methane-containing soils present a hazard, especially during and after construction. When excavation occurs in soils containing methane, the pooling of methane gas can create an explosion and asphyxiation hazard, particularly in confined, unventilated areas. This can lead to fatalities and injuries and an economic burden to make the area safe and habitable again. Identifying and then locating the source of the gas can be a costly and time-consuming process as well. The Orange County Fire Authority (OCFA) has published a document "Combustible Soil Gas Hazard Mitigation, Guideline C-03," discussing the guidance for the scientific investigation, remediation, and/or mitigation of potentially hazardous concentrations of combustible soil gases associated with the construction and occupancy of

a building or structure. [121] Adherence to these additional requirements can increase the costs associated with construction; however, the protection of life far outweighs the added expense.

Hazardous Materials

Physical Threat

Hazardous materials can cause damage to physical assets in Costa Mesa if they are released into the environment. Corrosive hazardous materials can damage building exteriors of CFs or FOC. Flammable hazardous materials can potentially start fires and may cause any CFs or FOC nearby to flashover. Generally, sites closer to the origin for the release of the hazardous materials are threatened greater than those further away.

Table 4-10 shows the numbers of physical assets in Costa Mesa threatened by a hazardous materials release within 500 feet of a site storing or using hazardous materials. There are 3 CFs composed of Vital City Operations located within 500 feet of a site with hazardous materials and 5 FOC within 500 feet of a site with hazardous materials. The total potential loss estimated for these locations is approximately $25 million.

Table 4-11 identifies the number of facilities located within areas of increased pollution (Census Tracts in the 50th percentile or greater), as indicated by Cal EPA's Cal Enviro Screen dataset. Based on this dataset, 9 CFs and 32 FOC are located within these census tracts. Based on this analysis, approximately $47 million in potential losses could occur if a hazardous materials incident were to occur.

Table 4-12 also identifies the areas within 500 feet of a well location within the City. These locations are of concern if a potential leak occurs due to failure of the capping process or damage during a hazard event (i.e., earthquake). Based on this analysis, approximately 2 CFs and 8 FOC are near these sites, totaling over $14 million in potential losses.

Table 4-10: Critical Facilities and Facilities of Concern (HazMat Buffer 500 ft)

Category	Number of Facilities		Potential Loss**
	Critical	Concern	
City Vital Operations	3	0	$11,671,729
City Community Centers	0	0	-
City Resident Services	0	1	$12,545,875
City Recreation Support	0	2	$711,771
Bridges	0	0	-
Schools*	0	1	-
HazMat Locations	0	1	-
Total	**3**	**5**	**$24,929,375**

* Replacement Values Unavailable
** Based on the City of Costa Mesa insured replacement values

[121] Orange County Fire Authority, Combustible Soil Gas Hazard Mitigation, Guideline 0-3

Social Threat

The threat of a hazardous materials release event affects those closest to a source of hazardous materials, including industrial sites, gas stations, gas transmission lines, or sewer mains. **Table 4-13** shows the City's vulnerable populations living within 500 feet of a hazardous materials storage/waste site and within 500 feet of a well site. For both site types, the median household income is approximately $17,000 less than the rest of the City. This suggests that more impoverished populations may be living near hazardous materials locations, indicating potential environmental justice concerns should be considered. This data also suggests higher percentages of households with at least one person living with a disability, higher percentages living under the poverty limit, and high percentages of households with one member aged 65+.

Table 4-11: Critical Facilities and Facilities of Concern (Cal Enviro Screen)

Category	Number of Facilities		Potential Loss**
	Critical	Concern	
City Vital Operations	3	0	$5,913,845
City Community Centers	3	0	$19,344,445
City Resident Services	0	13	$17,387,290
City Recreation Support	1	8	$4,949,181
Bridges	2	0	-
Schools*	0	9	-
HazMat Locations	0	2	-
Total	**9**	**32**	**$47,594,761**

* Replacement Values Unavailable
** Based on the City of Costa Mesa insured replacement values

Table 4-12: Critical Facilities and Facilities of Concern (Wells Buffer – 500 ft)

Category	Number of Facilities		Potential Loss**
	Critical	Concern	
City Vital Operations	1	0	$10,050,000
City Community Centers	1	0	$1,319,900
City Resident Services	0	4	$1,843,654
City Recreation Support	0	3	$1,135,016
Bridges*	0	0	-
Schools*	0	0	-
HazMat Locations	0	1	-
Total	**2**	**8**	**$14,348,570**

* Replacement Values Unavailable
** Based on the City of Costa Mesa insured replacement values

Table 4-13: Hazardous Materials Threatened Populations

Threatened Population Metric	500 Feet from Hazardous Materials Site	500 Feet from a Well Site	City of Costa Mesa
Population	**1,956**	**15,858**	**112,943**
Households	714	5,115	40,896
Median household income	$64,542	$64,079	$82,096
Percentage of households with at least one person living with a disability	21.0%	16.8%	16.2%
Percentage of households living under the poverty limit	16.4%	15.6%	11.4%
Percentage of households with one member aged 65+	25.4%	22.9%	20.9%

Costa Mesa residents living next to major transportation infrastructures, such as highways or major arterial streets, also face a greater threat of being affected by a release of hazardous materials since vehicles transporting hazardous materials may release their contents into the environment if involved in a collision. Specifically, residents in Costa Mesa living near John Wayne Airport and the major transportation corridors running through the City (SR-73, SR-55, I-405) are at greater risk of exposure from a transportation-related hazardous material release than residents living in other parts of the City.

Groups such as the elderly, low-income persons, or renters face a greater risk of exposure since they may not have the financial resources necessary to retrofit their homes against infiltration by hazardous materials or move away to a home that is further from the potential sources of hazardous materials release events.

Additionally, any private schools, preschools, and residential care and skilled nursing facilities located in this area are at risk of being impacted.

Other Threats

Hazardous materials release could threaten the City's, and potentially the region's, transportation networks. Large areas of the local road or rail systems may be closed to keep people away from areas contaminated with hazardous materials to allow remediation and cleanup activities to occur. If a highly corrosive hazardous material is released, it could potentially cause significant damage to the exteriors of any homes or businesses in the area surrounding the release. Hazardous materials could also harm the City's urban forest, resulting in the premature death of vegetation in the affected areas.

Human-Caused Hazards

Physical Threat

Terrorism/Mass-Casualty Incident

There is no way to predict which of Costa Mesa's facilities or assets may be impacted by a mass casualty incident/act of terrorism since the motivation behind the incident is often complex and not easily understood. Generally, these types of incidents occur at places of political, economic, or cultural importance. If the perpetrator's motives are to shut down

city or regional government activity for a period, they may instead target pieces of infrastructure, like water systems, utility delivery systems, or transportation networks. In this situation, bridges may become prime locations for these types of activities. The financial losses that may result would depend on the degree of destruction associated with the activity. If the incident involves the destruction of physical assets, the cost to the City or property owners in Costa Mesa could be significant.

Civil Disturbance

Like mass-casualty incidents, civil disturbance threats to physical assets are hard to predict. Typically, these incidents involve protests, marches, or celebrations that can turn into destructive or violent incidents (i.e., riots), causing property damage. Impacts associated with these incidents would likely initiate at the site of origin, which usually occurs at places of political, economic, or cultural importance.

Cyber Threat

Cyber threats would have a limited impact on physical assets. The extent of this impact would focus on City-owned computer and network infrastructure.

Social Threat

Terrorism/Mass-Casualty Incident

Since mass casualty incidents/acts of terrorism could occur anywhere in Costa Mesa, all groups are potentially threatened by the impacts of these incidents; however, the extent of the threat would depend upon the type and magnitude of the event. For example, an active shooter situation may be isolated to a single location, whereas a larger-scale incident may affect multiple locations. Some locations are more likely to be targeted than others, including but not limited to medical facilities, government buildings, or financial institutions. Populations that frequently visit these areas may face a greater threat than the average person. Seniors, pregnant women, and persons with disabilities, for instance, are more likely to frequently visit the local medical facilities than other subpopulations in the City. If an incident occurs at a medical facility or within the community (overwhelming medical resources), these groups are expected to face an increased impact from the incident.

An incident that occurs at a government building or financial institution may be more likely to threaten seniors or lower-income individuals that rely on in-person transactions in place of online options. As such, their use of these in-person services may place them in harm's way. An incident that occurs at Costa Mesa City Hall or bank locations in the City can be expected to be more of a threat to these groups. Seniors and persons with limited income may be challenged if there is a need to shelter in place or evacuate during an incident requiring additional services, assistance, and/or medical treatment.

Civil Disturbance

Since civil disturbance could occur anywhere in Costa Mesa, all groups are potentially threatened by the impacts of these incidents. While most residents affected by a civil disturbance would be able to recover from the incident, residents on fixed incomes or living below the poverty limit may have difficulty doing so if damage to their residence or property were to occur.

CYBER THREAT

Cyber threats may have an impact on residents and businesses throughout the City. While most cyber threats focus on large entities like major corporations and/or government agencies, all residents could become victims of cyber threats. If services affected by cyber incidents become delayed or are impacted, populations that rely on those services may be negatively impacted if no alternatives exist.

Seismic Hazards

PHYSICAL THREAT

FAULT RUPTURE

The City has numerous faults that have been mapped and identified within the City. **Table 4-14** identifies the CFs and FOC located within 500 feet of these mapped fault segments. Based on this table, potential losses associated with fault rupture could affect 11 FOC totaling almost $5 million in potential losses.

Table 4-14: Critical Facilities and Facilities of Concern (Fault Rupture – Buffer 500 ft)

Category	Number of Facilities		Potential Loss**
	Critical	Concern	
City Vital Operations	0	0	-
City Community Centers	0	0	-
City Resident Services	0	1	-
City Recreation Support	0	5	$4,879,837
Bridges*	0	2	-
HazMat Locations	0	2	-
Schools*	0	1	-
Total	**0**	**11**	**$4,879,837**

* Replacement Values Unavailable
** Based on the City of Costa Mesa insured replacement values

SEISMIC SHAKING

Many physical assets in the City are estimated to experience the same seismic shaking intensity, ranging from .55g to .75g (shaking intensity in relation to earth's gravity). Therefore, all facilities could potentially be damaged during a significant seismic event, which would likely be extremely costly for the City. If all facilities were to be damaged at the same time during a seismic shaking event, it can be assumed that the City would incur a percentage of the maximum potential loss of its physical assets. Assuming 20% of the City's assets are impacted, this potential loss could amount to over $30 million. Underground physical assets, like pipelines or utilities, could be damaged if nearby faults ruptured below the surface. In such a scenario, natural gas and water delivery service to Costa Mesa homes and businesses would be out of commission until repairs are completed.

Liquefaction

Due to the City's location near many active faults capable of generating large earthquakes, the potential for CFs and FOC to be affected by liquefaction is a concern. **Table 4-15** identifies the CFs and FOC located within these areas, accounting for over $6 million in potential losses affecting 2 CFs and 22 FOC.

Social Threat

The risk of a seismic event is a danger to all groups in Costa Mesa though some are more threatened than others.

Fault Rupture

Table 4-16 identifies the threatened populations within 500 feet of faults located within the City. These areas include over 12,000 residents with a median household income of approximately $4,000 lower than the City average. These areas also include a higher percentage of persons living with a disability and a higher percentage of households with one member aged 65+.

Table 4-15: Critical Facilities and Facilities of Concern (Liquefaction)

Category	Number of Facilities		Potential Loss**
	Critical	Concern	
City Vital Operations	1	0	$3,922,995
City Community Centers	1	0	$1,459,809
City Resident Services	0	0	-
City Recreation Support	0	9	$1,405,494
Bridges*	0	12	-
Schools*	0	1	-
HazMat Locations	0	0	-
Total	**2**	**22**	**$6,788,298**

* Replacement Values Unavailable
** Based on the City of Costa Mesa insured replacement values

Table 4-16: Fault Rupture Hazard Threatened Populations

Threatened Population Metric	Fault Rupture	City of Costa Mesa
Population	**12,019**	**112,973**
Households	3,917	40,896
Median household income	$78,152	$82,096
Percentage of households with at least one person living with a disability	19.6%	16.2%
Percentage of households living under the poverty limit	11.6%	11.4%
Percentage of households with one member aged 65+	24.4%	20.9%

Seismic Shaking

Seniors, pregnant women, and persons with disabilities are more threatened by seismic shaking since they may have limited mobility and may not reach shelter in time. Even if these groups reach shelter in time, they may find themselves trapped if furniture or building components have fallen around them. Renters and low-income persons are also more threatened by seismic shaking since these groups may live in homes that are not properly retrofitted to survive the stresses of a seismic event. These groups may not be able to absorb the costs associated with repairing their homes or looking for new housing should their existing housing be too damaged for occupancy.

Liquefaction

Approximately 14% of the City's population is located within a designated zone of liquefaction. Thankfully, much of the construction over the years throughout the City has considered liquefaction. Newer buildings constructed in these areas are anticipated to contain moderate- and high-income tenants that would have greater amounts of disposable income to use during recovery after an incident. However, lower-income residents and residents located in areas of older construction may be impacted greater due to the lack of financial resources need to make repairs and/or the cost associated with retrofitting older buildings.

Table 4-17 compares the populations within the liquefaction hazard zones with citywide populations. Households located in these areas have a median household income of approximately $27,000 higher than the Citywide median. Persons living with a disability is lower than the City average, while households with a member aged 65+ is about the same as the City average.

Other Threats

Fault Rupture

Seismic events that cause surface fault rupture tend to damage roads and structures in the areas of impact. The length of rupture is typically a component of the magnitude of the seismic event. The stronger the event, the greater distance that rupture can occur. Within Costa Mesa, most of the fault segments identified are not considered active; therefore, they have a lower likelihood of rupturing. In addition, most of the fault movement occurring in the region is associated with strike-slip faulting along the San Andreas, San Jacinto, Whittier Elsinore, and Newport Inglewood fault zones. The faults within the City of Costa Mesa are less likely to rupture in comparison to these faults, and if a rupture were to occur, it would most likely impact small areas.

Table 4-17: Liquefaction Hazard Threatened Populations

Threatened Population Metric	Liquefaction Zones	City of Costa Mesa
Population	**15,850**	**112,943**
Households	6,590	40,896
Median household income	$109,033	$82,096
Percentage of households with at least one person living with a disability	13.1%	16.2%
Percentage of households living under the poverty limit	8.2%	11.4%
Percentage of households with one member aged 65+	20.7%	20.9%

SEISMIC SHAKING

As early earthquake warnings systems become operational soon, it can be expected that utilities will take advantage of these warnings to shut off gas, water, and power transmission to control any potential leaks following the event. Authorities may have enough time to halt the use of bridges or move workers to a safe distance away from hazardous locations. Workers will cease their activity and take shelter until they can be safely evacuated. Therefore, all services will be non-operational during the seismic shaking and remain inactive until authorities are confident that it is safe to reactivate utilities and return employees to their workplaces. The length of this time would vary depending on the magnitude of the event. A significant earthquake would likely put utilities out of commission and halt any employment activity in the City for a few hours or several days. The City and the region would lose the economic activity that normally occurs. Like telephone poles or power transmission towers that are felled by the shaking, structures could block roadways and prevent first responders from reaching victims or evacuees who need assistance. An earthquake outside of the city could still have significant impacts on the City as the fairgrounds would most likely be utilized during emergency response situations.

LIQUEFACTION

Services and mobility may be disrupted during and following a liquefaction event. Sidewalks, roadways, and pipelines may become fractured and disjointed because of the liquefying soils. Roads and sidewalks may be usable in some form, but a severe liquefaction event may render them impassible until they are repaired. Broken gas and water pipelines would result in utility outages, with services delayed until this infrastructure is repaired/replaced. Damage to power lines is unlikely since they are not rigid structures and can move if any of the transmission towers experience slight leaning. Homes and mid-rise office buildings may be damaged if the soils beneath lose strength rendering these locations unsafe for occupancy.

Severe Weather

PHYSICAL THREAT

EXTREME HEAT

Very high temperatures can cause roads to deform and buckle as the concrete expands in the heat, especially weaker spots in the pavement, such as areas that have not been

maintained well. Power lines and other sections of the electrical grid are less effective in higher temperatures and may suffer damage due to stress during extreme heat events.

Buildings with dark materials and pavements will absorb more heat than vegetated surfaces or lighter materials, which are better at reflecting the sun's energy. This urban heat island effect is strongest during hot periods when the sun is strongest.

Severe Wind

Intense winds likely present the greatest threat to physical structures, particularly from trees or branches that fall on buildings and cause substantial damage. Older structures that have deferred maintenance or have not been retrofitted for high wind conditions may suffer greater damage than newer/updated structures. Utility lines and wooden utility poles face an elevated threat from wind, as do buildings without reinforced roofs.

Another physical threat associated with severe wind is wildfire impacts and the recent practice of electric utilities conducting Public Safety Power Shutoff activities. During high wind events, these shutoffs may impact structures that rely on electricity for normal operations. Most of these impacts for Costa Mesa would be power loss related, which is discussed in the Energy/Power Shortage discussion. Refer to the discussion of the social threat below for population impacts that may also occur due to these events.

Severe Storms

There is no indication that rainfall or severe rain hazards will abate either in Costa Mesa or the greater region of Southern California in the future. While Costa Mesa may experience prolonged periods of dry or wet years, all expectations are that they will continue and increase severity. Rain could damage any structures with poorly constructed roofs and could also erode the soil around building foundations. Heavy rain could also lead to flooding, which would damage unelevated structures in flood zones. Landslides triggered by heavy rains would damage any structures located below the landslide's starting point.

Social Threat

Extreme Heat

Whereas a heat event can be relatively harmless for those with a reliable means for staying hydrated and cool, it can be deadly for others. Young children, the elderly, or people suffering from serious medical conditions are physiologically more vulnerable to heatstroke. Some senior citizens also take medication that can make it harder for their bodies to maintain a safe internal temperature, creating an additional threat from extreme heat events. Young children may be more vulnerable since they are not aware of the signs of dehydration or ways of protecting themselves from heatstroke.

Homeless people are at a high risk of health complications during heat waves, especially if they are unsheltered. According to the OC Homeless Management Information System data, in 2019, there were approximately 6,860 individuals experiencing homelessness in the

county, with 57% unsheltered and 42% sheltered.[122] These people are vulnerable to heatstroke during a heatwave, especially if they cannot reach a cooling center.

Sudden spikes in heat can catch people by surprise. Stores can rapidly sell out of fans, air-conditioning units, or drinking water during a heatwave. Lower-income households or those with limited mobility may be unable to acquire enough insulation or cooling devices without significant preparations. This can be further compounded by the threat of Public Safety Power Shutoff events. During these events, extreme heat impacts may affect larger portions of the City and populations that would not be viewed as vulnerable under normal circumstances.

Severe Wind

Events such as severe winds and winter weather can harm people throughout Costa Mesa but have a greater effect on the safety of homeless persons and persons who work outdoors. Lower-income households, who may not be able to afford homes built or retrofitted to withstand powerful winds, could also have difficulty coping or recovering from wind events. This can be further compounded by the threat of Public Safety Power Shutoff events.

Severe Storms

Severe storms pose a threat to any groups in Costa Mesa who cannot access adequate shelter. Homeless people often live in tents or other informal structures that may protect against minor rains but are inadequate against heavy rain events. Heavy rain can lead to flooding, which could inundate or sweep away any informal dwellings. Additionally, vulnerable populations living in older homes with outdated building materials may experience damage during significant rain events. If affected groups have limited incomes or lack the resources to make necessary repairs or maintain the structures, retrofit of these structures may be hindered.

Urban Fires

Physical Threat

Structures and physical assets in Costa Mesa that are not equipped with fire suppression technology or design features that mitigate fire vulnerability are at risk of fire. Generally, these buildings are older, may not be well maintained, or not meet current code requirements and regulations. While all structures can be impacted by urban fire, those that are older may have increased vulnerability to this hazard. Power lines located around overgrown trees, where the tree crown envelops part or all of the power line, are also at risk of catching fire. When the wires overheat, they may ignite a fire in the tree, spread back to the power lines themselves, and burn the power line infrastructure. Underground utilities, like water delivery systems, residential electrical systems, or natural gas pipelines, are not threatened by the occurrence of fire since any urban fires that emerge in Costa Mesa are likely to occur on the surface. According to Cal Fire, the City has moderate and high fire-threat areas, which would be most prone to a fire event. **Tables 4-18** and **4-19** identify these hazard zones and indicate that three FOC and two FOC are located within the moderate and high zones, respectively.

[122] OCHMIS.org. 2019. Orange County Point in Time Count 2019: Homelessness in Orange County. http://ochmis.org/wp-content/uploads/2019/08/2019-PIT-Infographic-7.30.2019.pdf

Table 4-18: Critical Facilities and Facilities of Concern (Fire Hazard Severity Zone-Moderate)

Category	Number of Facilities		Potential Loss**
	Critical	Concern	
City Vital Operations	0	0	-
City Community Centers	0	0	-
City Resident Services	0	0	-
City Recreation Support	0	3	$402,210
Bridges*	0	0	-
Schools*	0	0	-
HazMat Locations	0	0	-
Total	**0**	**3**	**$402,210**

* Replacement Values Unavailable
** Based on the City of Costa Mesa insured replacement values

Social Threat

Seniors and persons with disabilities are those that are most immediately threatened by a fire hazard. These groups may have limited mobility and weakened environmental awareness. For example, a senior who lives alone may not be aware that a fire has been ignited in their house until the room begins to fill with smoke or even flashover, at which point escape may be more difficult or impossible. Therefore, a fire that starts in or spreads to any of the senior residences in Costa Mesa could be highly threatening to those populations. Persons with disabilities may require special mobility devices or caregiver assistance to go outside, which may not be readily available when the fire ignites.

Table 4-19: Critical Facilities and Facilities of Concern (Fire Hazard Severity Zone-High)

Category	Number of Facilities		Potential Loss**
	Critical	Concern	
City Vital Operations	0	0	-
City Community Centers	0	0	-
City Resident Services	0	0	-
City Recreation Support	0	2	$112,566
Bridges*	0	0	-
Schools*	0	0	-
HazMat Locations	0	0	-
Total	**0**	**2**	**$112,566**

* Replacement Values Unavailable
** Based on the City of Costa Mesa insured replacement values

Other groups with increased threat levels include lower-income persons and renters. These persons may live in substandard housing with outdated materials that are known to be flammable. Renters and lower-income persons may also live in housing units with improperly

designed or maintained electrical or heating systems that could lead to a fire. Additionally, these groups may not possess enough financial resources to rebuild their homes or search for new homes after an urban fire. Based on the results of **Table 4-20**, the City does not have any residents located within either of these hazard areas.

Table 4-20: Fire Hazard Severity Zone Threatened Populations

Threatened Population Metric	Moderate Fire Hazards	High Fire Hazard	City of Costa Mesa
Population	**0**	**0**	**112,943**
Households	0	0	40,896
Median household income	$0	$1	$82,096
Percentage of households with at least one person living with a disability	0.0%	0.0%	16.2%
Percentage of households living under the poverty limit	0.0%	0.0%	11.4%
Percentage of households with one member aged 65+	0.0%	0.0%	20.9%

Other Threats

Urban fires can consume power lines and force utility operators to shut off electrical and gas transmission activity, leading to utility outages in Costa Mesa homes and businesses. Any streets surrounded by blazes or blocked by burning debris would hinder transportation, prevent victims from escaping, and block emergency response crews from reaching the source of the fire. Anyone living towards the end of a cul-de-sac faces an elevated threat of being trapped if the fire occurs or spreads to the mouth of the street. Fires that destroy trees or vegetation (especially within parks and open space areas) could limit or prevent the use of these areas affecting recreational opportunities for residents.

Figure 4-1: Identified PSPS Circuits

Public Safety Power Shutoffs (PSPS) will become a significant issue for many communities throughout California. Although there are no designated PSPS circuits within Costa Mesa, the potential for large-scale events affecting residents and businesses should be an ongoing concern. **Figure 4-1** identifies the designated circuits and high-risk areas for PSPS events within the vicinity of Costa Mesa. In the event of a PSPS outage in neighboring areas such as Irvine, the

City's resources could be strained as residents of affected areas seek refuge in communities that have power. Outreach to residents and businesses to help them understand and prepare for these future events will become an important aspect of the City's overall hazard mitigation strategy.

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Chapter 5 – Hazard Mitigation Strategy

Strategy Development Process

Costa Mesa's hazard mitigation strategy is a comprehensive set of actions intended to reduce the impacts of hazard events. These hazard mitigation actions will help protect the safety and well-being of residents and visitors, enhance critical facilities and facilities of concern, other buildings and structures, key services, the local economy, and other important community assets. Some actions will also help with emergency preparedness, allowing for a more effective community response to hazard events. Preparedness actions are not a required component of an LHMP, but they support and complement mitigation activities, and the HMPC chose to include them as part of the overall hazard mitigation strategy.

Use of Hazard and Threat Assessment

The HMPC relied partly on the hazard profiles and threat assessments in this Plan to develop the actions in the mitigation strategy. A comprehensive set of mitigation actions that respond to the relevant hazard situations and protect residents, businesses, and community assets in Costa Mesa were prepared. The HMPC ensured that the mitigation actions would help reduce damage from the most frequent types of hazard events, the most significant that may reasonably occur, and those with the greatest potential to harm the community. The Committee also drafted mitigation actions that will help protect the most vulnerable members of the community and the most vulnerable local assets.

Capabilities Assessment

As part of the effort to draft mitigation actions, the City completed a capabilities assessment, which included reviewing existing policies, personnel, and technical resources that currently support hazard mitigation activities in Costa Mesa. The hazard mitigation actions build off the existing success of these resources and leverage their capabilities to support improved resilience in the community. The capabilities assessment looked at the following types of resources:

- **Personnel resources:** City employees and volunteers, and employees and volunteers at other agencies
- **Plan resource:** Advisory or enforceable plans adopted by the City or other agencies
- **Policy resource**: Policies adopted and implemented by the City or other agencies
- **Technical resource**: Data and tools available to the City
- **Financial resource**: funding mechanisms available to the City that support mitigation activities

Table 5-1 shows the capabilities assessment for Costa Mesa and indicates specific ways each capability can support and enhance mitigation with underlined text.

Capabilities Improvement/Expansion

The ability to expand current mitigation capabilities will generally be reliant upon the budgeting allocated for each department/program for that fiscal year. The level at which these programs may or may not be expanded upon, will be dependent upon the amount of funding received. FEMA has released a series of guides over the past few years which highlight some of the ways in which jurisdictions can expand mitigation. Some strategies for increasing current mitigation capabilities may include:

1. City should actively identify, adopt, and enforce the most current set of development codes and standards available. Strongly encouraging new development to be constructed to higher standards than currently required, increasing resilience within the community.
2. Engaging parts of the community that may not be actively involved in mitigation efforts.
3. Expanding the number and types of organizations involved in mitigation planning and implementation, increasing both efficiency and bandwidth.
4. Fostering new relationships to bring underrepresented populations and partners to the hazards mitigation planning process.
5. During the annual LHMP review, the committee should look for opportunities to fund and expand/enhance the effectiveness of current mitigation actions.
6. During annual budgeting processes, the City should identify new funding sources (bonds, grants, assessment districts, etc..) that can be used to support existing capabilities enhancements.

Table 5-1: Costa Mesa Capabilities Assessment

Resource Name	Type of Resource	Ability to Support Mitigation
City of Costa Mesa		
City Manager's Office	Personnel Resource	The City Manager's office provides administrative direction to the City's Executive Directors and is responsible for managing the activities and operations of the City, ensuring the provision of quality services, and representing the City's interests throughout the region. The City Manager's Office is focused on the Council's top priorities, to address homelessness, both locally and on a cooperative basis with other communities. Mitigation activities implemented by this office may include direction setting with the City Council and City Departments and prioritizing new initiatives that support mitigation activities within the City.
City Clerk	Personnel Resource	The City Clerk's Office is a division of the City Manager's Office. The responsibilities of the office include maintaining the City's legislative history, the Costa Mesa Municipal Code, preparation, and distribution of the City Council agendas, managing the City's documents such as contracts, deeds, leases, ordinances, resolutions, and election information. Mitigation activities implemented by this office may include direction setting with the City

		Council and City Departments and prioritizing new initiatives that support mitigation activities within the City.
Finance Division	Personnel Resource	The Finance Division is comprised of two departments: Finance Administration and Financial Operations. Both of which are overseen by the City Treasurer, responsible for administering City finances and directing the Finance Department. The Treasurer is also responsible for developing and implementing municipal financial policies, which can be important when pursuing grant funding and overseeing the Adopted Budget and Comprehensive Annual Financial Report. Financial management and strategic planning functions (and personnel) within the City can assist with key mitigation activities associated with cost tracking hazard events and disasters, identifying grant funding opportunities, grant reporting and administration, and establishing financial risk calculations that can help assist with budgeting of operations, maintenance, and capital improvements.
Communications and Marketing	Personnel Resource "Community Engagement and Outreach"	Communications and Marketing informs, educates, and engages residents and businesses using the City of Costa Mesa website, Costa Mesa Minute, CMTV, the City Hall Snapshot e-newsletter, the city news blog, and social media platforms (Facebook, Twitter, Instagram, Nextdoor). This department aims to promote information and events through a clear and unified voice and ensure that the public's business is handled transparently. The following city initiatives are managed by City staff: • Public information and education • Media relations • Social media posting and monitoring • Video production • Mail, printing, and graphic design services • Website development and maintenance • Special Events • Internal communications Communications and Marketing play a key role in hazard mitigation through the relationships and trust developed with City residents and businesses. Their efforts have created strong ties to community organizations and businesses and ensure key content and information is timely and relevant. Through the various platforms developed/used by this Department, the City has various ways to ensure information and content reaches community members.
Planning Division	Personnel Resource	The Planning Division is responsible for implementing the regulations of the Zoning Code and the goals/policies/objectives of the General Plan. A planner's role is to promote the public health, safety, and general welfare of the business and residential community and therefore preserve/enhance the quality of life in the City. Mitigation activities undertaken by the Planning

		Department include reviewing new developments/redevelopments for code compliance, enforcement of new policies and regulations aimed at reduced hazard exposure, and the oversight of advanced planning efforts to address acute or systemic community issues.
Building Safety Division	Personnel Resource	Building Safety is responsible for reviewing building plans for compliance with city building ordinances and applicable state building regulations. The Building Division issues permits for grading, building, plumbing, electrical, mechanical, and demolition permits for on-site construction. The Building Division is also responsible for the inspection of onsite construction work and code enforcement. Mitigation activities by this division focus on the construction of new structures or retrofits or improvements to existing structures as part of the plan review process. This division also maintains information regarding substandard building locations and deficiencies that may require retrofit or modification.
Housing and Community Development Division	Personnel Resource	Housing and Community Development administers funds the City receives from the United States Department of Housing and Urban Development (HUD). These funds are authorized under HUD's Community Development Block Grant (CDBG) program and used to benefit low- and moderate-income families and aid in the rehabilitation and development of blighted areas within the City. Mitigation activities could include using new and current funds to assist low-income households with retrofitting properties to reduce vulnerabilities and address issues within the community.
Community Improvement Division	Personnel Resource	Community improvement is responsible for responding to citizen requests to investigate potential violations related to property maintenance, noise, and illegal building use. Mitigation activities could include identifying violations requiring mitigation, implementing improvements that reduce vulnerability to these conditions, and reducing overall City intervention.
Costa Mesa Fire & Rescue	Personnel Resource "Community Engagement and Outreach"	Fire and Rescue consist of the following divisions: Community Risk Reduction (CRRD), Fire Administration, Fire/Rescue Operations, Emergency Medical Services, and Training. The CRRD is the division with the most direct connection to mitigation activities since they develop and enforce local fire, life safety, property, and environmental protection standards; enforce State adopted fire codes; review construction plans; conduct inspections; investigate citizen complaints; provide training; and conduct community education and preparedness activities. Their primary focus embraces community risk reduction, relying on fire prevention measures are incorporated into new and existing developments.

Costa Mesa Police Department	Personnel Resource "Community Engagement and Outreach"	The Police Department is tasked with protecting life and property while preserving the peace and practicing the philosophy of community-oriented policing. This department is responsible for conducting emergency preparedness activities, investigating criminal activity, and directing traffic. Mitigation activities relate to the safe movement of traffic (e.g., during evacuations), the public safety of residents during emergency events, and monitoring and assessing threats that could impact residents and businesses. Since emergency management is a critical function of the department, coordination, and collaboration with other agencies through the Operational Area plays a key role in the City's overall mitigation strategy.
Information Technology Department	Personnel Resource	The Information Technology Department Is responsible for network administration; software development and installation; maintenance of hardware and software, including upgrade and replacement; database management; and the support and oversight of all the technology-related products and services for all city departments. Mitigation activities undertaken by this department focus on the technological needs of other departments and provision of key services (GIS, Records Management, Data Analysis) needed to understand key city issues and solutions.
Parks and Community Services	Personnel Resource	The Community Services Department is responsible for a range of services for residents which include: Adult Sports, Aquatics Program, Community Centers, Golf Course, Senior Center, Tennis Center, Parks and Community Gardens, Sponsor Costa Mesa Youth, Sports Fields Info, Summer Sports, Music & Art Camps, Youth and Teen Programs, Youth Sports & Fitness, Youth Sports Organizations. Mitigation activities undertaken by Community Services include establishing locations for cooling centers, evacuations, sheltering residents in need, and other community needs. This department also has the ability to tailor programs and resources to accommodate community member needs.
Public Services	Personnel Resource	The Public Services Department provides engineering, transportation, park and city facilities maintenance, water quality, and waste management, and recycling. The four divisions within the department include Administration, Engineering, Maintenance Services, and Transportation Services. The Administrative Division sets annual goals and performance measures in accordance with the Department's strategic plan, City Council priorities, and needs of the community. The Engineering Division is responsible for designing, coordinating, and constructing Capital Improvement projects located on public property or within the public right-of-way and the procurement of needed right-of-way. Maintenance Services is responsible for responding to emergencies such as fallen limbs, power

		outages, and flooding, working on a year-round maintenance schedule. The Transportation Services Division is responsible for the operation and maintenance of the transportation infrastructure in the City and implementation of the General Plan Circulation Element. Support for mitigation activities from this department may include assessing mobility options for residents with Access and Functional Needs and identifying future transportation projects that can reduce evacuation vulnerabilities or enhance the roadway network, so it is less prone to damage during hazard events. Aid in the identification of public needs and the resulting mitigation policies.
Building Code	Plan Resource	The Costa Mesa Building Code and associated standards (Residential, Mechanical, Electrical, etc.) govern how new buildings are constructed. They are published by the state and are adopted by local communities, sometimes with amendments to make the codes more locally applicable. Mitigation actions to construct buildings to a safer standard, allowing them to resist damage during a hazard event better, may be made part of future building code updates.
Capital Improvement Projects	Plan Resource	The Costa Mesa Capital Improvement Program (CIP) is a long-range fiscal forecast that identifies major public improvements to the City's infrastructure over the next five years (FY 2019-2020 marks the transition of the CIP from a seven-year period CIP to a Five-Year CIP). The Plan is important for planning and managing the City's growth and development and maintaining existing infrastructure. During Plan development, capital projects affecting public health and safety and/or legal mandates receive the highest priority; emphasis is also placed on projects maintaining service levels or preventing deterioration of facilities. Integration of this Plan into the CIP can assist in mitigation efforts by identifying new funding sources for future improvements. As new grant opportunities become available, the CIP may already have projects consistent with the LHMP (Currently being developed), that can easily be used for grant submittals once the LHMP is completed and adopted. Leveraging these two plans can help secure needed funds to reduce vulnerabilities throughout the City.
Adopted FY Budget	Financial Resource	The City adopts its budget each year, which identifies the funding available to support governmental operations. This budget is a key location where future mitigation projects can be identified from a funding perspective.
General Plan	Plan Resource	The General Plan is the long-term, comprehensive blueprint for development and changes in the community. The policies in the general plan address land use, public safety, environmental protection, transportation, and others. The general plan serves as a framework for mitigation actions, establishing the

		overarching policies for mitigation activities. To provide a stronger enforcement mechanism, mitigation actions may be directly incorporated into the general plan as policies and/or implementation actions.
Zoning Ordinance	Plan Resource	The Costa Mesa Zoning Ordinance is an implementation tool for the City's general plan. It establishes regulations for land uses throughout the community, including where different types of development and land use activity can occur, how these developments can look, and how they may be operated. Mitigation actions related to the siting, construction, and operation of new developments in Costa Mesa may be implemented through the Zoning Code to ensure these locations address risks identified in the plan.
	Orange County	
Orange County Hazard Mitigation Plan	Plan Resource	The Orange County Hazard Mitigation Plan identifies and describes the hazard events that may occur in the unincorporated areas of Orange County and provides a suite of mitigation actions to help decrease the potential damage from these hazards. Mitigation actions for Costa Mesa that require coordination with the county may be integrated into the County's Hazard Mitigation Plan. Similar mitigation actions in both the county's and Costa Mesa's hazard mitigation plans can lead to a more regionally unified hazard mitigation strategy, improving effectiveness.
Mesa Water District	Technical Resource	Mesa Water District (Mesa) is an AAA-rated independent special district that provides water service to 110,000 residents in an 18-square-mile area. Mesa Water serves most of Costa Mesa, parts of Newport Beach, and some unincorporated areas of Orange County, including John Wayne Airport. Mesa can assist with mitigation efforts when addressing drought conditions within the City or enhancements to water infrastructure. As the City's primary water provider, Mesa can effectively manage and monitor water use and ensure adequate water supplies during times of severe drought.
Irvine Ranch Water District	Technical Resource	Irvine Ranch Water District (IRWD) is an independent special district serving Central Orange County, California. IRWD provides high-quality drinking water, reliable wastewater collection and treatment, ground-breaking recycled water programs, and environmentally sound urban runoff treatment to more than 380,000 residents. IRWD can assist with mitigation efforts when addressing drought conditions within the City. As the water provider for small portions of the City, IRWD can effectively manage and monitor water use and ensure adequate water supplies during times of severe drought and support Mesa Water District if necessary.
Orange County Fire Authority	Technical Resource	The Orange County Fire Authority (OCFA) provides fire protection and firefighting services to the unincorporated areas of Orange County. Fire-related mitigation

		collaboration on regional projects that could benefit Costa Mesa would occur by working with OCFA staff.
Orange County Sanitation District	Technical Resource	The Orange County Sanitation District (OCSD) is the agency that provides wastewater collection, treatment, and disposal services for approximately 2.6 million people in central and northwest Orange County. Mitigation strategies by this agency would focus on the enhancement of infrastructure within the City.
Combustible Soil Gas Hazard Mitigation, Guideline C-03	Plan Resource	The Orange County Fire Authority has created a document intended to serve as guidance for the scientific investigation, remediation, and/or mitigation of potentially hazardous concentrations of combustible soil gases associated with the construction and occupancy of a building or structure located within the areas specified herein. This document can be used to help guide mitigation action creation relating to methane-containing soils.
Regional, State, and Federal Agencies		
California State Hazard Mitigation Plan	Plan Resource	The California State Hazard Mitigation Plan assesses the types of hazards that may be present in California. It includes descriptions of these hazards, summaries of past hazard events, descriptions of how these hazards may occur in the future, and how these hazards may harm the people and assets of California. Like a local hazard mitigation plan, the State Hazard Mitigation Plan is updated every five years. The Committee can use the State Hazard Mitigation Plan as a source of information to refine the hazard profiles and vulnerability assessments in future Costa Mesa LHMPs.
Cal-Adapt	Technical Resource	Cal-Adapt is an online tool that provides detailed projections for future climate-related conditions in California, including factors such as temperature, precipitation, and sea-level rise. These projections can help inform future hazard events and explain how hazard conditions are expected to change. The Committee can use Cal-Adapt to monitor anticipated changes in future climate conditions and adjust mitigation actions accordingly.
California Governor's Office of Emergency Services	Technical Resource	The California Governor's Office of Emergency Services (Cal OES) is the state agency responsible for reducing hazards through mitigation activities, conducting emergency planning, supporting emergency response and recovery activities, and acting as a liaison between local and federal agencies on emergency-related issues. Cal OES provides guidance on hazard mitigation planning activities, shares best practices, and distributes funding opportunities. The Committee can work with Cal OES to obtain funding to implement LHMP mitigation strategies and receive future updates.
Federal Emergency Management Agency	Technical Resource	The Federal Emergency Management Agency (FEMA) is the federal agency responsible for hazard mitigation, emergency preparedness, and emergency response and

		recovery activities. It provides guidance to state and local governments on hazard mitigation activities, including best practices and how to comply with federal requirements. FEMA also provides funding for hazard mitigation actions through grant programs.
California Department of Transportation	Technical Resource	The California Department of Transportation (Caltrans) is the state agency with jurisdiction over designated highways, including State Route 55 and 73 and Interstate Route 405. Mitigation actions related to ensuring the resiliency of state-designated routes will be implemented through coordination with Caltrans.
Private Organizations		
Southern California Edison	Technical Resource	Southern California Edison (SCE) is the electrical service provider for Costa Mesa. SCE also owns the electrical distribution grid in the community. Mitigation actions relating to the resiliency of Costa Mesa's electrical grid will be implemented through coordination with SCE.
Southern California Gas Company	Technical Resource	The Southern California Gas Company (SoCalGas) is the natural gas provider for Costa Mesa and owns the natural gas infrastructure in the community. Mitigation actions that address the resiliency of natural gas infrastructure and services in Costa Mesa will be implemented through coordination with SoCalGas.

Hazard Mitigation Strategies and Actions

Hazard Mitigation Goals

The goals identified in Chapter 1 help develop policies to protect community members, ecosystems, and other important assets from hazard events. These goals were developed to ensure consistency with the City's General Plan Safety Element, which plays an important role in risk reduction within Costa Mesa. These goals informed the development of mitigation actions and act as checkpoints to help City staff determine implementation progress.

Evaluation of Potential Hazard Mitigation Actions

Based on the hazard profiles, threat assessment, and capabilities assessment; the results of the community survey; discussions among Committee members; and existing best practices, the Committee prepared a set of potential mitigation actions, which were evaluated using the following criteria:

FEMA requires local governments to evaluate the monetary and non-monetary costs and benefits of potential mitigation actions. Although local governments are not required to assign specific dollar values to each action, they should identify the general size of costs and benefits. The Committee may elect to include measures with high cost or low benefits, but such measures should be clearly beneficial to the community and an appropriate use of local resources.

In addition, FEMA directs local governments to consider the following questions as part of the financial analysis:

- What is the frequency and severity of the hazard type to be addressed by the action, and how vulnerable is the community to this hazard?
- What impacts of the hazard will the action reduce or avoid?
- What benefits will the action provide to the community?

The Committee also chose to review and revise the potential hazard mitigation actions using a third set of criteria (**Table 5-2**), known as STAPLE/E (Social, Technical, Administrative, Political, Legal, Economic, and Environmental). The Committee did not formally assess every potential mitigation action under all STAPLE/E criteria but used the criteria to guide and inform the discussion. The Committee also discussed how the criteria might be used to evaluate grant applications the City may submit to receive funding for LHMP implementation.

Table 5-2: STAPLE/E Criteria

Issue	Criteria
Social	• Is the action socially acceptable to Costa Mesa community members? • Would the action mistreat some individuals? • Is there a reasonable chance of the action causing a social disruption?
Technical	• Is the action likely to reduce the risk of the hazard occurring, or will it reduce the hazard's effects? • Will the action create new hazards or make existing hazards worse? • Is the action the most useful approach for Costa Mesa to take, given the City and community members' goals?
Administrative	• Does the City have the administrative capabilities to implement the action? • Are there existing City staff who can lead and coordinate the measure's implementation, or can the City reasonably hire new staff for this role? • Does the City have enough staff, funding, technical support, and other resources to implement the action? • Are there administrative barriers to implementing the action?
Political	• Is the action politically acceptable to City officials and other relevant jurisdictions and political entities? • Do community members support the action?
Legal	• Does the City have the legal authority to implement and enforce the action? • Are there potential legal barriers or consequences that could hinder or prevent the implementation of the action? • Is there a reasonable chance that the implementation of the action would expose the City to legal liabilities? • Could the action reasonably face other legal challenges?
Economic	• What are the monetary costs of the action, and do the costs exceed the monetary benefits? • What are the start-up and maintenance costs of the action, including administrative costs? • Has the funding for action implementation been secured, or is a potential funding source available? • How will funding the action affect the City's financial capabilities?

	• Could the implementation of the action reasonably burden the Costa Mesa economy or tax base? • Could there reasonably be other budgetary and revenue impacts to the City?
Environmental	• What are the potential environmental impacts of the action? • Will the action require environmental regulatory approvals? • Will the action comply with all applicable federal, state, regional, and local environmental regulations? • Will the action reasonably affect any endangered, threatened, or otherwise sensitive species of concern?

Prioritization

As part of the mitigation actions development and review, the HMPC also prioritized the actions. The prioritization efforts looked at the risks and threats from each hazard, financial costs and benefits, technical feasibility, and community values, among others. Committee members were asked to identify their priority actions through a voting exercise. Items prioritized by at least three Committee members are considered high priority, and those prioritized by one or two members are considered a medium priority. Actions not prioritized by any Committee member are considered low priority.

Cost Estimates

To meet the cost estimation requirements of the hazard mitigation planning process, the HMPC identified relative cost estimates based on their understanding of the mitigation action intent and their experience developing identical or similar programs/implementing projects. Three cost categories based on the City's typical cost criteria were used for budgeting purposes:

- **Low cost ($):** $60,000 or less
- **Medium cost ($$):** $60,001 to $199,999
- **High cost ($$$):** Greater than $200,000

Based on the criteria and evaluation processes used during Plan development, the Committee prepared a prioritized list of mitigation actions to improve Costa Mesa's resilience to hazard events. **Table 5-3** lists the mitigation actions, prioritization of each action, and other details related to implementation. In addition to mitigation actions and strategies, several preparedness activities were identified and denoted with a letter "P."

National Flood Insurance Program

Costa Mesa participates in the National Flood Insurance Program (NFIP), which Congress created in 1968 to subsidize flood insurance to homeowners who live in flood-prone areas. Individual communities have the option to participate in the NFIP. However, property owners who live in nonparticipating communities with flood-prone areas will not be able to buy flood insurance through the program. Additionally, nonparticipating communities with mapped flood plains cannot receive federal grants or loans for development activities in flood-prone areas and cannot receive federal disaster assistance to repair flood-damaged buildings in mapped flood plains. Costa Mesa has participated in the NFIP since 09/30/1982.

Although participation is not a dedicated hazard mitigation action, Costa Mesa will continue to participate in the NFIP and comply with the program's requirements through continued enforcement of the City's Floodplain Management Regulations (Municipal Code Title 13, Chapter 5, Article 10). These regulations apply to all areas identified as flood-prone within the City and identify the purpose, methods of reducing flood losses, basis for establishing flood hazard areas, development permit requirements, duties and responsibilities of the City's Floodplain Administrator, development standards that apply in flood-prone areas, and required documentation and analysis for construction within these areas. As part of the City's efforts to comply with NFIP, Costa Mesa will update and revise the Floodplain Management regulations to minimize the threat of harm from future flood events. These updates and revisions may be promoted by changes in local demographics, shifts in land use, changes to flood regimes such as frequency and intensity of flood events, and other factors that may warrant municipal action. The City will also continue to incorporate any changes to the locations and designations of mapped flood plains into future planning documents, including future updates to this Plan.

The City of Costa Mesa contains Special Flood Hazard Areas (SFHA) that include 168 policies in force. Total insurance coverage for these policies amounts to $55,969,900. Eight of the properties within SFHA are considered repetitive loss properties, which have experienced repeated flood claims.

Table 5-3: Costa Mesa Mitigation Actions Implementation Plan

	Mitigation Action	Potential Funding Sources	Responsible Department	Relative Cost	Time Frame	Priority
Preparedness Activities						
P1	Conduct regular emergency preparedness drills and training exercises for City staff.	General Fund, Grants	Police	$	Annually	N/A
P2	Continue agreements with local school districts to ensure that school facilities can act as evacuation sites during major emergencies.	General Fund, Grants	Police	S	Annually	N/A
P3	Work with local businesses and organizations to conduct regular workplace emergency preparedness drills through the Costa Mesa Business Preparedness Academy.	General Fund, Grants	Fire	$	Annually	N/A
P4	Expand participation in the Costa Mesa Community Emergency Response Team (CERT) program for residents and businesses.	General Fund, Grants	Fire	$	Annually	N/A
P5	Ensure that community evacuation plans include provisions for community members who do not have access to private vehicles or are otherwise unable to drive.	General Fund, Grants	Police	$	Ongoing	N/A
P6	Continue to ensure effective emergency notifications through multiple media formats, in at least English and Spanish, about pending, imminent, or ongoing emergency events. Ensure that information is accessible to persons with disabilities and functional needs.	General Fund, Grants	Police	S	Ongoing	N/A
P7	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.	General Fund, Grants	Public Services	$$$	Ongoing	N/A
P8	Update the Costa Mesa Emergency Operations Plan to identify backup power and communications locations for critical facilities.	General Fund, Grants	Police	$	Annually	N/A
P9	Continuously update response procedures for first responder departments to properly address new hazard events as they emerge.	General Fund, Grants	Police	$	Annually	N/A

	Mitigation Action	Potential Funding Sources	Responsible Department	Relative Cost	Time Frame	Priority
P10	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.	General Fund, Grants	Public Services	$	Ongoing	N/A
P11	Conduct active shooter drills for City staff, residents, and businesses.	General Fund, Grants	Police	$	Annually	N/A
P12	Increase the number of City staff who have CalOES Safety Assessment Program (SAP) credentials.	General Fund, Grants	Police	$	Annually	N/A
	Multiple Hazards					
1.01	Explore the feasibility of connecting critical facilities (Civic Center, key Community Centers) to a microgrid power-supply network. (Hazards addressed: All)	General Fund, BRIC/ HMGP Grants, Other Grants	Public Services	$$$	2026	High
1.02	Install energy-efficient equipment to increase the longevity of the fuel supply for backup generators. (Hazards addressed: All)	General Fund, BRIC/ HMGP Grants, Other Grants	Public Services	$$$	Ongoing	Medium
1.03	Conduct routine updates to Facility Conditions Assessments for City-owned infrastructure, buildings, lift stations, and other utilities and coordinate with other agencies to ensure inspections of other important infrastructure. (Hazards addressed: All)	General Fund, BRIC/ HMGP Grants, Other Grants	Public Services/Development Services	$$$	Ongoing	Low
1.04	Repair, as feasible, all major deficiencies discovered by inspections to prevent collapse, failure, or damage in the event of a natural disaster. (Hazards addressed: All)	General Fund, BRIC/ HMGP Grants, Other Grants	Public Services	$$$	Ongoing	High
1.05	Incentivize public and private utility operators to harden their lines passing through the City from potential breaches. Encourage adoption of supervisory control and data acquisition (SCADA) to allow instantaneous shut down of line	General Fund, BRIC/ HMGP	Public Services	$$$	Ongoing	Low

	Mitigation Action	Potential Funding Sources	Responsible Department	Relative Cost	Time Frame	Priority
	breaches. Use mitigation grants to incentivize entities to partner with the City to complete these projects. (Hazards addressed: All)	Grants, Other Grants				
1.06	Install and harden emergency backup power at Civic and Community Centers and other critical facilities as the city may determine necessary. Prioritize installations for facilities that serve as key cooling/warming centers and evacuation centers. (Hazards addressed: All)	General Fund, BRIC/ HMGP Grants, Other Grants	Public Services	$$$	2024	High
1.07	Conduct a feasibility assessment of installing solar and battery backup systems at key critical facilities within the City. (Hazards addressed: All)	General Fund, BRIC/ HMGP Grants, Other Grants	Public Services	$$$	Currently Underway	Medium
1.08	Work closely with community groups to increase awareness of hazard events and resiliency opportunities among socially vulnerable community members, including the homeless. (Hazards addressed: All)	General Fund, BRIC/ HMGP Grants, Other Grants	Community Services/ Development Services/ City Manager's Office	$	Ongoing	Low
1.09	Avoid building new City-owned key facilities in mapped hazard areas. If no feasible sites outside of mapped areas exist, ensure that such facilities are hardened against hazards beyond any minimum building requirements/ mitigation standards. (Hazards addressed: All)	General Fund, BRIC/ HMGP Grants, Other Grants	Public Services/Development Services	$$$	Ongoing	Low
1.10	Closely monitor changes in the boundaries of mapped hazard areas resulting from land use changes or climate change and adopt new mitigation actions or revise existing ones to ensure continued resiliency. (Hazards addressed: All	General Fund, BRIC/ HMGP Grants, Other Grants	Development Services	$	Annually	Low
1.11	Integrate policy direction and other information from this Plan into other City documents, including the General Plan,	General Fund, BRIC/	All Departments	$	Annually	Low

	Mitigation Action	Potential Funding Sources	Responsible Department	Relative Cost	Time Frame	Priority
	Emergency Operations Plan, and Capital Improvements Program. (Hazards addressed: All)	HMGP Grants, Other Grants				
1.12	Monitor funding sources for hazard mitigation activities. (Hazards addressed: All)	General Fund, BRIC/ HMGP Grants, Other Grants	All Departments	$	Ongoing	Low
1.13	Enhance the City's existing all hazards early warning alarm system to be activated prior to or during hazard events. (Hazards addressed: All)	General Fund, BRIC/ HMGP Grants, Other Grants	Police/Fire Departments	$$	2027	Low
	Aircraft Incident					
2.01	Coordinate with the Federal Aviation Administration on flight paths over the City and potential changes that may increase vulnerability to aircraft incidents.	General Fund, BRIC/ HMGP Grants, Other Grants	Development Services	$	Ongoing	Medium
2.02	Coordinate with SNA on future improvements and enhancements that may impact City infrastructure and/ or function.	General Fund, BRIC/ HMGP Grants, Other Grants	Development Services	$	Ongoing	Medium
	Diseases and Pests (Agricultural Pests, Epidemic/Vector-Borne Diseases, Tree Mortality)					
3.01	Coordinate with surrounding jurisdictions, local health care providers, businesses, schools, the Orange County Health Care Agency, the California Department of Public Health, and the Centers for Disease Control to inform community members about current public health trends or issues, free and low-cost healthcare options, treatments, and where to find local healthcare facilities.	General Fund, BRIC/ HMGP Grants, Other Grants	City Manager's Office	$	Ongoing	High

	Mitigation Action	Potential Funding Sources	Responsible Department	Relative Cost	Time Frame	Priority
	(Hazards addressed: Epidemic/Vector-Borne Diseases)					
3.02	Cooperate with the Orange County Mosquito and Vector Control District to inform community members on best practices for mosquito-proofing homes and businesses and how to avoid mosquito bites. (Hazards addressed: Epidemic/Vector-Borne Diseases	General Fund, BRIC/ HMGP Grants, Other Grants	Development Services	$	Ongoing	Medium
3.03	Participate in exercises conducted by the operational area surrounding diseases and pest issues. (Hazards addressed: All)	General Fund, BRIC/ HMGP Grants, Other Grants	Development Services	$	Ongoing	Low
3.04	Continue to work with residents, business owners, and utilities to remove dead, dying, and diseased trees weakened by disease and/or pests. (Hazards addressed: Tree Mortality)	General Fund, BRIC/ HMGP Grants, Other Grants	Development Services	$	Ongoing	High
3.05	Update City landscape standards to incorporate disease-resistant and drought resistant native plant species as part of landscaping projects/ improvements. (Hazards Addressed: Tree Mortality)	General Fund, BRIC/ HMGP Grants, Other Grants	Public Services	$	2024	Low
3.06	Conduct an Arborist's Evaluation of the City's tree inventory to locate, identify, and determine the health of tree species within the City.	General Fund, BRIC/ HMGP Grants, Other Grants	Public Services	$$	Ongoing	Medium
		Drought				
4.01	Coordinate closely with Mesa Water District (MWD) on water use and water conservation efforts throughout the City.	General Fund, BRIC/ HMGP Grants, Other Grants	Development Services	$	Ongoing	Medium

	Mitigation Action	Potential Funding Sources	Responsible Department	Relative Cost	Time Frame	Priority
4.02	Update "Title 13 Planning, Zoning, and Development Chapter VII. Landscaping Standards 13-101" - of the Costa Mesa Municipal Code of Ordinances to reflect the latest advances in best practices in landscape design and irrigation that reduce water use within the City. Continue to update this section to reflect the newest technology, designs, and techniques to increase the sustainability of water resources. Prepare drought tolerant landscaping in such a way that it will not increase the negative impacts of flooding, such as debris flow.	General Fund, BRIC/ HMGP Grants, Other Grants	Development Services	$	Annually	High
4.03	Use drought-tolerant plants when installing new or significantly redoing 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.	General Fund, BRIC/ HMGP Grants, Other Grants	Public Services	$$	Ongoing	Low
4.04	Work with MWD to develop a focused water leak pilot program to eliminate leaky water mains, sprinklers, and other water fixtures, focusing on areas of the City with the greatest water demand	General Fund, BRIC/ HMGP Grants, Other Grants	Public Services	$	Ongoing	Low
4.05	Develop a Drought Strategic Plan that focuses on reductions in water use for municipal operations and strategies for inclusion into Mesa Water District drought planning programs and processes.	General Fund, BRIC/ HMGP Grants, Other Grants	Public Services	$	TBD	Low
	Energy/Power Shortage					
5.01	Coordinate with utility providers to enhance their assets located within or traversing through the City.	General Fund, BRIC/ HMGP Grants, Other Grants	Public Services	$	Ongoing	Low

	Mitigation Action	Potential Funding Sources	Responsible Department	Relative Cost	Time Frame	Priority
5.02	Establish and routinely update a confidential inventory of critical infrastructure and ensure utility providers coordinate development activities with future resilience enhancements.	General Fund, BRIC/ HMGP Grants, Other Grants	Development Services/Public Services	$	Annually	High
5.03	Expand access to alternative energy technologies, energy efficiency improvements and appliances, and programs for vulnerable populations to reduce energy consumption and the need for City services during extreme heat events.	General Fund, BRIC/ HMGP Grants, Other Grants	Public Services	$$	2026	Medium
5.04	Install new and harden existing emergency backup generators at critical facilities and infrastructure as deemed necessary.	General Fund, BRIC/ HMGP Grants, Other Grants	Public Services	$$	2024	High
5.05	Install battery backup power supplies for traffic signals to ensure functionality in the event of power failure.	General Fund, BRIC/ HMGP Grants, Other Grants	Public Services	$$	2026	Low
5.06	Monitor changes to PSPS circuits in and around the City that could affect residents, businesses, and organizations, and increase awareness of these events' effects on the City's resources.	General Fund, BRIC/ HMGP Grants, Other Grants	Police	$	Annually	Low
5.07	Develop a Power Failure Strategic Plan that prioritizes strategies focused on the following: • Identification of critical facilities requiring backup power supplies. • Identification of critical systems requiring backup battery supplies to ensure effective operations during power failure events.	General Fund, BRIC/ HMGP Grants, Other Grants	All Departments	$	2023	High

	Mitigation Action	Potential Funding Sources	Responsible Department	Relative Cost	Time Frame	Priority
	• Development of criteria for backup power supplies and equipment for City-owned building and infrastructure • Development of code updates/modifications for new development/redevelopments that are energy resilient or include backup power supplies or plug-in-ready retrofits. • Compilation of funding sources and strategies for City facility improvements and resources for residents and businesses.					
5.08	Install resilient emergency power supplies and microgrids at key critical facility locations throughout the City.	General Fund, BRIC/ HMGP Grants, Other Grants	All Departments	$$$	TBD	High
	Flooding					
6.01	Coordinate with dam owners/operators, state, and federal agencies to collectively identify threats to the City and the region and identify ways to retrofit/strengthen the dams under their control.	General Fund, BRIC/ HMGP Grants, Other Grants	Public Services	$	Ongoing	Low
6.02	Identify potential flood improvements that reduce inundation from both storm flows and potential dam inundation effects	General Fund, BRIC/ HMGP Grants, Other Grants	Public Services	$$	2024	High
6.03	Update the City's Storm Drain Master Plan periodically (in conjunction with the LHMP and CIP) to incorporate new data and/or address emerging issues.	General Fund, BRIC/ HMGP Grants, Other Grants	Public Services	$$$	2023	High

	Mitigation Action	Potential Funding Sources	Responsible Department	Relative Cost	Time Frame	Priority
6.04	Investigate the use of permeable paving and landscaped swales for new construction and replacement of City-owned hardscaped areas.	General Fund, BRIC/ HMGP Grants, Other Grants	Public Services	$$	Ongoing	Medium
6.05	Conduct frequent cleanings of storm drain intakes, especially before and during the rainy season.	General Fund, BRIC/ HMGP Grants, Other Grants	Public Services	$$	Ongoing	Low
6.06	Track areas where ponding frequently occurs during heavy rainfall and install new drains or upgrade existing ones to reduce ponding of water.	General Fund, BRIC/ HMGP Grants, Other Grants	Public Services	$$$	Ongoing	Low
	Geological Hazards (Expansive Soil, Erosion, Landslide, Methane Containing Soils)					
7.01	Conduct an analysis of old oil infrastructure in and around Costa Mesa to verify methane releases are not occurring. (Methane Containing Soils)	General Fund, BRIC/ HMGP Grants, Other Grants	Public Services/Development Services	$	2026	Low
7.02	Ensure effective drainage systems and stabilizing vegetation on and above landslide-prone slopes and bluffs are installed and maintained in areas prone to this hazard. (Landslide, Erosion)	General Fund, BRIC/ HMGP Grants, Other Grants	Public Services/Development Services	$	2024	High
7.03	Adopt guidelines for Methane Containing Soils based on the Orange County Fire Authority (OCFA), Combustible Soil Gas Hazard Mitigation, Guidelines for areas prone to impacts from methane containing soils. (Methane Containing Soils)	General Fund, BRIC/ HMGP Grants, Other Grants	Public Services/Development Services/Fire Department	$	2023	High

	Mitigation Action	Potential Funding Sources	Responsible Department	Relative Cost	Time Frame	Priority
7.04	Conduct a methane gas assessment in the southern portion of the City to identify areas with a high methane concentration. As part of the study, the City should identify potential strategies for capturing and using these gases. (Methane Containing Soils)	General Fund, BRIC/ HMGP Grants, Other Grants	Public Services/Development Services/Fire Department	$	2025	Low
	Hazardous Materials					
8.01	Discourage new sensitive land uses, including schools, parks, childcare centers, adult and senior assisted living facilities, and community centers, from locating near identified hazardous material facilities. Discourage or prohibit new hazardous material facilities from locating near sensitive land uses.	General Fund, BRIC/ HMGP Grants, Other Grants	Development Services	$	Ongoing	Low
8.02	Pursue full alignment of the General Plan with policies and actions outlined in state and regional plans such as the California Accidental Release Prevention (CalARP) Program and the Orange County Fire Authority Hazardous Materials Area Plan.	General Fund, BRIC/ HMGP Grants, Other Grants	Development Services	$	Annually	High
8.03	Continuously inspect businesses and other properties storing hazardous materials and create an inventory of storage locations that require updates, maintenance, or renovation.	General Fund, BRIC/ HMGP Grants, Other Grants	County Health (CUPA)	$	Ongoing	Medium
8.04	Discourage new sensitive land uses, including schools, parks, childcare centers, adult and senior assisted living facilities, and community centers, from locating near identified hazardous material facilities. Discourage or prohibit new hazardous material facilities from locating near sensitive land uses.	General Fund, BRIC/ HMGP Grants, Other Grants	Public Services	$	Ongoing	Low
	Human-Caused Hazards					
9.01	Coordinate with the Orange County Intelligence Assessment Center (OCIAC) to monitor potential incidents resulting in civil disturbance events (riots, mass shootings, etc.).	General Fund, BRIC/ HMGP	Police/Fire Departments	$	Ongoing	Low

	Mitigation Action	Potential Funding Sources	Responsible Department	Relative Cost	Time Frame	Priority
	(Hazards addressed: Mass-Casualty Incidents, Civil Disturbance)	Grants, Other Grants				
9.02	Disseminate information on cyber threats or potential terrorist activity to City staff and continually follow up with information on further developments in the situation. (Hazards addressed: Human-Caused Hazards)	General Fund, BRIC/ HMGP Grants, Other Grants	IT Department	$	Annually	Medium
9.03	Regularly update cybersecurity software and educate business owners and residents on current internet-based threats. (Hazards addressed: Cyber Threats	General Fund, BRIC/ HMGP Grants, Other Grants	IT Department	$	Annually	Medium
9.04	Retrofit all critical facilities, City administration buildings, and other buildings the City may deem important in the future with counterterrorism design elements and building materials. (Hazards addressed: Human-Caused Hazards)	General Fund, BRIC/ HMGP Grants, Other Grants	Public Services/Police Department	$$$	2026	High
9.05	Establish a backup location for the City's Traffic Control Management System and install backup emergency power to ensure system operation during an emergency. (Multi-Hazard	General Fund, BRIC/ HMGP Grants, Other Grants	Development Services/ Public Services	$$$	2024	High
9.06	Conduct a cyber threat assessment for the Traffic Control Management System and determine system vulnerabilities.	General Fund, BRIC/ HMGP Grants, Other Grants	Development Services	$$-$$$	Ongoing	Low
	Seismic Hazards					
10.01	Encourage the installation of resilient (seismically appropriate) piping for new or replacement pipelines in close coordination with local water, natural gas, and other providers.	General Fund, BRIC/ HMGP	Development Services/Public Services	$	Ongoing	Low

	Mitigation Action	Potential Funding Sources	Responsible Department	Relative Cost	Time Frame	Priority
		Grants, Other Grants				
10.02	Assess soft story conditions for apartment buildings constructed prior to 1980.	General Fund, BRIC/ HMGP Grants, Other Grants	Development Services	$$	2026	Medium
10.03	Conduct an educational campaign and incentives to encourage the use of reinforced chimneys, anchored rooftop-mounted equipment, window film, and other preventative measures to reduce damage to private buildings.	General Fund, BRIC/ HMGP Grants, Other Grants	Development Services	$$	TBD	Low
10.04	Encourage community groups and industry representatives to assist in outreach to residents and businesses to obtain earthquake insurance.	General Fund, BRIC/ HMGP Grants, Other Grants	City Manager's Office	$	Ongoing	Low
10.05	To the extent feasible, construct all new and significantly retrofitted City-owned facilities to remain operational in the event of a major earthquake.	General Fund, BRIC/ HMGP Grants, Other Grants	Public Services/Development Services	$$$	Ongoing	High
10.06	Retrofit key critical facilities with seismically rated window film treatments that ensure glass windows do not shatter during a strong seismic event.	General Fund, BRIC/ HMGP Grants, Other Grants	Public Services	$$	2025	High
10.07	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 shutoff mechanisms to	General Fund, BRIC/ HMGP Grants, Other Grants	Public Services/Development Services `	$	Ongoing	Low

	Mitigation Action	Potential Funding Sources	Responsible Department	Relative Cost	Time Frame	Priority
	reduce exposure of pipeline contents to residents and businesses.					
	Severe Weather					
11.01	Notify residents through public service announcements a couple of days in advance of a severe weather 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. (Hazards addressed: Severe Weather)	General Fund, BRIC/ HMGP Grants, Other Grants	City Manager's Office/ Public Services	$	Ongoing	Medium
11.02	Expand public facilities (libraries, community centers, etc.) as warming/cooling centers for vulnerable populations during extreme weather events, and assess facility needs to automatically open these facilities as severe weather centers when conditions require. (Hazards addressed: Severe Weather)	General Fund, BRIC/ HMGP Grants, Other Grants	Community Services/Public Services	$$	2024	High
11.03	Increase the use and construction of shade structures within new developments, City facilities, parks, and trails to reduce urban heat island impacts. (Hazards Addressed: Extreme Heat)	General Fund, BRIC/ HMGP Grants, Other Grants	Public Services	$$$	Ongoing	Medium
11.04	Evaluate the long-term capacity of designated cooling centers and shelters in the City to provide sufficient relief from extreme heat. Assess the need to expand services as the frequency, length, and severity of future heatwaves potentially change because of climate change. (Hazards addressed: Extreme Heat)	General Fund, BRIC/ HMGP Grants, Other Grants	Community Services/Public Services	$$	2025	Medium
11.05	Upgrade HVAC within City facilities to more efficient systems, including split systems or decentralized systems that allow for heating and cooling the spaces needed, not entire buildings. (Hazards addressed: Extreme Heat)	General Fund, BRIC/ HMGP Grants, Other Grants	Public Services	$$$	Ongoing	Low

	Mitigation Action	Potential Funding Sources	Responsible Department	Relative Cost	Time Frame	Priority
11.06	Conduct outreach to residents and businesses prior to severe winds (Santa Ana Wind events) on proper tree maintenance and identification of potentially hazardous trees. (Hazards addressed: Severe Wind)	General Fund, BRIC/ HMGP Grants, Other Grants	Development Services	$	Annually	Medium
	Urban Fire					
12.01	Promote the proper maintenance and separation of power lines from trees and other hazards.	General Fund, BRIC/ HMGP Grants, Other Grants	Public Services/ Development Services/ Fire Department	$	Ongoing	Medium
12.02	Provide information and resources to residents citywide on ways to improve resilience to home fires, including procedures for fallen powerlines.	General Fund, BRIC/ HMGP Grants, Other Grants	Public Services/ Development Services/ Fire Department	$	Annually	Low
12.03	Conduct regular vegetation management activities to reduce fire hazard risks, such as clearing out dead vegetation in parks, open spaces, rights-of-way, and other areas that could become fuel for fires.	General Fund, BRIC/ HMGP Grants, Other Grants	Public Services/ Development Services/ Fire Department	$$	Ongoing	Medium
12.04	Establish thresholds for fire sprinkler installation in retrofitted buildings and structures undergoing use changes or remodel.	General Fund, BRIC/ HMGP Grants, Other Grants	Public Services/ Development Services/ Fire Department	$	2023	Medium
12.05	Promote the planting of fire-resistant landscaping in all new developments and significant landscape retrofits in accordance with State and local recommendations, such as high-moisture, low-resin trees, shrubs, and ground cover.	General Fund, BRIC/ HMGP Grants, Other Grants	Public Services/ Development Services/ Fire Department	$	Ongoing	Low

*** Relative Cost Categories: $ - Less than $60,000 | $$ - $60,001 to $199,999 | $$$ - Greater than $200,000**

Chapter 6 – Plan Maintenance

For this LHMP to remain effective and useful to the community of Costa Mesa, it must remain up to date. An updated version of the LHMP will guide hazard mitigation activities in Costa Mesa and help keep the City eligible for state and federal hazard mitigation funding. The HMPC has structured this LHMP so individual sections can easily be updated as new information becomes available and new needs arise, helping to keep this Plan current.

This chapter discusses how to update this Plan to keep it in compliance with applicable state and federal requirements. This chapter also describes how the City can incorporate the mitigation actions described in Chapter 5 into existing programs and planning mechanisms and how public participation will remain an important part of Plan monitoring and future update activities.

Coordinating Body

The HMPC will remain responsible for maintaining and updating the Plan, including evaluating the Plan's effectiveness as needed. Members of the HMPC will also coordinate the implementation of the Plan through their respective positions. **Table 1-1** contains a list of HMPC members that participated in plan development. In future years, staff, and representatives (either current HMPC members or other individuals) from the following Departments should be included in maintenance and update activities:

- City Clerk
- City Manager's Office
- Community Development
- Community Services
- Financial Management and Strategic Planning
- Human Resources & Innovation
- Police
- Fire
- Public Services
- Transportation

The staff member currently serving as the HMPC leader (responsible for coordinating future updates) is the City's Emergency Manager within the Police Department. This person will serve as the project manager during the update process or designate this role to another staff member. The HMPC leader or their designee will coordinate maintenance of this Plan, lead the formal Plan review and evaluation activities, direct the Plan update, and assign tasks to other members of the HMPC to complete these activities. Such tasks may include collecting data, developing new mitigation actions, updating mitigation actions, making presentations to City staff and community groups, and revising sections of the Plan.

Plan Implementation

The effectiveness of the Plan depends on the successful implementation of the mitigation actions. This includes integrating mitigation actions into existing City plans, policies, programs, and other implementation mechanisms. The mitigation actions in this Plan are

intended to reduce the damage from hazard events, help the City secure funding, and provide a framework for hazard mitigation activities. Committee members prioritized the hazard mitigation actions in **Table 5-3** in Chapter 5. These priorities will guide the implementation of these actions through new or existing City mechanisms as resources are available. The LHMP project manager is responsible for overseeing the implementation, promotion, and maintenance of this Plan and facilitating meetings and other coordinating activities related to Plan implementation and maintenance.

The key City Plans that should incorporate content from this LHMP include:

- **Costa Mesa General Plan Safety Element** – this element should incorporate relevant mapping and analysis in the Safety Element to ensure the goals and policies of this plan are reinforced throughout future developments and projects proposed within the City.
- **Costa Mesa Emergency Operations Plan** – The EOP focuses on the effective preparedness and response to hazard events within the City. Incorporating relevant content from this plan into the EOP ensures consistency regarding the hazards addressed in both plans.
- **Costa Mesa Capital Improvements Program** – The CIP identifies key infrastructure investments throughout the City that may include hazard mitigation elements. Incorporating this plan into the CIP may assist with enhancing infrastructure investment through additional funding and/or modification of improvements to include hazard mitigation elements.

This integration of the LHMP into the Costa Mesa General Plan also allows the City to comply with AB 2140 requirements, as identified in Chapter 1 of this plan.

Future integration of the LHMP into other plans and processes should focus on the following:

- Updates to existing plans and documents should always refer to the LHMP for any relevant information (risk assessment, maps, tables) that can be incorporated into the new document.
- Identification of hazard conditions addressed in the LHMP should be referenced in plans prepared by the City to reduce inconsistencies and minimize redundancy.
- Proposed projects/investments made by the City should identify relevant mitigation actions that may apply to future construction funding
- Changes to policies, rules, and regulations that involve hazard mitigation should reference the LHMP, ensuring greater connection regarding the reason behind the modification.

Integration into other plans and processes should be an ongoing process undertaken by all departments and be regularly monitored as part of the annual maintenance process (see below).

Plan Maintenance Process

The City's plan maintenance process will rely on the Local Hazard Mitigation Plan Implementation Handbook, located in **Appendix E**. The handbook is intended to function as a stand-alone document that gives a concise and accessible guide to jurisdiction staff for implementing and maintaining the Plan. A key component of the handbook is the specific

mechanisms that the jurisdiction can use to integrate this plan into other City planning mechanisms.

Plan Monitoring and Evaluation

When members of the HMPC are not updating the Plan, they should meet at least once a year to go over mitigation action implementation and evaluate the Plan's effectiveness. These meetings should include:

- Discussion of the timing of mitigation action implementation
- Mitigation action implementation evaluation, and determination of success
- Mitigation action prioritization revisions, if deemed necessary
- Mitigation action integration into other mechanisms, as needed

The first of these meetings will be held in the 2022-2023 fiscal calendar year. To the extent possible, Committee meetings should be scheduled at an appropriate time in the City's annual budgeting process, which will help ensure that funding and staffing needs for mitigation actions are considered.

When the Committee meets to evaluate the Plan, members should consider these questions:

1. What hazard events, if any, have occurred in Costa Mesa in the past year? What were the impacts of these events on the community? Were the impacts mitigated, and if so, how?
2. What mitigation actions have been successfully implemented? Have any mitigation actions been implemented but not successfully, and if so, why?
3. What mitigation actions, if any, have been scheduled for implementation but have not yet been implemented?
4. What is the schedule for implementing future mitigation actions? Is this schedule reasonable? Does the schedule need to be adjusted for future implementation, and are such adjustments appropriate and feasible?
5. Have any new issues of concern arisen, including hazard events in other communities or regions that are not covered by existing mitigation actions?
6. Are new data available that could inform updates to the Plan, including data relevant to the hazard profiles and threat assessments?
7. Are there any new planning programs, funding sources, or other mechanisms that can support hazard mitigation activities in Costa Mesa?

Plan Updates

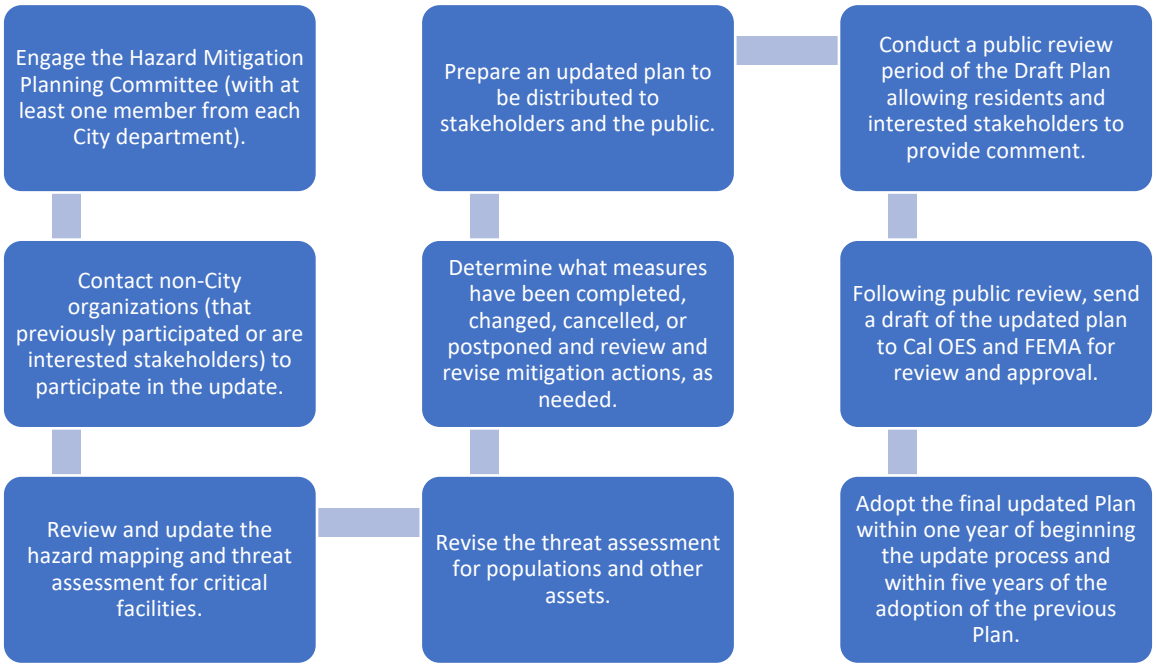
The information in this Plan, including the hazard profiles, threat assessments, and mitigation actions, is based on the best available information, practices, technology, and methods available to the City and HMPC when this Plan was prepared. As factors change, including technologies, community demographics and characteristics, best practices, and hazard conditions, it is necessary to update the Plan to remain relevant. Additionally, Title 44, Section 201.6(d)(3) of the Code of Federal Regulations requires that LHMPs be reviewed, revised, and resubmitted for approval every five years to remain eligible for federal benefits.

Update Method and Schedule

The update process should begin no later than four years after this Plan is adopted, allowing a year for the update process before the Plan expires. Depending on the circumstances, the LHMP project manager or their designee may also choose to begin the update process sooner. Some reasons for accelerating the update process may include:

- A presidential disaster declaration for Costa Mesa or an area that includes part or the entire City.
- A hazard event that results in one or more fatalities in Costa Mesa.

The update process will add new and updated methods, demographic data, community information, hazard data and events, considerations for threat assessments, mitigation actions, and other information, as necessary. This helps keep the Plan relevant and current. The Committee will determine the best process for updating the Plan, which should include the following steps:



Update Adoption

The Costa Mesa City Council is responsible for adopting this Plan and all future updates. As previously mentioned, adoption should occur every five years. The City should begin the update process at least one year prior to expiration to ensure the plan remains active. If the City has a grant application that relies on the LHMP, an update to the plan should occur no later than 18 months before expiration. Adoption should take place after FEMA notifies the City that the Plan is Approved Pending Adoption. Once the City Council adopts the Plan following its approval by FEMA, the adopted plan should be transmitted to FEMA.

Continued Public Involvement

The City will continue to keep members of the public informed about the HMPC's actions to review and update the LHMP. A revised community engagement strategy needs to be developed for future updates that reflect the City's updated needs and capabilities. The updated strategy should include a tentative schedule and plan for public meetings, recommendations for using the City website and social media accounts, and content for public outreach documentation. The HMPC will also determine the appropriate method of providing Costa Mesa community members with information annually regarding any actions taken by the City and ways that residents and businesses can help further the City's goals. These updates are anticipated to occur after the annual HMPC meeting conducted by the City.

Point of Contact

The HMPC leader for Costa Mesa is the primary point of contact for this Plan and future updates. At the time of writing, the HMPC leader is Brenda Emrick, available at brenda.emrick@costamesaca.gov | (714) 327-7406.

Appendix A HMPC Meeting Materials

LHMP Hazard Mitigation Planning Committee Meetings: List of Invitees / Attendees ✓= Attended the Meeting

Name	Title	Department	HMPC Meeting 1	HMPC Meeting 2	HMPC Meeting 3
Jason Dempsey (Primary POC)	Emergency Services Administrator	Police	✓	✓	✓
Alma Reyes	Assistant to the City Manager	CMO			
Ana Baca	Budget & Purchasing Manager	Finance	✓	✓	✓
Bart Mejia	Interim City Engineer	Public Services	✓	✓	✓
Cathleen Serrano	Purchasing Supervisor	Finance	✓	✓	✓
Jon Neal	Fire Marshall	Fire Department	✓	✓	✓
Dane Bora	Public Affairs Manager	Communications and Marketing Division			
Daniel Jojola	Maintenance Supervisor	Public Services	✓		
Itzia Carvajal	Principal Human Resources Analyst	Human Resources			
Jason Minter	PCS Director	Parks and Community Services	✓		✓
Jennifer Le	Development Services Director	Development Services	✓		
Jennifer Rosales	Transportation Services Manager	Public Services	✓	✓	
Joe Noceti	Public Information Officer	Fire			
Steve Ely	I.T. Director	Information Technology	✓		✓
Ruth Wang	Human Resources Analyst	Human Resources	✓	✓	✓
Chris Yeager	Assistant Planner	Development Services			
Salem Afeworki	Energy and Sustainability Services Manager	Public Services	✓	✓	✓
Stacy Bennet	Deputy City Clerk	City Manager		✓	

October 7, 2020

Costa Mesa Hazard Mitigation Planning Team: Meeting #1

Agenda

1. Team Introductions (10 minutes)
2. City of Costa Mesa Project Overview (10 minutes)
3. Local Hazard Mitigation Plan Overview (10 minutes)
4. Project Goals and Expectations (10 minutes)
5. Hazard Mitigation Planning Team Roster (10 minutes)
6. Communication Protocols (5 minutes)
7. Break (5 minutes)
8. Data Needs (Critical Facilities List, vulnerable populations, recent/past hazards, GIS) (10 minutes)
9. Community Engagement and Outreach Strategy (10 minutes)
10. Hazard Identification/Prioritization (20 minutes)
11. Next Steps and To Do List (5 minutes)

February 3rd, 2021

City of Costa Mesa Hazard Mitigation Planning Team: Meeting #2

Agenda:

12. Introductions (5 Minutes)
13. Review of Project Goals (10 Minutes)
14. Review of Critical Facilities (5 Minutes)
15. Review of Hazard Prioritization (5 Minutes)
16. Review of Hazard Profiles/Mapping Discussion/Threat Assessment (75 Minutes)
17. Introduction to Mitigation Strategies (5 Minutes)
18. Recap of Mitigation Strategies/Actions (5 minutes)
19. Next Steps (5 Minutes)

Next Steps

HMPC Meeting #3 – Mitigation Action Review/Prioritization	**March 2021**
Community Outreach	October 2020 - February 2021
Administrative Draft LHMP	April 2021
Public Review Draft LHMP Document	May 2021 – June 2021
Cal OES/FEMA Review Draft Document	July 2021

March 3rd, 2021

City of Costa Mesa Hazard Mitigation Planning Team: Meeting #3

Agenda:

1. Overview of Mitigation Strategies
2. Discussion of STAPLE/E Criteria
3. Discussion of Relative Cost Estimates
4. Review of Discussion of Draft Mitigation Strategies
5. Next Steps

Typical Mitigation Categories

Plans and Regulations

- Ordinances, Regulations

Structural Projects

- Utility Undergrounding, Structural Retrofits

Natural Systems Protection

- Stream restoration, erosion control

Education Programs

- Outreach materials, websites, presentations

Preparedness and Response Actions

- Mutual aid agreements, equipment purchases, notification protocols

Table 1: STAPLE/E Criteria	
Issue	**Criteria**
Social	• Is the action socially acceptable to Costa Mesa community members? • Would the action treat some individuals unfairly? • Is there a reasonable chance of the action causing a social disruption?
Technical	• Is the action likely to reduce the risk of the hazard occurring, or will it reduce the effects of the hazard? • Will the action create new hazards, or make existing hazards worse? • Is the action the most useful approach for Costa Mesa to take, given the goals of the City and of community members?
Administrative	• Does the City have the administrative capabilities to implement the action? • Are there existing City staff who can lead and coordinate implementation of the measure, or can the City reasonably hire new staff for this role? • Does the City have enough staff, funding, technical support, and other resources to carry out implementation? • Are there administrative barriers to implementing the action?
Political	• Is the action politically acceptable to City officials and to other relevant jurisdictions and political entities? • Do community members support the action?
Legal	• Does the City have the legal authority to implement and enforce the action? • Are there potential legal barriers or consequences that could hinder or prevent implementation of the action? • Is there a reasonable chance that implementation of the action would expose the City to legal liabilities? • Could the action reasonably face other legal challenges?
Economic	• What are the monetary costs of the action, and do the costs exceed the monetary benefits? • What are the start-up and maintenance costs of the action, including administrative costs? • Has funding for action implementation been secured, or is a potential funding source available? • How will funding the action affect the City's financial capabilities? • Could implementation of the action reasonably burden the Costa Mesa economy or tax base? • Could there reasonably be other budgetary and revenue

	impacts to the City?
Environmental	• What are the potential environmental impacts of the action? • Will the action require environmental regulatory approvals? • Will the action comply with all applicable federal, state, regional, and local environmental regulations? • Will the action reasonably affect any endangered, threatened, or otherwise sensitive species of concern?

*** Relative Cost Categories:**

$ Less than $XXX

$$ $XXX to $YYY

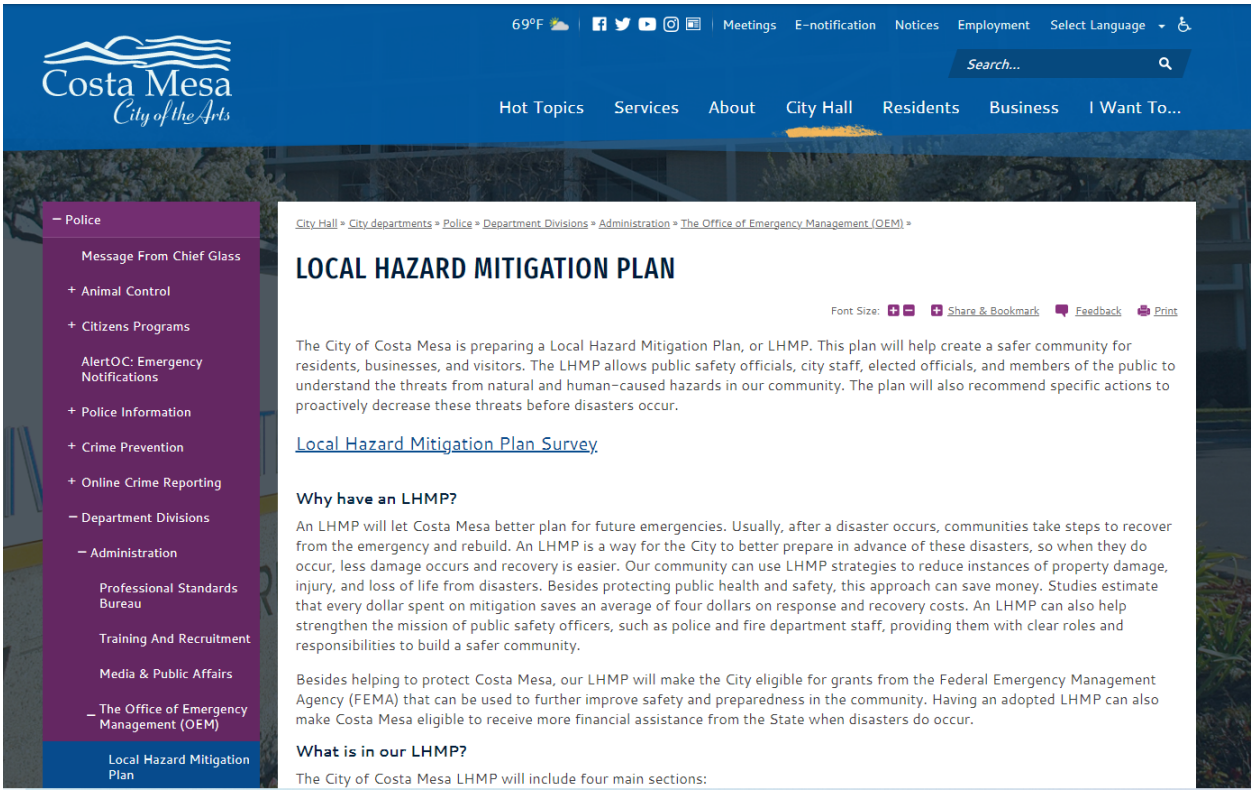
$$$ Greater than $YYY

Next Steps

Community Outreach	**March 2021 - May 2021**
Administrative Draft LHMP	March 2021
Public Review Draft LHMP Document	May 2021 – June 2021
Cal OES/FEMA Review Draft Document	July 2021

To Do List

Appendix B – Outreach Engagement Materials



https://www.costamesaca.gov/city-hall/city-departments/police/department-divisions/administration/the-office-of-emergency-management-oem/local-hazard-mitigation-plan

City of Costa Mesa Face Book Post
https://www.facebook.com/CostaMesaCityHall/posts/5329978017044148

2021 Costa Mesa Hazard Mitigation Plan Survey

I. Local Hazard Mitigation Plan Survey

Dear Community Member,

The City of Costa Mesa is preparing a Local Hazard Mitigation Plan or LHMP. Like all other communities, Costa Mesa could potentially face widespread devastation in the event of a natural disaster. While no community can completely protect itself against all potential hazardous situations, this plan will help identify those situations, assess our current provisions, and outline a strategy to lessen the vulnerability and severity of future disasters.

Your responses to this survey will inform the preparation of the plan. Thank you for your time and cooperation.

II. Hazard Awareness

Question Title

1. Please indicate whether you live or work in the City of Costa Mesa.

- (•) I live in the City of Costa Mesa.
- ( ) I work in the City of Costa Mesa.
- ( ) I live and work in the City of Costa Mesa.
- ( ) Neither applies to me, but I am interested in the City's resiliency.

Question Title

2. What is the ZIP code of your home?

[ ]

Question Title

3. Have you been impacted by a hazard event in your current residence?

- ( ) Yes
- ( ) No

Question Title

4. If you answered yes to the previous question, please select the type of hazard event that you have been impacted by (select all that apply).

- [ ] Aircraft incident
- [ ] Diseases and Pests
- [ ] Drought

- ☐ Energy/Power Shortage
- ☐ Flooding
- ☐ Geologic Hazards
- ☐ Hazardous Materials Release
- ☐ Human-Caused Hazards
- ☐ Seismic Hazards
- ☐ Severe Weather
- ☐ Urban Fire

Question Title

5. Please list any additional hazards that have previously impacted your neighborhood or home.

Question Title

6. The following hazards could potentially impact the City. Please mark the THREE (3) hazards that are of most concern to your neighborhood or home.

- ☐ Aircraft incident
- ☐ Diseases and Pests
- ☐ Drought
- ☐ Energy/Power Shortage
- ☐ Flooding
- ☐ Geologic Hazards
- ☐ Hazardous Materials Release
- ☐ Human-Caused Hazards
- ☐ Seismic Hazards
- ☐ Severe Weather
- ☐ Urban Fire

Question Title

7. Please list any additional hazards that present a threat to your neighborhood or home.

Question Title

8. The planning team is using various data sources to identify hazards in your community; however, some of these data sources do not provide data at a general citywide level. Are there any small-scale issues, such as ponding at a specific intersection during rain, that you would like the planning team to consider?

- I am not aware of local hazards
- I am aware of local hazards

Question Title

9. Please provide as much detail as possible, including location and type of hazard.

Question Title

10. How concerned are you that climate change may create new hazardous situations in Costa Mesa or make existing natural hazards worse?

- Very concerned.
- Somewhat concerned.
- Somewhat unconcerned.
- Not at all concerned.
- Unsure.

Question Title

11. If you have taken any action to protect yourself against natural hazards, how confident are you that these actions will be sufficient to protect against more severe hazards that are expected because of climate change?

- Very confident.
- Somewhat confident.

- Somewhat unconfident.
- Not at all confident.
- Unsure.

Question Title

12. When do you think climate change will pose a threat to your health, property, livelihood, or overall wellbeing?

- It already is.
- Within the next five years.
- In five to twenty years.
- Not for at least another twenty years.
- Never, or not in my lifetime.

Question Title

13. If you are a homeowner, do you have adequate homeowners insurance to cover the hazards that could impact your home?

- Yes, my insurance coverage should be adequate.
- No, I don't believe my insurance coverage would be adequate for a major disaster.
- Unsure.
- I do not have an insurance policy.
- Not applicable; I rent my current residence.

Question Title

14. If you rent your residence, do you have renters insurance?

- Yes
- No
- Not applicable; I own my residence.

Question Title

15. Do you have flood insurance for your home?

- Yes, I own my home and have flood insurance.
- Yes, I rent my home and have flood insurance.
- No, but I am interested in reviewing flood insurance options (http://www.floodsmart.gov/floodsmart/).

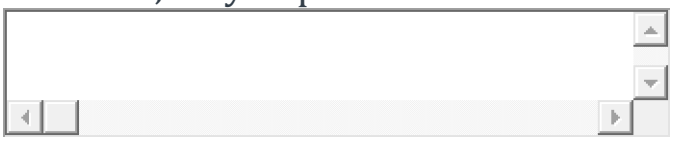
Question Title

16. Have you done anything to your home to make it less vulnerable to hazards such as earthquakes, floods, and fires?

- ○ Yes
- ○ No
- ○ Not applicable; I rent my residence.

Question Title

17. If not, do you plan to?



Question Title

18. If a severe hazard event occurred today such that all services were cut off from your home (power, gas, water, sewer) and you were unable to leave or access a store for 72 hours, which of these items do you have readily available?

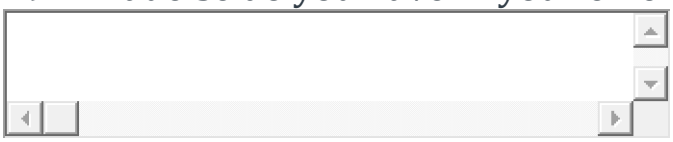
- ☐ Potable water (3 gallons per person)
- ☐ Cooking and eating utensils
- ☐ Can opener
- ☐ Canned / nonperishable foods (ready to eat)
- ☐ Gas grill / camping stove
- ☐ Extra medications and contact lenses (if applicable)
- ☐ First aid kit / supplies
- ☐ Portable AM/FM radio (solar powered, hand crank, or batteries)
- ☐ Handheld "walkietalkie" radios (with batteries)
- ☐ Important family photos / documentation in a water- and fireproof container
- ☐ Extra clothes and shoes
- ☐ Blanket(s) / sleeping bag(s)
- ☐ Cash
- ☐ Flashlight (with batteries)
- ☐ Gasoline
- ☐ Telephone (with batteries)

- [ ] Pet supplies
- [ ] Secondary source of heat

For more information on emergency kits, visit: https://www.ready.gov/kit

Question Title

19. What else do you have in your emergency kit?



Question Title

20. Are you familiar with the special needs of your neighbors in the event of a disaster situation (special needs may include limited mobility, severe medical conditions, memory impairments)?

- ○ Yes
- ○ No

Question Title

21. Are you a trained member of your Community Emergency Response Team (CERT)?

- ○ Yes
- ○ No, but I would like to learn more about CERT.
- ○ No, I am not interested in being a trained CERT member.

For more information about CERT, please visit:

https://www.costamesaca.gov/city-hall/city-departments/fire-rescue/community-education-and-preparedness/community-emergency-response-team-cert#:~:text=The%20City%20of%20Costa%20Mesa,practice%20and%20learn%20new%20skills.

Question Title

22. How can the City help you become better prepared for a disaster? (choose all that apply)

- [ ] Provide effective emergency notifications and communication.
- [ ] Provide training and education to residents and business owners on how to reduce future damage.

- ☐ Provide community outreach regarding emergency preparedness.
- ☐ Create awareness of special needs and vulnerable populations.
- ☐ Other (please specify)

If you do NOT work in the City of Costa Mesa, please skip to question 26.

Question Title

23. What is the ZIP code of your workplace?

Question Title

24. Does your employer have a plan for disaster recovery in place?

- ○ Yes
- ○ No
- ○ I don't know

Question Title

25. Does your employer have a workforce communications plan to implement following a disaster, so they can contact you?

- ○ Yes
- ○ No

III. Recommendations and Future Participation

Question Title

26. Would you like to be contacted when the Draft 2020 Costa Mesa Hazard Mitigation Plan is available for review?

- ○ Yes; please notify me using my contact information in the next question.
- ○ No

Question Title

27. If you would like to be notified of future opportunities to participate in hazard mitigation and resiliency planning, please provide your name and e-mail address. If you do not have an e-mail address, please provide your mailing address.

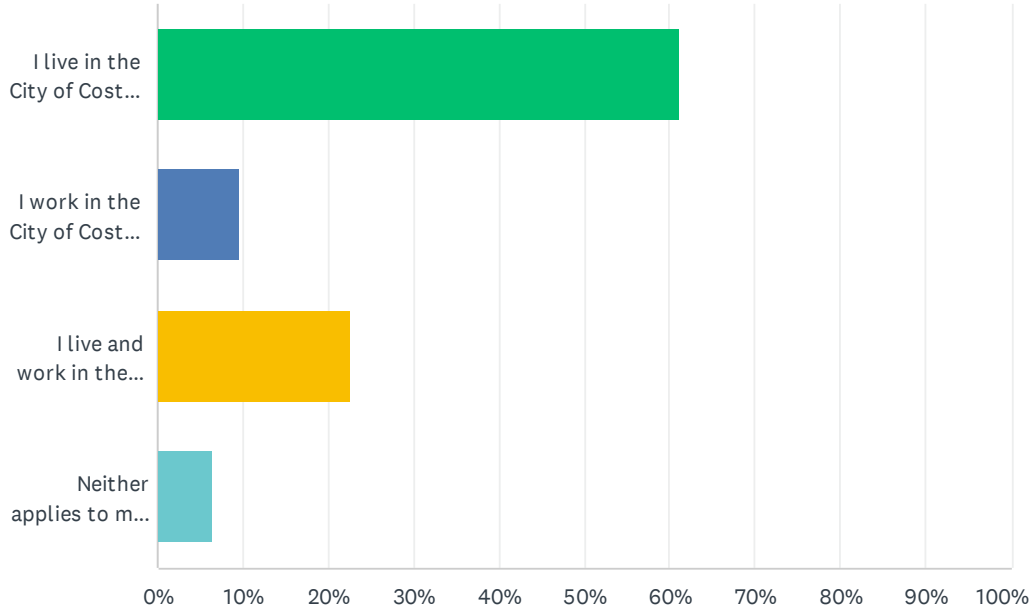
Question Title

28. Please provide us with any additional comments/suggestions/questions regarding your risk of future hazard events.

Thank you for taking the time to complete this survey. If you have any questions, or if you know of other people/organizations that should be involved, please contact Jason Dempsey at jdempsey@costamesaca.gov.

Q1 Please indicate whether you live or work in the City of Costa Mesa.

Answered: 31 Skipped: 1



ANSWER CHOICES	RESPONSES	
I ve n the C ty of Costa Mesa.	61.29%	19
I wo k n the C ty of Costa Mesa.	9.68%	3
I ve and wo k n the C ty of Costa Mesa.	22.58%	7
Ne the app es to me, but I am nte ested n the C ty's es ency.	6.45%	2
TOTAL		31

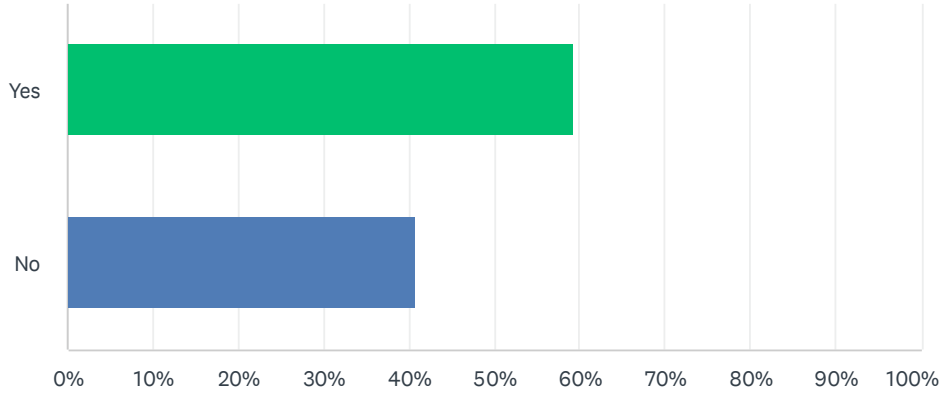
Q2 What is the ZIP code of your home?

Answered: 31 Skipped: 1

#	RESPONSES	DATE
1	92626	8/26/2021 10:23 AM
2	92663	8/26/2021 8:34 AM
3	92627	8/25/2021 11:11 PM
4	92626	8/25/2021 7:56 PM
5	92626	8/25/2021 7:55 PM
6	92662	8/25/2021 7:34 PM
7	92626	5/25/2021 4:40 PM
8	92627	4/20/2021 2:07 PM
9	92627	4/17/2021 9:07 AM
10	92627	3/30/2021 2:49 PM
11	92626	3/8/2021 9:26 AM
12	90620	3/8/2021 8:45 AM
13	92626	3/8/2021 8:40 AM
14	92647	3/8/2021 8:25 AM
15	92626	3/7/2021 6:53 PM
16	92626	3/7/2021 9:32 AM
17	92626	3/7/2021 8:15 AM
18	92626	3/6/2021 8:04 PM
19	92627	3/6/2021 1:26 PM
20	92627	3/6/2021 11:10 AM
21	92627	3/6/2021 10:31 AM
22	92626	3/6/2021 8:44 AM
23	92626	3/6/2021 6:04 AM
24	92705	3/5/2021 9:04 PM
25	92627	3/5/2021 8:46 PM
26	92627	3/5/2021 7:29 PM
27	92626	3/5/2021 6:32 PM
28	92626	3/5/2021 6:03 PM
29	92627	3/5/2021 5:49 PM
30	92626	3/5/2021 5:41 PM
31	92627	3/3/2021 7:43 PM

Q3 Have you been impacted by a hazard event in your current residence?

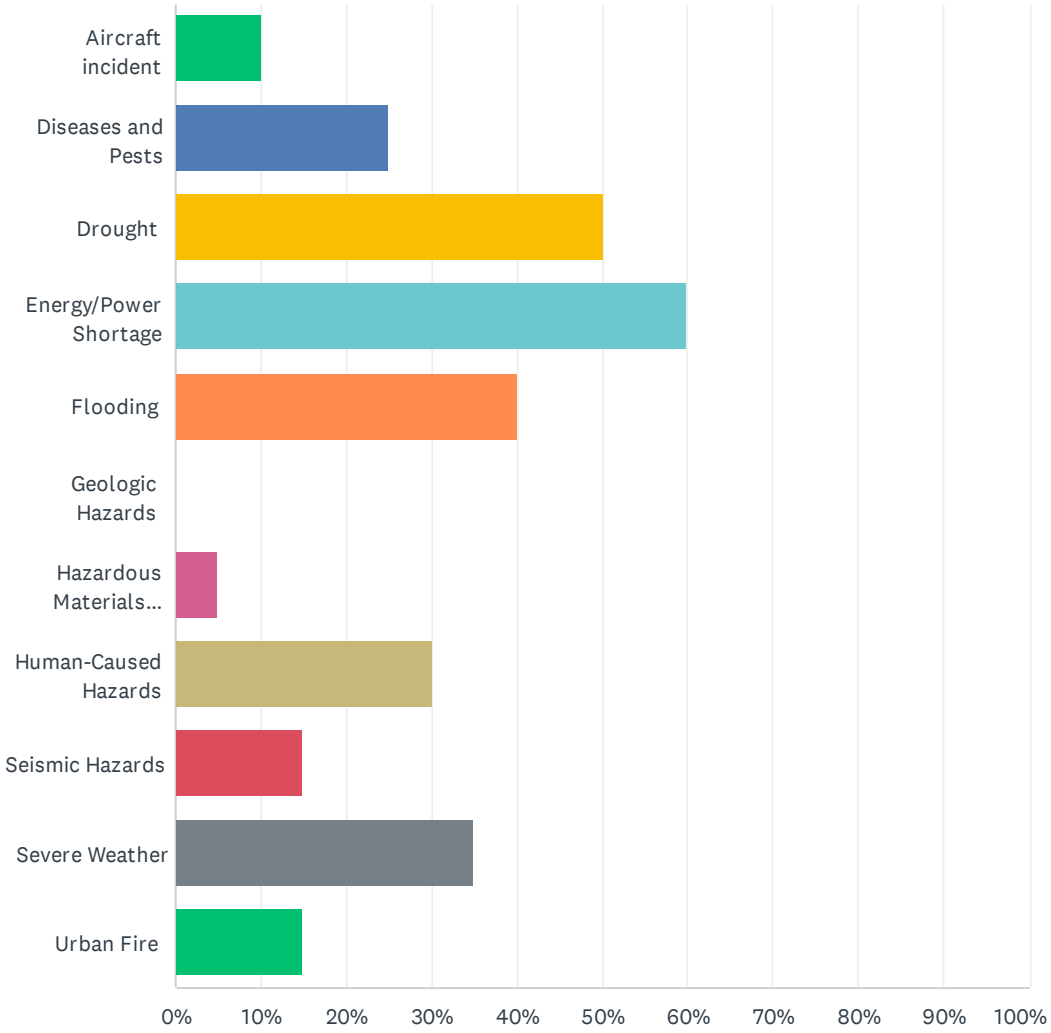
Answered: 32 Skipped: 0



ANSWER CHOICES	RESPONSES	
Yes	59.38%	19
No	40.63%	13
TOTAL		32

Q4 If you answered yes to the previous question, please select the type of hazard event that you have been impacted by (select all that apply).

Answered: 20 Skipped: 12



ANSWER CHOICES	RESPONSES	
Aircraft incident	10.00%	2
Diseases and Pests	25.00%	5
Drought	50.00%	10
Energy/Power Shortage	60.00%	12
Flooding	40.00%	8
Geologic Hazards	0.00%	0
Hazardous Materials Release	5.00%	1
Human-Caused Hazards	30.00%	6
Seismic Hazards	15.00%	3
Severe Weather	35.00%	7
Urban Fire	15.00%	3
Total Respondents: 20		

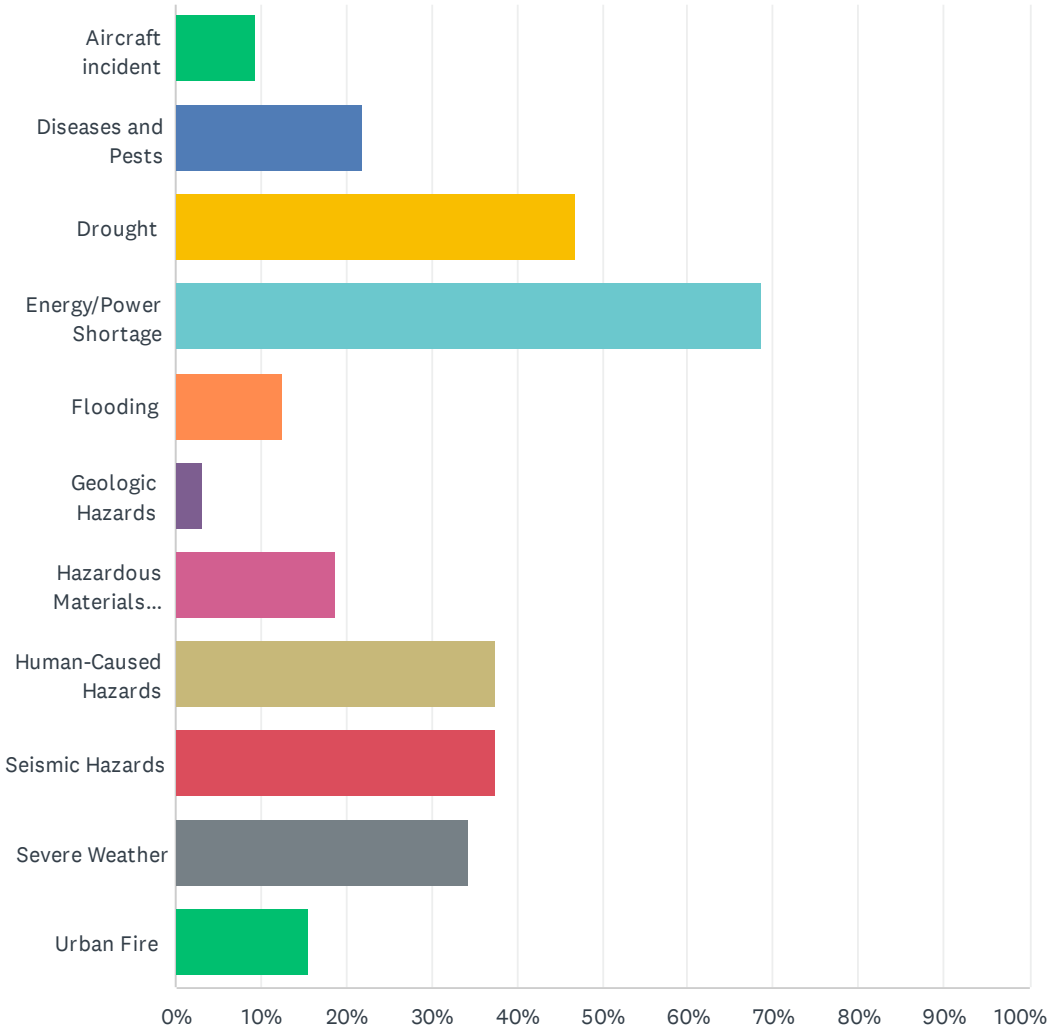
Q5 Please list any additional hazards that have previously impacted your neighborhood or home.

Answered: 10 Skipped: 22

#	RESPONSES	DATE
1	Increased ant invasions, cockroach infestation increase, more extreme heat causing hotter days and nights, more noise in neighborhood as homes that have never needed A/C are not installing units, drought drying out soils, smoke pollution from fires in foothills, more spikes in pollen aggravating allergies, people like me avoiding outdoor exercise in middle of day due to heat.	8/26/2021 10:23 AM
2	air quality from fires	8/26/2021 8:34 AM
3	homeless and homeless drug addicts	4/17/2021 9:07 AM
4	Illegal immigrants have impacted my neighborhood and as we all know, they are not supposed to be here! We are told we have to conserve water yet illegals are not told to stop using our water. The same goes for electricity, we get brown-outs yet illegals still use our electricity. No parking, excess traffic, overcrowded classrooms all hazards impacting my neighborhood. Even during pandemic when teachers say they need safe-distancing before kids can attend in-person classes no one says sorry, we just don't have room for illegals (who are not supposed to be here).	3/30/2021 2:49 PM
5	Flooding and ponding on streets during strong rain events.	3/8/2021 8:45 AM
6	Proximity to landfill	3/8/2021 8:25 AM
7	N/A	3/7/2021 6:53 PM
8	None	3/7/2021 9:32 AM
9	Dangerous driving in residential areas	3/5/2021 9:04 PM
10	We live across from The fountain valley sanitation plant and are impacted by the fumes blowing into our neighborhood. Mesa verde state streets area.	3/5/2021 6:03 PM

Q6 The following hazards could potentially impact the City. Please mark the THREE (3) hazards that are of most concern to your neighborhood or home.

Answered: 32 Skipped: 0



ANSWER CHOICES	RESPONSES	
Aircraft incident	9.38%	3
Diseases and Pests	21.88%	7
Drought	46.88%	15
Energy/Power Shortage	68.75%	22
Flooding	12.50%	4
Geologic Hazards	3.13%	1
Hazardous Materials Release	18.75%	6
Human-Caused Hazards	37.50%	12
Seismic Hazards	37.50%	12
Severe Weather	34.38%	11
Urban Fire	15.63%	5
Total Respondents: 32		

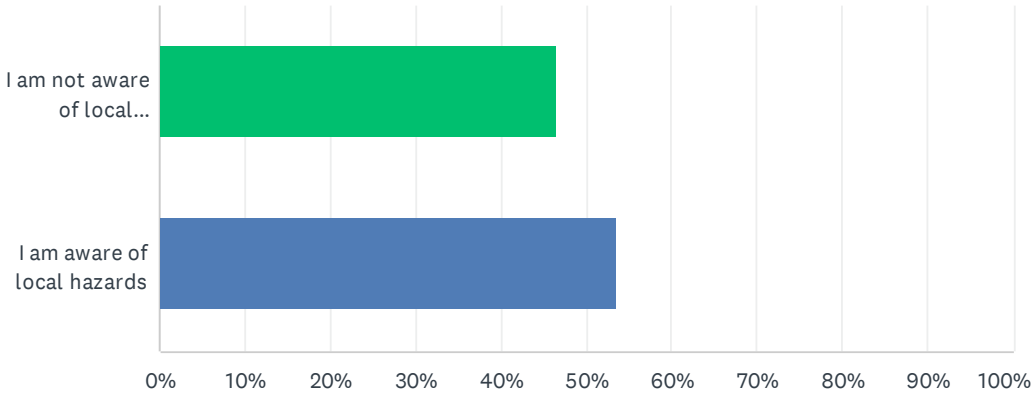
Q7 Please list any additional hazards that present a threat to your neighborhood or home.

Answered: 14 Skipped: 18

#	RESPONSES	DATE
1	Green House Gases Globally: It is a hazard that community leaders are not moving fast enough to implement local and global solutions to getting to net zero emissions. The Titanic sunk because the rudder was too small and turned too late. We need BIG action and NOW from our leaders.	8/26/2021 10:23 AM
2	Flooding	8/26/2021 8:34 AM
3	Westside. Heat events. Not enough trade and trees are a reality now.	8/25/2021 11:11 PM
4	City sidewalk green area not well maintained. Hazard for pedestrians.	8/25/2021 7:55 PM
5	the drug addicted homeless that invade my neighborhood	4/17/2021 9:07 AM
6	People who don't follow our laws and park in front of fire-hydrants, write graffiti garbage on walls, homes, and even churches, illegally dispose of garbage.	3/30/2021 2:49 PM
7	N/A	3/7/2021 6:53 PM
8	None	3/7/2021 9:32 AM
9	Government	3/6/2021 11:10 AM
10	Coyotes	3/5/2021 9:04 PM
11	Wildfire smoke	3/5/2021 7:29 PM
12	Sober living homes is a major issue for the safety of our neighborhood along with the parking problem it creates	3/5/2021 6:03 PM
13	Speeding cars (or is that what “human-caused hazard” means?)	3/5/2021 5:49 PM
14	Inequality driving civil unrest	3/3/2021 7:43 PM

Q8 The planning team is using various data sources to identify hazards in your community; however, some of these data sources do not provide data at a general citywide level. Are there any small-scale issues, such as ponding at a specific intersection during rain, that you would like the planning team to consider?

Answered: 28 Skipped: 4



ANSWER CHOICES	RESPONSES	
I am not awa e of oca haza ds	46.43%	13
I am awa e of oca haza ds	53.57%	15
TOTAL		28

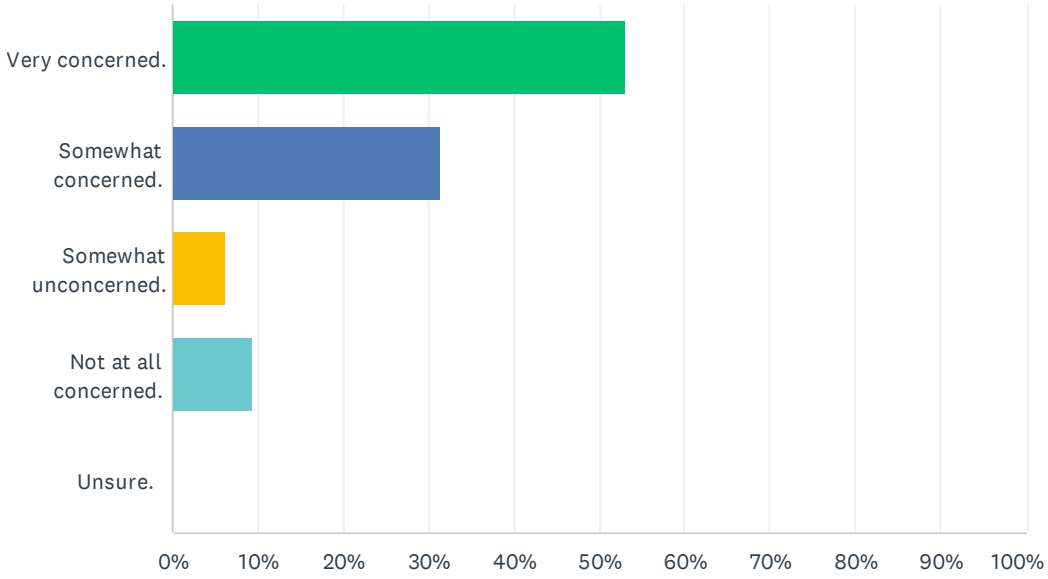
Q9 Please provide as much detail as possible, including location and type of hazard.

Answered: 18 Skipped: 14

#	RESPONSES	DATE
1	There is a low lying area on 17th at Monrovia that floods at even normal rain events. Tennessee got 17in in 24 hours because of Climate change. We need to be ready.	8/26/2021 8:34 AM
2	We have had a few floods on Maple Street between Victoria and Wilson. It's just a low curb in heavy rain. Not in my house yet!	8/25/2021 11:11 PM
3	College Ave. behind Killybrook School.	8/25/2021 7:55 PM
4	More aware of hazards in Newport Beach where I reside	8/25/2021 7:34 PM
5	storm drains being plugged during heavy rains cause flooding	5/25/2021 4:40 PM
6	the increase in drug addicts that threaten my kids and me, they also break into my car. its a huge problem for costa mesa	4/17/2021 9:07 AM
7	Rain water causes flooding at intersections on west side of C.M. at 19th St/Park Ave & 19th St/Anaheim.	3/30/2021 2:49 PM
8	Street racing! It can be deadly and it is a serious quality of life issue in the area.	3/8/2021 9:26 AM
9	Flooding and ponding on streets during strong rain events.	3/8/2021 8:45 AM
10	N/A	3/7/2021 6:53 PM
11	None	3/7/2021 9:32 AM
12	Adequacy of storm drain on south side of Tanager Drive immediately south of Tanager Park.	3/7/2021 8:15 AM
13	Ponding on Fordham Drive between Villa Nova and Fair	3/6/2021 9:14 AM
14	Flooding at Fordham Drive and Villinova. Reckless and speeding hazards on Fordham and Villinova. Hazard for school children.	3/6/2021 8:44 AM
15	Traffic control at Hamilton and Harbor. Need to change east Hamilton to North Harbor and include pedestrian traffic on North side going East and West.	3/5/2021 9:04 PM
16	The intersection Gisler and Harbor has problem with the in and out burger and the gas station and vagabond inn. Along with the fwy on and off ramps. Backed up traffic and accidents are regular.	3/5/2021 6:03 PM
17	Local flooding at Newport Blvd at Virginia	3/5/2021 5:49 PM
18	Low spot in the curb and gutter system on the SW corner of Oak and Continental	3/3/2021 7:43 PM

Q10 How concerned are you that climate change may create new ha ardous situations in Costa Mesa or make existing natural ha ards worse?

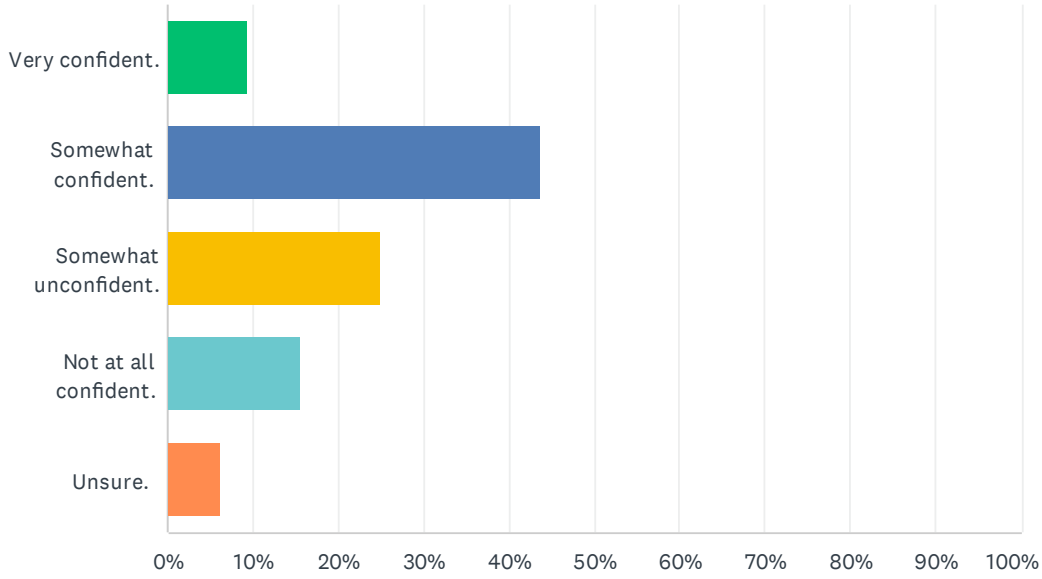
Answered: 32 Skipped: 0



ANSWER CHOICES	RESPONSES	
Ve y conce ned.	53.13%	17
Somewhat conce ned.	31.25%	10
Somewhat unconce ned.	6.25%	2
Not at a conce ned.	9.38%	3
Unsu e.	0.00%	0
TOTAL		32

Q11 If you have taken any action to protect yourself against natural hazards, how confident are you that these actions will be sufficient to protect against more severe hazards that are expected because of climate change?

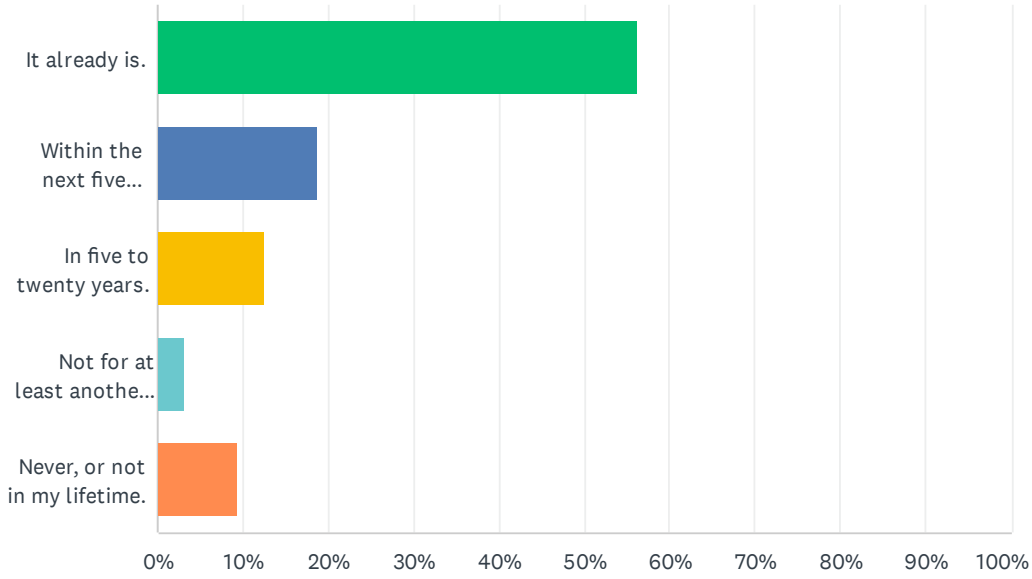
Answered: 32 Skipped: 0



ANSWER CHOICES	RESPONSES	
Ve y confident.	9.38%	3
Somewhat conf dent.	43.75%	14
Somewhat unconf dent.	25.00%	8
Not at a conf dent.	15.63%	5
Unsu e.	6.25%	2
TOTAL		32

Q12 When do you think climate change will pose a threat to your health, property, livelihood, or overall wellbeing?

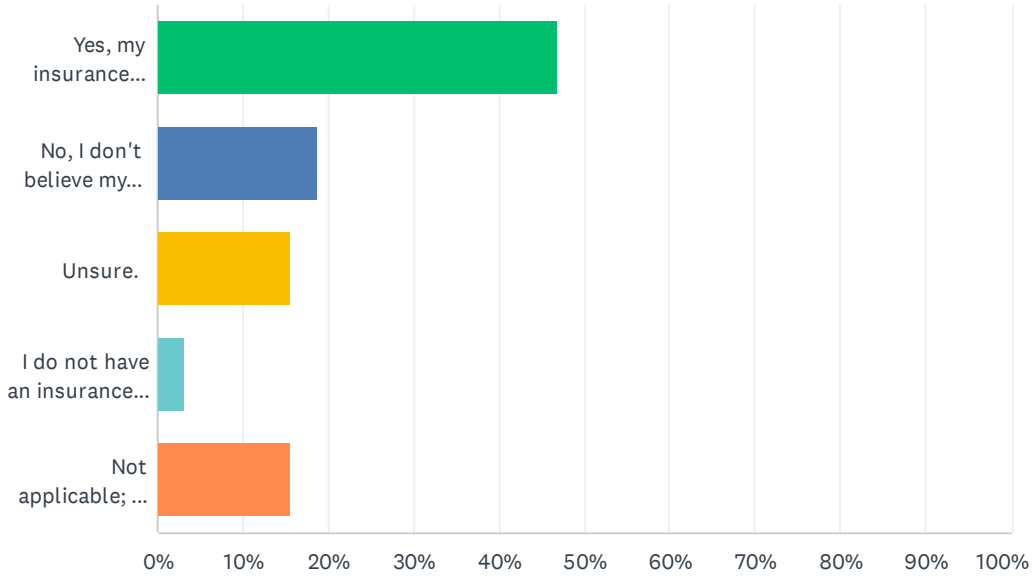
Answered: 32 Skipped: 0



ANSWER CHOICES	RESPONSES	
It a eady s.	56.25%	18
W th n the next f ve years.	18.75%	6
In f ve to twenty years.	12.50%	4
Not fo at east anothe twenty yea s.	3.13%	1
Never, o not n my fet me.	9.38%	3
TOTAL		32

Q13 If you are a homeowner, do you have adequate homeowners insurance to cover the hazards that could impact your home?

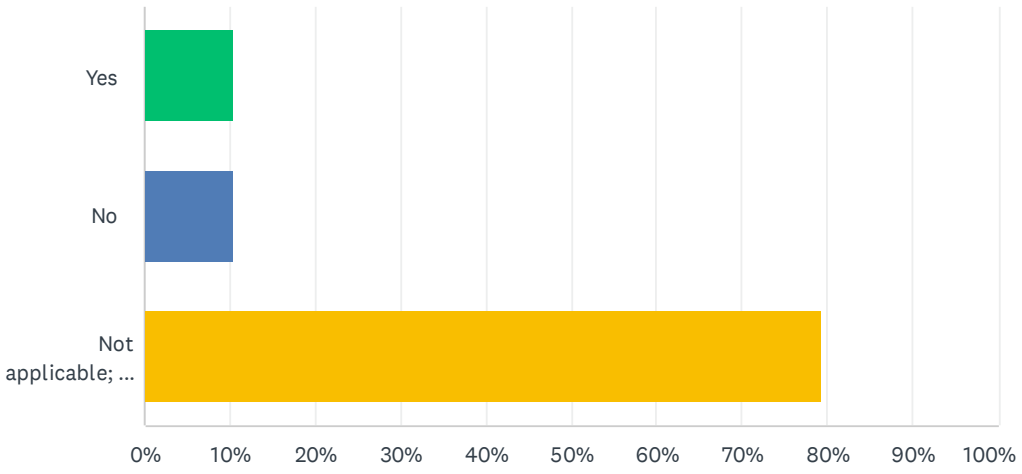
Answered: 32 Skipped: 0



ANSWER CHOICES	RESPONSES	
Yes, my nsu ance coverage shou d be adequate.	46.88%	15
No, I don't bel eve my nsu ance cove age wou d be adequate fo a major d saster.	18.75%	6
Unsu e.	15.63%	5
I do not have an nsu ance po cy.	3.13%	1
Not app cab e; I ent my cu ent es dence.	15.63%	5
TOTAL		32

Q14 If you rent your residence, do you have renters insurance?

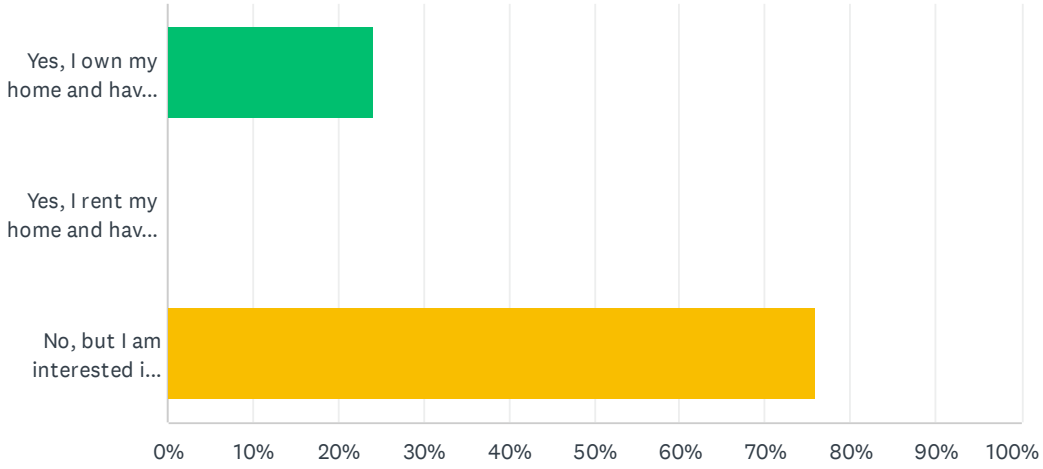
Answered: 29 Skipped: 3



ANSWER CHOICES	RESPONSES	
Yes	10.34%	3
No	10.34%	3
Not app cab e; I own my es dence.	79.31%	23
TOTAL		29

Q15 Do you have flood insurance for your home?

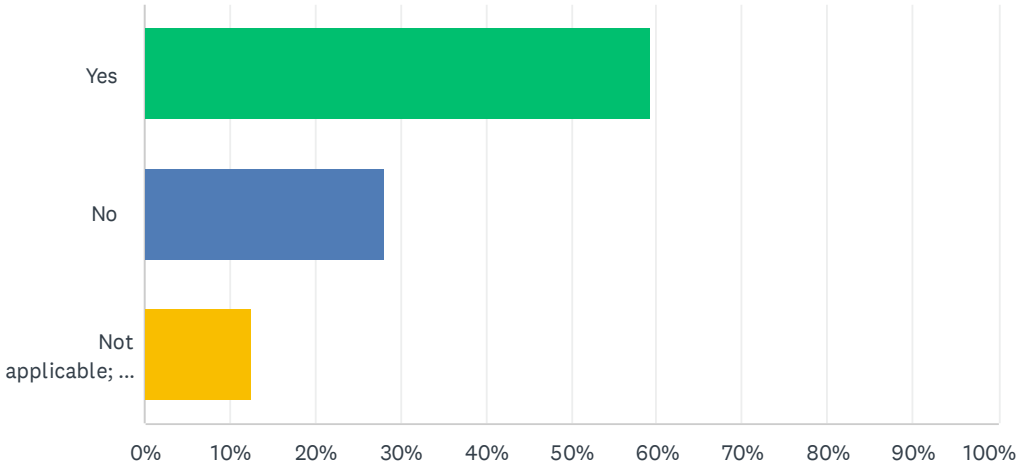
Answered: 25 Skipped: 7



ANSWER CHOICES	RESPONSES	
Yes, I own my home and have flood nsu ance.	24.00%	6
Yes, I ent my home and have f ood nsu ance.	0.00%	0
No, but I am nte ested n ev ewing f ood nsu ance opt ons (http://www.f oodsma t.gov/f oodsma t/).	76.00%	19
TOTAL		25

Q16 Have you done anything to your home to make it less vulnerable to hazards such as earthquakes, floods, and fires?

Answered: 32 Skipped: 0



ANSWER CHOICES	RESPONSES	
Yes	59.38%	19
No	28.13%	9
Not app cab e; I ent my es dence.	12.50%	4
TOTAL		32

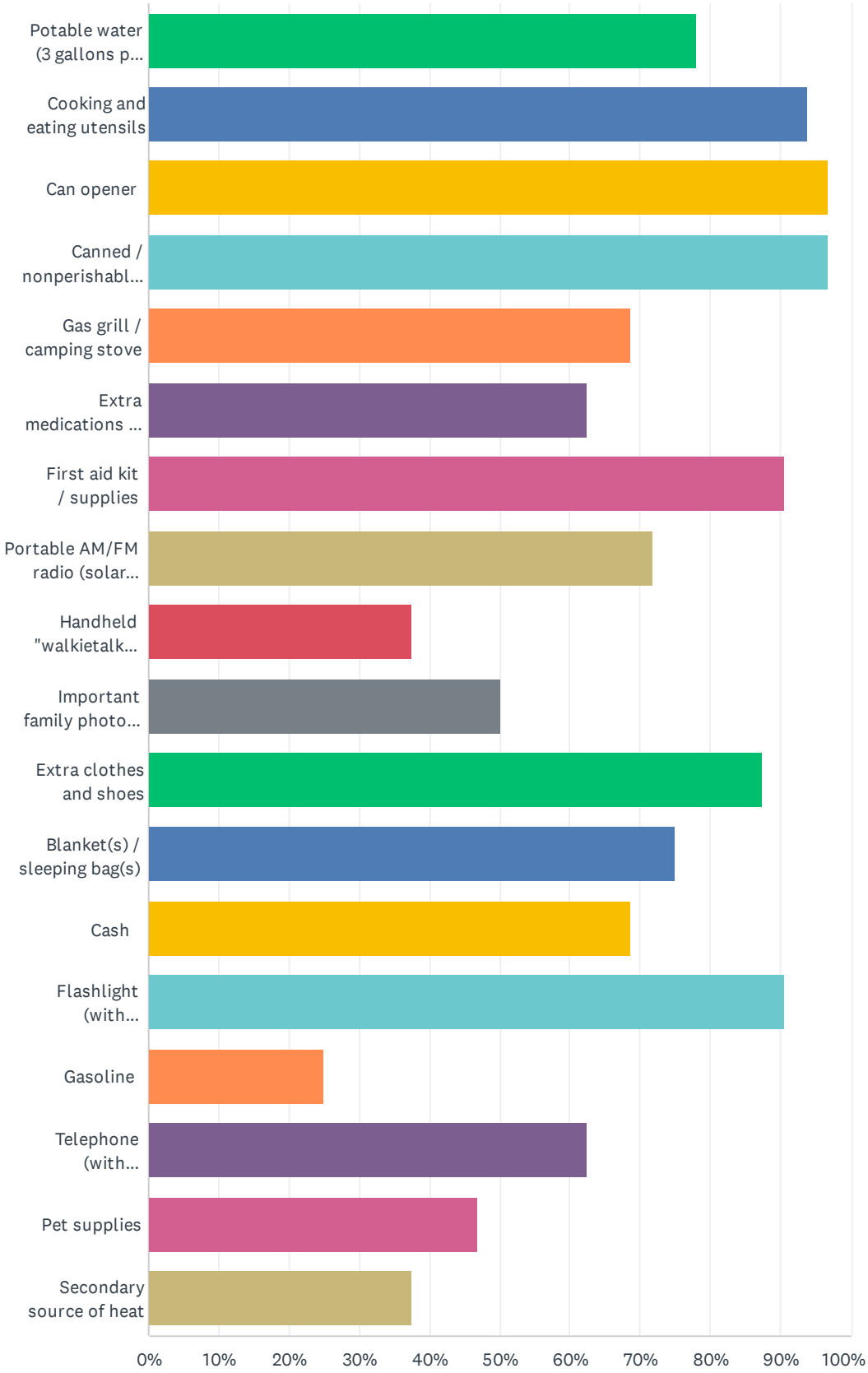
Q17 If not, do you plan to?

Answered: 7 Skipped: 25

#	RESPONSES	DATE
1	Considering if we get more flooding. Heat index may force me to adjust home for heat. Food insecurity will increase costs significantly in the next 10 years. I am training to garden more.	8/25/2021 11:11 PM
2	In a condo with an HOA.	8/25/2021 7:55 PM
3	Yes	3/7/2021 6:53 PM
4	Plan to do seismic retrofit if grants become available. This is a very expensive upgrade.	3/7/2021 9:32 AM
5	No	3/6/2021 11:10 AM
6	No	3/5/2021 7:29 PM
7	It’s on the list, but other repairs and improvements will take precedence	3/5/2021 5:49 PM

Q18 If a severe hazard event occurred today such that all services were cut off from your home (power, gas, water, sewer) and you were unable to leave or access a store for 72 hours, which of these items do you have readily available?

Answered: 32 Skipped: 0


Potable water (3 gallons p...
Cooking and eating utensils
Can opener
Canned / nonperishabl...
Gas grill / camping stove
Extra medications ...
First aid kit / supplies
Portable AM/FM radio (solar...
Handheld "walkietalk...
Important family photo...
Extra clothes and shoes
Blanket(s) / sleeping bag(s)
Cash
Flashlight (with...
Gasoline
Telephone (with...
Pet supplies
Secondary source of heat
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%

ANSWER CHOICES	RESPONSES	
Potable water (3 gallons per person)	78.13%	25
Cooking and eating utensils	93.75%	30
Can opener	96.88%	31
Canned / nonperishable foods (ready to eat)	96.88%	31
Gas grill / camping stove	68.75%	22
Extra medications and contact lenses (if applicable)	62.50%	20
First aid kit / supplies	90.63%	29
Portable AM/FM radio (solar powered, hand crank, or batteries)	71.88%	23
Handheld "walkietalkie" radios (with batteries)	37.50%	12
Important family photos / documentation in a water- and fireproof container	50.00%	16
Extra clothes and shoes	87.50%	28
Blanket(s) / sleeping bag(s)	75.00%	24
Cash	68.75%	22
Flashlight (with batteries)	90.63%	29
Gasoline	25.00%	8
Telephone (with batteries)	62.50%	20
Pet supplies	46.88%	15
Secondary source of heat	37.50%	12
Total Respondents: 32		

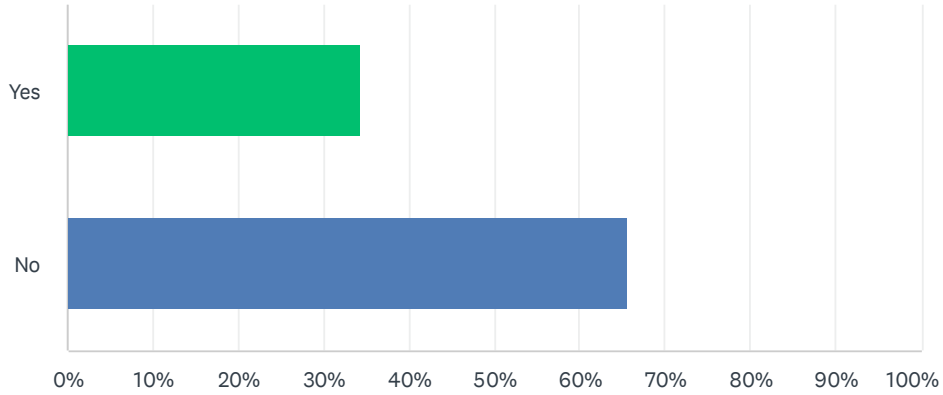
Q19 What else do you have in your emergency kit?

Answered: 10 Skipped: 22

#	RESPONSES	DATE
1	Cat carriers, Extra food for the neighborhood. Scooter if roads for an earthquake are really bad.	8/25/2021 11:11 PM
2	N95s, gloves, TP, hand sanitizer	5/25/2021 4:40 PM
3	MREs and Ammo	4/17/2021 9:07 AM
4	N/A	3/7/2021 6:53 PM
5	Nothing	3/7/2021 9:32 AM
6	Food, collapsible water dish and carry cages for pet cats. I carry a wallet & ID in my purse & know how to access by my iphone personal contacts & online inventory photos of home, furnishings and personal property.	3/6/2021 8:04 PM
7	Generator	3/6/2021 11:10 AM
8	Firearm	3/6/2021 8:44 AM
9	Tool kit	3/5/2021 9:04 PM
10	Nothing	3/5/2021 5:49 PM

Q20 Are you familiar with the special needs of your neighbors in the event of a disaster situation (special needs may include limited mobility, severe medical conditions, memory impairments)?

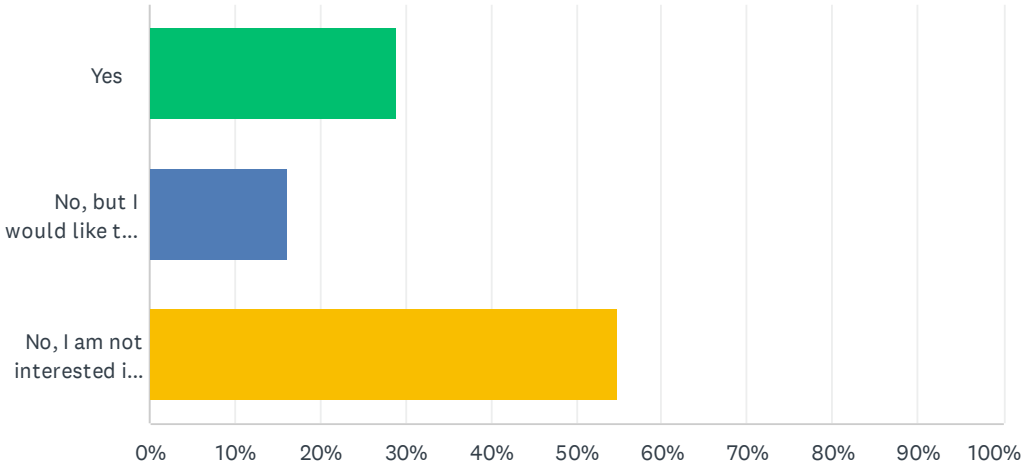
Answered: 32 Skipped: 0



ANSWER CHOICES	RESPONSES	
Yes	34.38%	11
No	65.63%	21
TOTAL		32

Q21 Are you a trained member of your Community Emergency Response Team (CERT)?

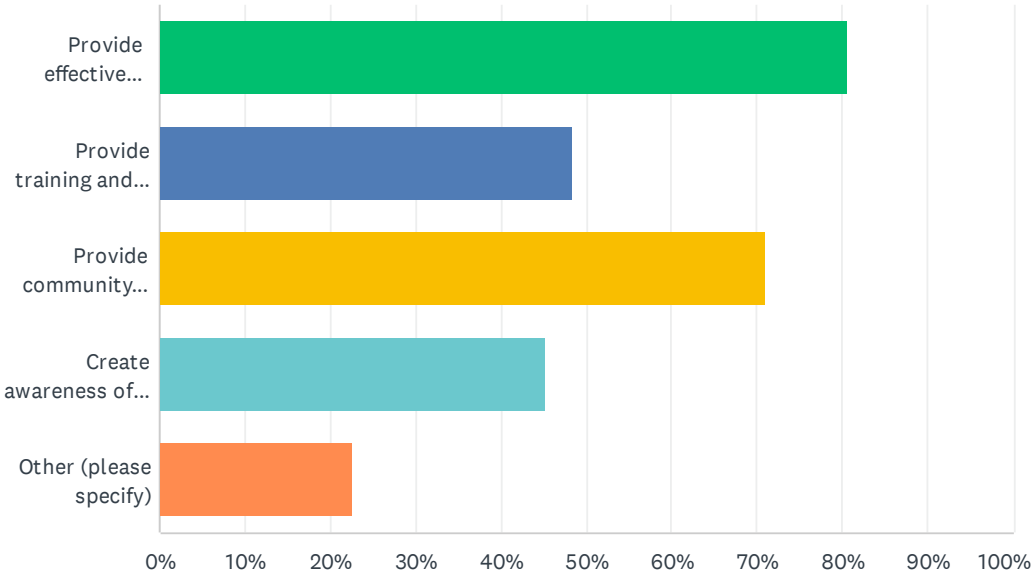
Answered: 31 Skipped: 1



ANSWER CHOICES	RESPONSES	
Yes	29.03%	9
No, but I wou d ke to ea n mo e about CERT.	16.13%	5
No, I am not nte ested n being a t ained CERT membe .	54.84%	17
TOTAL		31

Q22 How can the City help you become better prepared for a disaster? (choose all that apply)

Answered: 31 Skipped: 1



ANSWER CHOICES	RESPONSES	
P ov de effect ve emergency not f cat ons and commun cat on.	80.65%	25
P ov de t a n ng and educat on to es dents and bus ness owne s on how to educe futu e damage.	48.39%	15
P ov de commun ty out each ega d ng eme gency p epa edness.	70.97%	22
C eate awa eness of spec a needs and vu ne ab e popu at ons.	45.16%	14
Othe (p ease spec fy)	22.58%	7
Total Respondents: 31		

#	OTHER (PLEASE SPECIFY)	DATE
1	Educate the population on climate crisis and need for lowering Green House Gases.	8/26/2021 10:23 AM
2	Neighborhood Meetings	8/25/2021 11:11 PM
3	Stop being a sanctuary city to illegal immigrants!	3/30/2021 2:49 PM
4	Add a gift card or something of the sorts for attending	3/7/2021 6:53 PM
5	Revive seismic retrofit rebate program	3/7/2021 9:32 AM
6	Raise awareness of & clean up accumulating debris & trash behind property boundary walls/fences that create potential fire hazards.	3/6/2021 8:04 PM
7	Walk in shelters	3/5/2021 9:04 PM

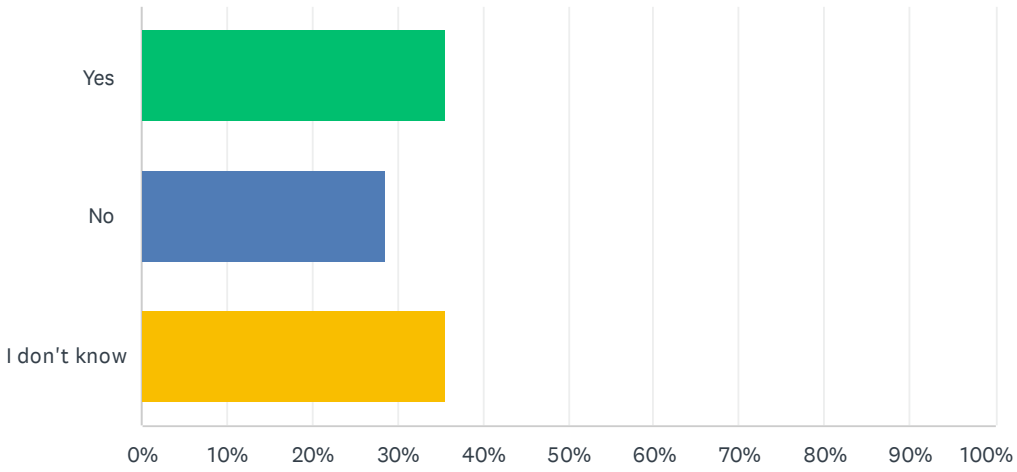
Q23 What is the ZIP code of your workplace?

Answered: 11 Skipped: 21

#	RESPONSES	DATE
1	92805	8/26/2021 10:23 AM
2	92626	8/25/2021 7:56 PM
3	92627	3/30/2021 2:49 PM
4	92628	3/8/2021 8:45 AM
5	92626	3/8/2021 8:40 AM
6	92660	3/7/2021 6:53 PM
7	92626	3/6/2021 8:44 AM
8	92627	3/5/2021 9:04 PM
9	92626	3/5/2021 6:03 PM
10	92626	3/5/2021 5:41 PM
11	92627	3/3/2021 7:43 PM

Q24 Does your employer have a plan for disaster recovery in place?

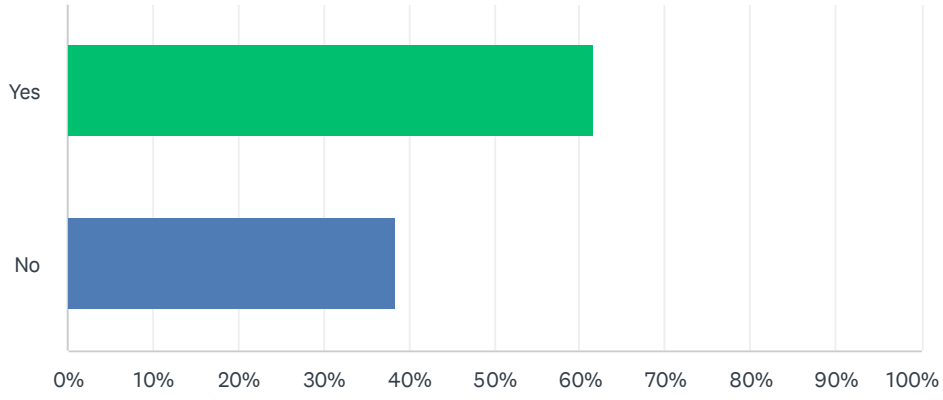
Answered: 14 Skipped: 18



ANSWER CHOICES	RESPONSES	
Yes	35.71%	5
No	28.57%	4
I don't know	35.71%	5
TOTAL		14

Q25 Does your employer have a workforce communications plan to implement following a disaster, so they can contact you?

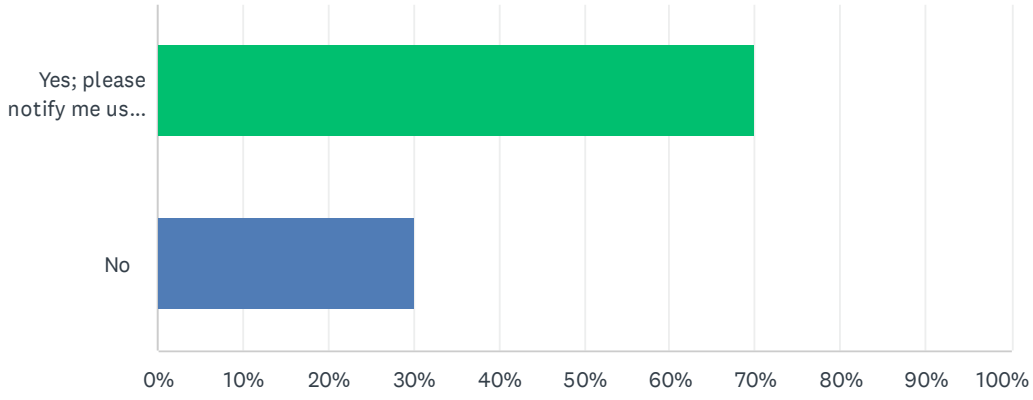
Answered: 13 Skipped: 19



ANSWER CHOICES	RESPONSES	
Yes	61.54%	8
No	38.46%	5
TOTAL		13

Q26 Would you like to be contacted when the Draft 2020 Costa Mesa Hazard Mitigation Plan is available for review?

Answered: 30 Skipped: 2



ANSWER CHOICES	RESPONSES	
Yes; p ease not fy me us ng my contact nfo mat on n the next quest on.	70.00%	21
No	30.00%	9
TOTAL		30

Q27 If you would like to be notified of future opportunities to participate in hazard mitigation and resiliency planning, please provide your name and e-mail address. If you do not have an e-mail address, please provide your mailing address.

Answe ed: 21 Sk pped: 11

#	RESPONSES	DATE
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
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[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]

Q28 Please provide us with any additional comments/suggestions/questions regarding your risk of future hazard events.

Answered: 11 Skipped: 21

#	RESPONSES	DATE
1	Let's lower our Green House Gases and show the world so they follow our lead. Three things will happen in the future: mitigation, adaptation, and suffering. Please join me in global mitigation.	8/26/2021 10:23 AM
2	Hazard mitigation is pointless without a credible climate action plan. Costa Mesa has an opportunity to be a leader by adopting a climate resolution including endorsing a carbon fee and dividend and Community Choice Energy. We have solutions. We need to rally the political will.	8/26/2021 8:34 AM
3	Thanks for the survey. In district 4 Many people don't have cars. Public transportation and bike lanes for students. Lack of knowledge for TOU peak charges have hit a few low-income neighbors trying to cool off in the heat waves.. Education is needed. Thanks!	8/25/2021 11:11 PM
4	Make the plans more transparent on the city website. Hard to find.	5/25/2021 4:40 PM
5	please clean up the drug addicts	4/17/2021 9:07 AM
6	N/A	3/7/2021 6:53 PM
7	Our house is raised with a crawlspace. Seismic retrofit would greatly reduce damage in an earthquake, but this retrofit is prohibitively expensive. Subsidies would be helpful.	3/7/2021 9:32 AM
8	Public property needs to be checked. One crew mows Gisler Park. They don't tend the row of trees between the lawn and wall of Edison substation. When I finally thought to look, accumulated dry leaves were more than a ft. thick. It took 3 truckloads to remove them after I called city.	3/6/2021 8:04 PM
9	4th of July illegal fireworks.	3/6/2021 8:44 AM
10	We think the homeless/ vagrant issue is Something we are worried about for the safety of our property and neighbors/residents. We are happy with what the city has done so far and are hoping for more enforcement mitigation of this issue that we face in our city	3/5/2021 6:03 PM
11	Consider integrating passive survivability of homes in the new housing element chapter of the General Plan to increa e re ilience in the community Al o con ider providing re ource for community based mutual aid in addition to CERT resources.	3/3/2021 7:43 PM

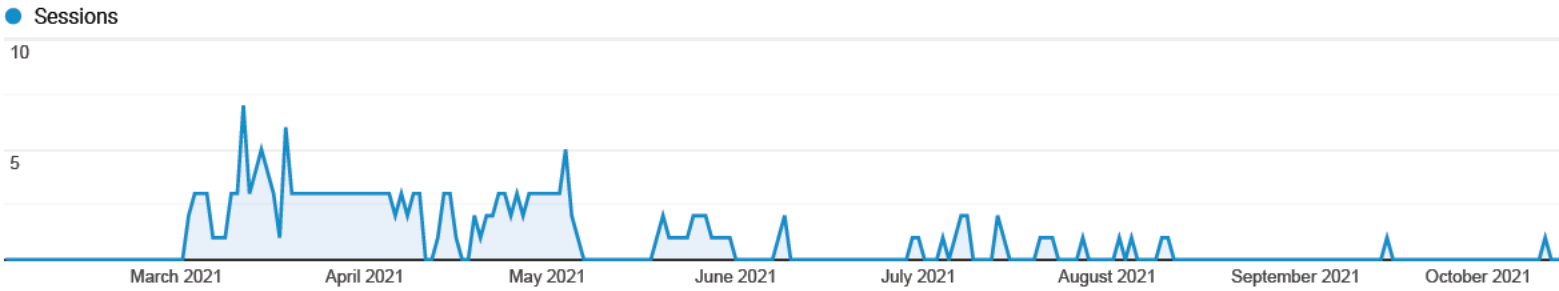
Landing Pages

ALL » LANDING PAGE: /city-hall/city-departments/police/department-divisions/administration/the-office-of-emergency-management-oem/local-hazard-mitigation-plan Feb 1

All Users
0.01% Entrances

Explorer

Summary



Landing Page	Acquisition			Behavior			Convers
	Sessions	% New Sessions	New Users	Bounce Rate	Pages / Session	Avg. Session Duration	Goal Convers Rate
	221 % of Total: 0.01% (1,531,766)	**88.69%** Avg for View: 88.62% (0.08%)	**196** % of Total: 0.01% (1,357,401)	**91.40%** Avg for View: 85.31% (7.14%)	**1.45** Avg for View: 1.46 (-0.39%)	**00:01:01** Avg for View: 00:00:40 (52.95%)	**0.0** Av V 0 (0.0
1. /city-hall/city-departments/police/department-divisions/administration/the-office-of-emergency-management-oem/local-hazard-mitigation-plan	**221** (100.00%)	88.69%	196 (100.00%)	91.40%	1.45	00:01:01	0.0

Appendix C - Resolution of Adoption
(to be inserted after City Council approval)

Appendix D- List of Key Facilities

City of Costa Mesa
List of Critical Facilities and Facilities of Concern

Red = Critical Facility Purple = Facility of Concern

	CF/FOC	Facility	Title
1	Critical	Bridge	Santa Ana Delhi Channel
2	Critical	Bridge	Bear Street Poc
3	Critical	Bridge	Santa Ana Delhi Channel
4	Critical	Bridge	Bristol Street Poc
5	Critical	Bridge	Greenville-Banning Channel
6	Critical	Bridge	Fairview Park Bicycle Trail Poc
7	Critical	Bridge	Greenville-Banning Channel
8	Critical	Bridge	Greenville-Banning Channel
9	Critical	Bridge	Santa Ana Delhi Channel
10	Critical	Bridge	Fairview Road Sidehill Viaduct
11	Critical	Bridge	Greenville-Banning Channel
12	Critical	Bridge	Greenville-Banning Channel
13	Critical	Bridge	Santa Ana Delhi Channel
14	Concern	City Recreation Support	PAULARINO PARK
15	Concern	City Recreation Support	VISTA PARK
16	Concern	City Recreation Support	SMALLWOOD PARK
17	Concern	City Recreation Support	Costa Mesa Country Club
18	Concern	City Recreation Support	TANAGER
19	Concern	City Recreation Support	MESA VERDE PARK
20	Concern	City Recreation Support	Estancia Park
21	Concern	City Recreation Support	DEL MESA PARK
22	Concern	City Recreation Support	FAIRVIEW PARK
23	Concern	City Recreation Support	Heller Park
24	Concern	City Recreation Support	FARM PARK
25	Concern	City Recreation Support	SHIFFER PARK
26	Concern	City Recreation Support	WAKEHAM PARK
27	Concern	City Recreation Support	WILSON PARK
28	Critical	City Recreation Support	Lions Park
29	Concern	City Recreation Support	COSTA MESA TENNIS CENTER
30	Concern	City Recreation Support	Tewinkle Park
31	Concern	City Resident Services	LIBRARY
32	Concern	City Resident Services	HISTORICAL SOCIETY HEADQUARTERS
33	Concern	City Resident Services	TEMPORARY HOMELESS SHELTER

34	Concern	City Resident Services	MESA VERDE LIBRARY
35	Concern	City Resident Services	SHELTER FOR HOMELESS
36	Concern	City Resident Services	CIVIC CENTER BARRIO
37	Concern	City Resident Services	CIVIC CENTER BARRIO
38	Concern	City Resident Services	CIVIC CENTER BARRIO
39	Concern	City Resident Services	CIVIC CENTER BARRIO
40	Concern	City Resident Services	CIVIC CENTER BARRIO
41	Concern	City Resident Services	CIVIC CENTER BARRIO
42	Concern	City Resident Services	CIVIC CENTER BARRIO
43	Concern	City Resident Services	CIVIC CENTER BARRIO
44	Critical	City Vital Operations	COSTA MESA FIRE STATION NO.1
45	Critical	City Vital Operations	FIRE STATION #3
46	Critical	City Vital Operations	Fire Station 4
47	Critical	City Vital Operations	Corporate Yard
48	Critical	City Vital Operations	FIRE STATION #5 CIVIC CENTER
49	Critical	City Vital Operations	FIRE STATION #1
50	Critical	City Vital Operations	METRO FIRE STATION #6
51	Critical	City Vital Operations	POLICE SUB-STATION
52	Critical	City Vital Operations	Civic Center Complex
53	Critical	City Vital Operations	CIVIC CENTER ANNEX
54	Critical	City Vital Operations	Fire Station 2
55	Critical	City Vital Operations	Civic Center Complex
56	Critical	Community Centers	NEIGHBORHOOD CENTER (Norma Hertzog Community Center
57	Critical	Community Centers	DOWNTOWN COMMUNITY CENTER
58	Critical	Community Centers	Balearic Community Center
59	Critical	Community Centers	SENIOR CENTER
60	Concern	Haz Mat Location	01. PARKING LOT
61	Concern	Haz Mat Location	02. PARKING LOT
62	Concern	Haz Mat Location	SURPLUS
63	Concern	Haz Mat Location	SURPLUS
64	Concern	Haz Mat Location	SURPLUS
65	Concern	Schools	Coastline ROP
66	Concern	Schools	Victoria Elementary School
67	Concern	Schools	Maude B. Davis Elementary School
68	Concern	Schools	Paularino Elementary School
69	Concern	Schools	International School for Science and Culture
70	Concern	Schools	Whittier Elementary School
71	Concern	Schools	OCDOE District Office
72	Concern	Schools	Woodland Elementary School
73	Concern	Schools	Pomona Elementary School
74	Concern	Schools	Heinz Kaiser Elementary School
75	Concern	Schools	Estancia High School

76	Concern	Schools	College Park Elementary
77	Concern	Schools	Costa Mesa High School
78	Concern	Schools	Adams Elementary School
79	Concern	Schools	Central Orange County CTE Partnership (CTEp)
80	Concern	Schools	NMUSD District Office
81	Concern	Schools	Early College High School
82	Concern	Schools	Killybrooke Elementary School
83	Concern	Schools	Charles W. Tewinkle Middle
84	Concern	Schools	California Elementary
85	Concern	Schools	Back Bay/ Monte Vista High School
86	Concern	Schools	Harper
87	Concern	Schools	Everett A. Rea Elementary
88	Concern	Schools	Wilson Elementary
89	Concern	Schools	Sonora Elementary

Appendix E – Hazard Mitigation Implementation Handbook

City of

Local Hazard Mitigation Plan Implementation Handbook

August 2022

What Is This Handbook?

The Local Hazard Mitigation Plan (LHMP) for the City of Costa Mesa features an evaluation of the City's hazards as well as a variety of corresponding mitigation actions. These actions are intended to preserve public safety, maintain critical municipal government operations and services when hazard events emerge, and empower community members to take on hazard mitigation at an individual level. This Implementation Handbook (Handbook) is intended for use by City staff and decision makers after the LHMP is adopted. It will:

- Give clear instructions as to what to do following adoption of the LHMP.
- Simplify future updates to the LHMP.
- Assist the City in preparing grant funding applications related to hazard mitigation.
- Guide annual plan review actions.

How do I Use This Handbook?

This Handbook can help City staff and decision makers in several different situations. If and when the events listed below occur, consult the respective sections of this Handbook for advice on how best to proceed:

- A disaster proclamation has been issued by the Costa Mesa City Council
- A disaster proclamation has been issued by the State of California
- A disaster declaration has been signed by the Federal Government
- I want to apply for mitigation grant funding
- Costa Mesa is undergoing its budgeting process
- Costa Mesa is holding its annual meeting of the Hazard Mitigation Planning Team
- Costa Mesa is updating the following policy and regulatory documents:
- The Local Hazard Mitigation Plan
- The Safety Element of the General Plan
- The Housing Element of the General Plan
- The Zoning Code

Who Maintains This Handbook?

The leader of the Hazard Mitigation Planning Committee (HMPC) is the one responsible for maintaining this Handbook. At the time of writing, the current HMPC leader is Jason Dempsey from the Costa Mesa Police Department. The HMPC may delegate this responsibility to someone else should they so choose.

What to do when a disaster has been proclaimed or declared

Disasters may be proclaimed or declared by the Costa Mesa City Council, the State of California, or the federal government. Responsibilities may differ depending on who proclaims or declares the disaster. If multiple organizations proclaim or declare a disaster, consult all applicable lists.

The Costa Mesa City Council

If the Costa Mesa City Council (or the Director of Emergency Services, if the City Council is not in session) proclaims a Local Emergency, take the following steps:

- ☐ Update **Attachment** 1 with information about the disaster. Include information about cumulative damage, including any damage outside of Costa Mesa.
- ☐ Discuss opportunities for local assistance with the representatives from the California Office of Emergency Services (Cal OES).
- ☐ If the disaster damages local infrastructure or City-owned facilities, repair or rebuild the structure to be more resilient, following applicable hazard mitigation actions. A list of actions, organized by hazards, is included as **Attachment 4**.
- ☐ **Chapter 6** of the Costa Mesa LHMP states that the City should consider updating the LHMP if a disaster causes a loss of life in the community, even if there is no state disaster proclamation or federal disaster declaration that includes part or all of the City. If there is a loss of life in Costa Mesa, consider updating the LHMP. Consult the section on updating the LHMP in this Handbook for details.

The State of California

If the State of California proclaims a disaster for Costa Mesa, or an area that includes part or all of Costa Mesa, take the following steps:

- ☐ Update **Attachment 1** with information about the disaster. Include information about cumulative damage, including any damage outside of Costa Mesa.
- ☐ Collaborate with representatives from Cal OES to assess the damage from the event.
- ☐ Discuss opportunities for local assistance with representatives from Cal OES.
- ☐ If the disaster damages local infrastructure or City-owned facilities, repair or rebuild the structure to be more resilient, following applicable hazard mitigation actions. A list of actions, organized by hazards, is included as **Attachment 4.**
- ☐ If the disaster may escalate into a federal disaster declaration, begin any necessary coordination with representatives from the Federal Emergency Management Agency (FEMA).
- ☐ **Chapter 6** of the Costa Mesa LHMP states that the City should consider updating the LHMP if a disaster leads to a state disaster proclamation or federal disaster declaration that includes part or all of Costa Mesa, even if there is no loss of life. Consider updating the LHMP. Consult the section on updating the LHMP in this Handbook for details.

The Federal Government

If the federal government declares a disaster for Costa Mesa, or any area that includes part or all of Costa Mesa, take the following steps:

- ☐ Update **Attachment 1** with information about the disaster. Include information about cumulative damage, including any damage outside of Costa Mesa.
- ☐ Collaborate with representatives from Cal OES and FEMA to assess the damage from the event.

- ☐ Determine if Costa Mesa will be eligible for public assistance funds related to the federal disaster declaration. These funds can be used to reimburse the City for response and recovery activities. If the City is eligible, work with FEMA and Cal OES representatives to enact the necessary requirements and receive funding.
- ☐ If the disaster damages local infrastructure or City-owned facilities, repair or rebuild the structure to be more resilient, following applicable hazard mitigation actions. A list of actions, organized by hazards, is included as **Attachment 4**.
- ☐ The Hazard Mitigation Grant Program (HMGP) is a FEMA program that helps fund hazard mitigation activities after a disaster event. Costa Mesa may be eligible for funding because of the federal disaster declaration, although not all activities may meet the program's requirements. If Costa Mesa is eligible, work with FEMA to apply for this funding.
- ☐ **Chapter 6** of the Costa Mesa LHMP states that the City should consider updating the LHMP if a disaster leads to a state disaster proclamation or federal disaster declaration that includes part or all of Costa Mesa, even if there is no loss of life. Consider updating the LHMP. Consult the section on updating the LHMP in this Handbook for details.

I Want to Apply for Mitigation Grant Funding

There are three potential grant funding programs that FEMA administers for hazard mitigation activities. Two of these programs, the Building Resilient Infrastructure and Communities (BRIC) and Flood Mitigation Assistance (FMA) funding sources, are available to communities with an LHMP that complies with FEMA guidelines and has been adopted within the past five years. The third funding program is the Hazard Mitigation Grant Program (HMGP), which is available for communities that are part of a federal disaster declaration. This section discusses the BRIC and FMA programs, and how to apply for them. The HMGP is discussed under the "Federal Government" subsection of the above "What to Do When a Disaster Has Been Proclaimed or Declared" section.

Building Resilient Infrastructure and Communities (BRIC)

Building Resilient Infrastructure and Communities (BRIC) will support states, local communities, tribes and territories as they undertake hazard mitigation projects, reducing the risks they face from disasters and natural hazards. BRIC is a new FEMA pre-disaster hazard mitigation program that replaces the existing Pre-Disaster Mitigation (PDM) program.

The BRIC program guiding principles are supporting communities through capability- and capacity-building; encouraging and enabling innovation; promoting partnerships; enabling large projects; maintaining flexibility; and providing consistency.

Development projects must be identified in a hazard mitigation plan that meets FEMA guidelines and was adopted within the past five years. When applying to this program, review the list of hazard mitigation actions in **Attachment 4** to see which projects may be eligible. Planning efforts for communities that lack a valid hazard mitigation plan may be eligible for funding if the effort would create a valid hazard mitigation plan. All BRIC grant applications are processed through the State. To learn more, consult with Cal OES representatives or visit the FEMA webpage on the program. At time of writing, this webpage is available at https://www.fema.gov/pre-disaster-mitigation-grant-program.

TAKE THE FOLLOWING STEPS TO APPLY FOR BRIC FUNDING:

- ☐ Confirm that the program is currently accepting funding applications. Check with representatives from Cal OES or consult the Cal OES webpage on the BRIC program. At time of writing, this webpage is available at http://www.caloes.ca.gov/cal-oes-divisions/hazard-mitigation/pre-disaster-flood-mitigation.
- ☐ Identify the actions from the hazard mitigation strategy (see Attachment 4) that call on the City to pursue funding or list grants as a potential funding source. Confirm that the actions are consistent with the requirements of the BRIC grant.
- ☐ Coordinate with Cal OES representatives to compile and submit materials for the grant application.

Flood Mitigation Assistance

The FMA grant program is a competitive, national program that awards funding for physical development projects and planning efforts that mitigate against long-term damage from flooding. The funding is only available to communities that participate in the National Flood Insurance Program (NFIP), which Costa Mesa currently does. Communities must also have a valid hazard mitigation plan that meets FEMA guidelines in order to be eligible, and all projects must be consistent with the list of actions in the hazard mitigation strategy. When applying to this program, review the list of hazard mitigation actions in **Attachment 4** to see which projects may be eligible. As with the BRIC program, applications for the FMA program must be processed through the State. To view more information, consult with Cal OES representatives or visit the FEMA webpage on the program. At time of writing, this webpage is available at https://www.fema.gov/flood-mitigation-assistance-grant-program.

TAKE THE FOLLOWING STEPS TO APPLY FOR FMA FUNDING:

- ☐ Confirm that the program is currently accepting funding applications. Check with representatives from Cal OES or consult the Cal OES webpage on the FMA program. At time of writing, this webpage is available at http://www.caloes.ca.gov/cal-oes-divisions/hazard-mitigation/pre-disaster-flood-mitigation.
- ☐ Identify the actions from the hazard mitigation strategy (**see Attachment 4**) that call on the City to pursue funding or list grants as a potential funding source. Confirm that the actions are consistent with the requirements of the FMA grant.
- ☐ Coordinate with Cal OES representatives to compile and submit materials for the grant application

Costa Mesa is going through the budgeting process

Costa Mesa's budget process is an ideal opportunity to secure funding for hazard mitigation actions, and to ensure that hazard mitigation efforts are incorporated into the City's fiscal priorities. Costa Mesa currently operates on an annual budget cycle that runs from July 1 to June 30. During this process, City staff should take the following steps to incorporate hazard mitigation into Costa Mesa's annual budget:

- ☐ Include hazard mitigation activities into Costa Mesa's list of Capital Improvement Projects (CIP). Review the list of hazard mitigation actions in Attachment 4 and identify the projects that can be included into the CIP or can support efforts within the CIP.
- ☐ Review the risk and threat assessments in the LHMP (Chapter 3 and Chapter 4) to ensure that all items in the list of CIP are being planned, designed, and constructed so as to minimize the threat from hazard events.
- ☐ Identify opportunities to identify state-alone hazard mitigation actions through the annual budget process. Include appropriate items from Attachment 4 in the budget as stand-alone line items, particularly items that the Hazard Mitigation Planning Committee (Planning Team) considered a high priority.
- ☐ Set aside staff to conduct hazard mitigation activities, including time to participate in Planning Team meeting and time to research, prepare, and submit BRIC and FMA grant opportunities (consult the "I Want to Apply for Mitigation Grant Funding" section above).
- ☐ Ensure that hazard mitigation activities are reflected in each department's priorities and earmarked time for specific goals.

Costa Mesa is Conducting its Annual meeting of the Hazard Mitigation Planning Team

The hazard mitigation planning process brings together representatives from multiple City departments, as well as other relevant stakeholders, and provides a forum to discuss the hazards in Costa Mesa and how to mitigate them effectively. As mentioned in **Chapter 6** of the LHMP, the Planning Team should meet at least once each year, beginning a year after the LHMP is adopted. During these meetings, the Planning Team should discuss implementation progress and integration of hazard mitigation actions in other City documents. At these meetings, the Planning Team can review the status of the hazard mitigation actions and discuss whether completed or in-progress actions are working as expected. These meetings also allow the Planning Team to strategically plan for the upcoming year.

It may help for the Planning Team to meet early in the year, in advance of annual budget activities. **Attachment 3** contains an example of a Planning Team Meeting Agenda.

The annual meeting should include representatives from City departments and other organizations that originally prepared the LHMP. Representatives from other relevant organizations should also be invited. During the preparation of the LHMP, the following individuals were part of the Planning Team:

Costa Mesa Hazard Mitigation Planning Committee

Name	Title	Department
Jason Dempsey	Emergency Services	Police

	Administrator	
Alma Reyes (or designee)	Assistant to the City Manager	CMO
Stacy Bennett (or designee)	Deputy City Clerk	City Clerk, CMO
Tony Dodero (or designee)	Public Information Officer	City Manager, Communications
Jennifer Le (or designee)	Development Services Director	Development Services
Dan Inloes (or designee)	Economic Development Administrator	Development Services
Carol Molina (or designee)	Finance Director	Finance
Jon Neal (or designee)	Fire Marshal	Fire
Joe Noceti (or designee)	Public Information Officer	Fire
Kasama Lee (or designee)	Human Resources Manager	Human Resources
Steve Ely (or designee)	IT Director	Information Technology
Roxi Fyad (or designee)	Public Affairs Manager	Police
Salem Afeworki (or designee)	Energy and Sustainability Services Manager	Public Services
Jason Minter (or designee)	PCS Director	Parks and Community Services
Captain Joyce LaPointe	Police Captain	Police
Jennifer Rosales	Transportation Services Manager	Public Services
Raja Sethuraman	Public Services Director	Public Services
Seung Yang	City Engineer	Public Services
Daniel Jojola	Maintenance Supervisor	Public Services

In advance of Planning Team meetings, consider using **Attachment 1** to maintain an accurate list of recent disaster events that have occurred in and around Costa Mesa since the LHMP was adopted. At the Planning Team meeting, review the Plan Maintenance Table **(Attachment 2**) to identify any gaps in the LHMP or any other component of the Plan that needs updating. This also allows Planning Team members the opportunity to review the actions in the hazard mitigation strategy **(Attachment 4)** and ensure that they are implemented as intended.

Costa Mesa is updating its policy and regulatory documents

If Costa Mesa is updating the LHMP, the Safety Element or Housing Element of the General Plan, or the Zoning Code, consult the following applicable section.

Local Hazard Mitigation Plan

All LHMPs should be updated every five years. This helps keep the plan up to date and ensures that it reflects the most recent guidance, requirements, science, and best practices. An updated LHMP also helps keep Costa Mesa eligible for hazard mitigation grants that require a valid, recent LHMP (see "I Want to Apply for Mitigation Grant Funding"), along with an increased amount of post-disaster recovery funds.

The update process for the LHMP takes approximately one year. To ensure that a new LHMP comes into effect before the previous one expires, the update process should begin no later than four years after the plan is adopted. Updates may occur sooner at the City's discretion. Potential reasons for updating the LHMP sooner may include a state disaster proclamation or federal disaster declaration that covers part or all of Costa Mesa, or if a disaster leads to a loss of life in Costa Mesa (see the "What to Do When a Disaster Has Been Proclaimed or Declared" section), as discussed in **Chapter 6** of the LHMP.

Take the following steps to update the LHMP:

Assemble the Hazard Mitigation Planning Team

- ☐ Convene a Planning Team meeting no later than four years after the LHMP is adopted. Invite the regular Planning Team members, along with representatives from other organizations that may have a role to play in the update process.
- ☐ Review the current status of mitigation actions, including if there are any that are not being implemented as planned or are not working as expected. Determine if there have been any changes in hazard events, regulations, best practices, or other items that should be incorporated into an updated LHMP.
- ☐ Decide if there is a need for a technical consultant to assist with the LHMP update, and conduct consultant selection activities if needed. If a consultant is desired, the selection process should begin a few months before the update gets underway.
- ☐ Create and implement a community engagement strategy, building off of the strategy prepared for the existing LHMP. Describe in-person and online engagement strategies and materials, including ideas for meetings and workshops, draft community surveys, content for websites and press releases, and other materials that may be useful.

Update the Risk and Threat Assessments

- ☐ Review and update the risk assessment to reflect the most recent conditions in Costa Mesa. Consider recent hazard events, new science associated with hazards and climate change, new development and land use patterns, and other recent changes on local conditions.
- ☐ Evaluate the status of all key facilities. Update this list if new facilities have been constructed, or if existing facilities have been decommissioned. Re-assess the threat to key facilities.

- ☐ Review the demographics of community residents and update the threat assessment for vulnerable populations and other community members.
- ☐ Assess any changes to the threat to all other community assets, including key services, other facilities, and economic drivers.

Update the Mitigation Actions

- ☐ Update the existing hazard mitigation actions to reflect actions in progress. Remove actions that have been completed; or revise them to increase their effectiveness. Revise actions that have been abandoned or delayed so as to make them more feasible; or remove them from the list of mitigation actions if they are no longer appropriate for Costa Mesa.
- ☐ Develop mitigation actions to improve the status of hazard mitigation activities in Costa Mesa by addressing any issues not covered by the existing LHMP.
- ☐ Ensure that the feedback from the community engagement activities are reflected in the new and updated mitigation actions.

Review and Adopt the Updated Plan

- ☐ Review the other chapters and appendices of the LHMP to reflect any changes made through the update process.
- ☐ Release the updated Plan to Planning Team member; and revise the Plan to reflect any comments by Planning Team members.
- ☐ Distribute the updated Plan to any appropriate external agencies not included in the Planning Team; and revise the plan as appropriate in response to any comments.
- ☐ Release the updated Plan publicly for review; and make revisions to the Plan to reflect public comments.
- ☐ Submit the plan to Cal OES and FEMA for approval, and make any revisions as needed.
- ☐ Submit the plan to the Costa Mesa City Council for adoption.

The Safety Element of the General Plan

The Safety Element is a required component of Costa Mesa's General Plan. It can be updated as a stand-alone activity, or as part of a more comprehensive process to update multiple sections or all of the General Plan. The Safety Element does not need to be updated on any set schedule, but updates should be frequent enough for the element to remain current and applicable to the community.

Local communities can incorporate their LHMP into their Safety Element as allowed under Section 65302.6 of the California Government Code, as long as the LHMP meets minimum federal guidelines. This allows communities to be eligible for an increased share of post-disaster relief funding from the State if a hazard situation occurs, as per Section 8685.9 of the California Government Code.

Take the following steps to incorporate the LHMP into the Safety Element:

Incorporate New Requirements into the Safety Element, and ensure that the LHMP is consistent with the Safety Element

- ☐ Review the requirements for Safety Elements in Section 65302(g) of the California Government Code, and for LHMPs in Section 65302.6 of the California Government Code. Ensure that both documents meet all state requirements.
- ☐ Ensure that the information in both plans do not contradict each other, and that any inconsistencies are corrected to use the most accurate and appropriate information. This information should include community descriptions, a risk assessment, and a threat assessment.
- ☐ Ensure that the policies in the Safety Element support the LHMP and provide a planning framework for specific hazard mitigation actions.

The Housing Element of the General Plan

The Housing Element is a required component of Costa Mesa's General Plan. Section 65583 of the California Government Code requires a Housing Element to analyze and plan for new residential growth in a community, including residential growth for households with an annual income below the area median. Similar to an LHMP, state regulations require that the Housing Elements be updated regularly to remain current and valid.

The Housing Element is not required to contain any information or policies that relate to hazards, although it may include policies that address retrofitting homes to improve resiliency. However, state law links the regular schedule of Housing Element updates to mandatory revisions to other General Plan elements. For example, Section 65302(g)(2) of the California Government Code requires that communities that update their Housing Element on or after January 1, 2009 also update their Safety Element to include specific information and policies related to flood protection. As the LHMP is incorporated into the Safety Element, updates to the Housing Element may indirectly trigger updates to the LHMP.

To update the LHMP concurrent with updates to the Housing Element, take the following steps:

Ensure that the LHMP meets Any New Requirements for the Safety Element that May Be Triggered by a Housing Element Update

- ☐ Section 65302(g) of the California Government Code lists a number of requirements for the Safety Element of the General Plan. Some of these requirements are triggered by updates to the Housing Element. Check to see if there are any new requirements of this nature. Note that the requirement is linked to the date of adoption of the new Housing Element, not the date the update process begins.
- ☐ Because the LHMP is incorporated into the Safety Element, any amendments or revisions to the Safety Element triggered by the Housing Element update may be made directly in the LHMP. Requirements triggered by the Housing Element are unlikely to require a full rewrite of the LHMP, but the process should fully involve the Planning Team and include appropriate community engagement.
- ☐ Adopt the updated LHMP and incorporate it into the Safety Element. If necessary, amend the Safety Element to ensure the two documents are consistent (review the "Incorporate New

Requirements Into the Safety Element, and Ensure that the LHMP is Consistent with the Safety Element" subsection above).

The Costa Mesa Municipal Code

Costa Mesa's Municipal Code contains a set of standards that guide land uses and development in the community. These standards include where different types of buildings and land use activities may be located, how these structures must be built, and how they must be operated or maintained. The Municipal Code may include requirements that structures (particularly new structures or those undergoing substantial renovations) incorporate hazard-resistant features, be located outside of the most hazard-prone areas or take other steps to reduce hazard vulnerability.

All communities in California are required to adopt the minimum state Building Standard Code (BSC), which includes some hazard mitigation requirements for new or significantly renovated structures. The BSC is generally updated every three years, with supplemental code updates halfway into each update cycle. Title 5 "Buildings and Structures", of Costa Mesa's Municipal Code contains building regulations and incorporates the BSC. Other sections of the Code adopt additional standards as desired by the City that adapt the BSC to Costa Mesa's local context.

As a participant in the National Flood Insurance Program (NFIP), Costa Mesa is required to incorporate Floodplain Management Requirements in its Zoning Code, which is located in Title 13– Planning, Zoning and Development, Chapter V, Article 10 Floodway and Floodplain Districts. These regulations establish standards for development and operation of facilities within mapped flood-prone areas. Other sections of the Costa Mesa Municipal Code may include additional standards related to hazard mitigation activities.

With the exception of the Floodplain Management Regulations and the minimum standards in the BSC, Costa Mesa is not required to incorporate hazard-related requirements in the Municipal Code. However, the Municipal Code is an effective tool for implementing hazard mitigation measures that relate to the siting, construction, and operation of new buildings and other structures. Substantial updates to the Municipal Code, including the Buildings and Construction and Zoning Code sections, should be done in a way that is consistent with the LHMP.

Include Hazard-Related Requirements in Applicable Sections of the Costa Mesa Code of Ordinances

- ☐ If the BSC is being updated, evaluate the hazard-related requirements of all sections in the new BSC. Identify any areas where it may be feasible to add or revise standards to help reduce the threat from hazard events. Ensure that these standards are consistent with the LHMP. Consider whether standards should be applied to all structures, or to specific types of structures or to structures in a limited area (such as a flood plain).
- ☐ If the Zoning Code is being updated, ensure that all requirements do not expose community members or community assets to an excessive risk of harm. Where feasible, use the requirements to strengthen community resiliency to hazard events. Ensure that these standards are consistent with the LHMP. Consider possible standards such as overlay zones that strengthen zoning requirements in hazard-prone areas, landscaping and grading

requirements that buffer development from hazards, siting and design standards that make structures more resilient, and other strategies as appropriate.

Attachment 1: Disaster Information Table

Use this table to fill out information about any disaster events that have occurred in Costa Mesa or nearby and have had an effect on the community. Include the date and location of the disaster event, the damages associated with the event, and any information about disaster proclamations or declarations resulting from the event.

Date	Location	Damages *	Declaration Details †

* Includes number and type of injuries, number of deaths, and cost of physical damage

† If the disaster was proclaimed or declared by the local, state, and/or federal government

Attachment 2: Plan Maintenance Table

Use this table when reviewing the LHMP as part of the Planning Team's annual activities. For each section of the LHMP, note if any changes should be made to make the Plan more effective for the community. This includes noting if anything in the LHMP is incorrect or if any important information is missing. Make revisions that are consistent with these notes as part of the next update to the LHMP.

Section	Is Anything Incorrect?	Is Anything Missing?	Should Any Other Changes Be Made?
Multiple sections or throughout			
Chapter 1: Introduction			
Chapter 2: Community Profile			
Chapter 3: Risk Assessment			
Chapter 4: Threat Assessment			
Chapter 5: Mitigation Strategy			
Chapter 6: Plan Maintenance			
Appendices			

Attachment 3: Sample Agenda and Topics for the Hazard Mitigation Planning Team

This attachment includes a sample agenda and discussion topics for the annual meeting of the Planning Team. Meetings do not have to follow this order or structure, but the items included in this attachment should be addressed as part of the annual meeting. During the update process for the LHMP, it is likely that the Planning Team will meet more frequently. The meetings of the Planning Team during the update process will involve different discussion topics.

ITEM 1: RECENT HAZARD EVENTS

1.1. What hazard events have occurred this past year in Costa Mesa, or nearby in a way that affected the community?
- Identify events that caused loss of life or significant injury to Costa Mesa community members, significant property damage in Costa Mesa, or widespread disruption to Costa Mesa.
- More minor events should also be identified if there is a need for a community response to mitigate against future such events.

1.2. What are the basic facts and details behind any such hazard events?
- Consider the size and location of the affected area, any measurements of severity, any injuries and deaths, the cost of any damage, the number of people displaced or otherwise impacted, and other relevant summary information.
- Ensure that these facts and details are clearly recorded for future Plan updates, including through use of the Disaster Information Table (**Attachment 1**).

ITEMS 2: MITIGATION ACTION ACTIVITIES

2.1. What mitigation actions have been fully implemented? Are they working as expected, or do they need to be revised?

2.2. What mitigation actions have started to be implemented since the Planning Team last met? Is implementation of these actions proceeding as expected, or are there any barriers or delays? If there are barriers or delays, how can they be removed?

2.3. What mitigation actions are scheduled to begin implementation in the next year? Are there any factors that could delay implementation, or weaken the effectiveness of the actions? How can these factors be addressed?

2.4. What resources are needed to support planned, in-process, or ongoing mitigation actions? Does the City have access to these resources? If not, how can the City obtain access to these resources?

ITEM 3: INFORMATION SHARING

3.1. Is the City communicating with all appropriate local jurisdictions, including neighboring communities, Orange County, and special districts? This should include information on district-specific hazard situations, mitigation actions, and other relevant information.

3.2. Is the City communicating with the appropriate state and federal agencies? Is the City receiving information about new regulations, best practices, and data that relates to hazard mitigation activities?

3.3. Are there opportunities for the City to improve coordination with local, state, and federal jurisdictions and agencies?

ITEM 4: BUDGETARY PLANNING

4.1. What are the financial needs for Costa Mesa to support implementation of planned and in-process mitigation actions, including ongoing items? Is there sufficient funding for all measures in the LHMP that are planned for the next year, including in-process and ongoing items? If sufficient funding is not available, how can the City obtain these funds?

4.2. If it is not feasible for the City to support all planned, in-process, or ongoing mitigation actions, which ones should be prioritized?

4.3. Are there hazard-related activities not included in the LHMP that should be budget for? Can the City obtain the necessary funding for these activities?

ITEM 5: STRATEGIC PLANNING

5.1. Which grants are available for hazard mitigation activities, and which activities are best positioned to secure funding?

5.2. How should the agencies and other organizations represented on the Planning Team coordinate to maximize the chances of receiving funding?

5.3. Are there any scheduled or anticipated updates to other City documents that could relate to hazard mitigation activities? How can the Planning Team share information with staff and any technical consultants responsible for these updates, and ensure that the updates will enhance community resiliency?

5.4. What capital projects are scheduled or anticipated? Are these capital projects being designed and built to be resistant to hazard events? Are there opportunities for these projects to support hazard mitigation activities?

5.5. How can Planning Team members coordinate efforts with those responsible for capital projects to take advantage of economies of scale that will make hazard mitigation activities easier to implement?

5.6. Has it been four years since the adoption of the LHMP? If so, lay out a timeline for Plan update activities, including additional meetings of the Planning Team. Identify if a technical consultant is needed and begin the contracting process if so.

5.7. Are there any other opportunities for Planning Team members and the organizations they represent to coordinate efforts?

ITEMS 6: NEW BUSINESS

6.1. Are there any other items related to the Planning Team's mission?

There is no content on this page.

Attachment 4: Hazard Mitigation Strategy

	Mitigation Action	Potential Funding Sources	Responsible Department	Relative Cost	Time Frame	Priority
Preparedness Activities						
P1	Conduct regular emergency preparedness drills and training exercises for City staff.	General Fund, Grants	Police	$	Annually	N/A
P2	Continue agreements with local school districts to ensure that school facilities can act as evacuation sites during major emergencies.	General Fund, Grants	Police	S	Annually	N/A
P3	Work with local businesses and organizations to conduct regular workplace emergency preparedness drills through the Costa Mesa Business Emergency Response Team (BERT).	General Fund, Grants	Fire	$	Annually	N/A
P4	Expand participation in the Costa Mesa Community Emergency Response Team (CERT) program for residents and businesses.	General Fund, Grants	Fire	$	Annually	N/A
P5	Ensure that community evacuation plans include provisions for community members who do not have access to private vehicles or are otherwise unable to drive.	General Fund, Grants	Police	$	Ongoing	N/A
P6	Continue to ensure effective emergency notifications through multiple media formats, in at least English and Spanish; about pending, imminent, or ongoing emergency events. Ensure that information is accessible to persons with disabilities	General Fund, Grants	Police	S	Ongoing	N/A

	Mitigation Action	Potential Funding Sources	Responsible Department	Relative Cost	Time Frame	Priority
	and functional needs.					
P7	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.	General Fund, Grants	Public Services	$$$	Ongoing	N/A
P8	Update the Costa Mesa Emergency Operations Plan to identify backup power and communications locations for critical facilities.	General Fund, Grants	Police	$	Annually	N/A
P9	Continuously update response procedures for first responder departments to properly address new hazard events as they emerge.	General Fund, Grants	Police	$	Annually	N/A
P10	Ensure that the City has an adequate supply of sandbags for residents and businesses, including prefilled sandbags for individuals who may be unable to fill them on their own.	General Fund, Grants	Public Services	$	Ongoing	N/A
P11	Conduct active shooter drills for City staff, residents, and businesses.	General Fund, Grants	Police	$	Annually	N/A
P12	Increase number of City staff who have CalOES Safety Assessment Program (SAP) credentials.	General Fund, Grants	Police	$	Annually	N/A
	Multiple Hazards					
1.01	Explore the feasibility of connecting critical facilities	General	Public Services	$$$	2025	High

	Mitigation Action	Potential Funding Sources	Responsible Department	Relative Cost	Time Frame	Priority
	(Civic Center, key Community Centers) to a microgrid power-supply network. (Hazards addressed: All)	Fund, BRIC/ HMGP Grants, Other Grants				
1.02	Install energy-efficient equipment to increase the longevity of the fuel supply for backup generators. (Hazards addressed: All)	General Fund, BRIC/ HMGP Grants, Other Grants	Public Services	$$$		Medium
1.03	Conduct routine updates to Facility Conditions Assessments for City-owned infrastructure, buildings, lift stations, and other utilities and coordinate with other agencies to ensure inspections of other important infrastructure. (Hazards addressed: All)	General Fund, BRIC/ HMGP Grants, Other Grants	Public Services/Development Services	$$$	Ongoing	Low
1.04	Repair, as feasible, all major deficiencies discovered by inspections to prevent collapse, failure, or damage in the event of a natural disaster. (Hazards addressed: All)	General Fund, BRIC/ HMGP Grants, Other Grants	Public Services	$$$	Ongoing	High
1.05	Incentivize public and private utility operators to	General	Public Services	$$$	Ongoing	Low

	Mitigation Action	Potential Funding Sources	Responsible Department	Relative Cost	Time Frame	Priority
	harden their lines passing through the City from potential breaches. Encourage adoption of supervisory control and data acquisition (SCADA) to allow instantaneous shut down of line breaches. Use mitigation grants to incentivize entities to partner with the City to complete these projects. (Hazards addressed: All)	Fund, BRIC/ HMGP Grants, Other Grants				
1.06	Install and harden emergency backup power at Civic and Community Centers, and other critical facilities as the city may determine necessary. Prioritize installations for facilities that serve as key cooling/warming centers, and evacuation centers. (Hazards addressed: All)	General Fund, BRIC/ HMGP Grants, Other Grants	Public Services	$$$	2023	High
1.07	Conduct a feasibility assessment of installation of solar and battery backup systems at key critical facilities within the City. (Hazards addressed: All)	General Fund, BRIC/ HMGP Grants, Other Grants	Public Services	$$$	Currently Underway	Medium
1.08	Work closely with community groups to increase awareness of hazard events and resiliency opportunities among socially vulnerable community members, including the homeless. (Hazards addressed: All)	General Fund, BRIC/ HMGP Grants, Other Grants	Community Services/ Development Services/ City Manager's Office	$	Ongoing	Low

	Mitigation Action	Potential Funding Sources	Responsible Department	Relative Cost	Time Frame	Priority
1.09	Avoid building new City-owned key facilities in mapped hazard areas. If no feasible sites outside of mapped areas exist, ensure that such facilities are hardened against hazards beyond any minimum building requirements/ mitigation standards. (Hazards addressed: All)	General Fund, BRIC/ HMGP Grants, Other Grants	Public Services/Development Services	$$$	Ongoing	Low
1.10	Closely monitor changes in the boundaries of mapped hazard areas resulting from land use changes or climate change and adopt new mitigation actions or revise existing ones to ensure continued resiliency. (Hazards addressed: All	General Fund, BRIC/ HMGP Grants, Other Grants	Development Services	$	Annually	Low
1.11	Integrate policy direction and other information from this Plan into other City documents, including the General Plan, Emergency Operations Plan, and Capital Improvements Program. (Hazards addressed: All)	General Fund, BRIC/ HMGP Grants, Other Grants	All Departments	$	Annually	Low
1.12	Monitor funding sources for hazard mitigation activities. (Hazards addressed: All)	General Fund, BRIC/ HMGP Grants, Other Grants	All Departments	$	Ongoing	Low

	Mitigation Action	Potential Funding Sources	Responsible Department	Relative Cost	Time Frame	Priority
1.13	Enhance the City's existing all hazards early warning alarm system to be activated prior to or during hazard events. (Hazards addressed: All)	General Fund, BRIC/ HMGP Grants, Other Grants	Police/Fire Departments	$$	2026	Low
	Aircraft Incident					
2.01	Coordinate with the Federal Aviation Administration on flight paths over the City and potential changes that may increase vulnerability to aircraft incidents.	General Fund, BRIC/ HMGP Grants, Other Grants	Development Services	$	Ongoing	Medium
2.02	Coordinate with SNA on future improvements and enhancements that may impact City infrastructure and/ or function.	General Fund, BRIC/ HMGP Grants, Other Grants	Development Services	$	Ongoing	Medium
	Diseases and Pests (Agricultural Pests, Epidemic/Vector Borne Diseases, Tree Mortality)					
3.01	Coordinate with surrounding jurisdictions, local health care providers, businesses, schools, the Orange County Health Care Agency, the California	General Fund, BRIC/	City Manager's Office	$	Ongoing	High

	Mitigation Action	Potential Funding Sources	Responsible Department	Relative Cost	Time Frame	Priority
	Department of Public Health, and the Centers for Disease Control to inform community members about current public health trends or issues, free and low-cost healthcare options, treatments, and where to find local healthcare facilities. (Hazards addressed: Epidemic/Vector Borne Diseases)	HMGP Grants, Other Grants				
3.02	Cooperate with the Orange County Mosquito and Vector Control District to inform community members on best practices for mosquito-proofing homes and businesses and how to avoid mosquito bites. (Hazards addressed: Epidemic/Vector Borne Diseases	General Fund, BRIC/ HMGP Grants, Other Grants	Development Services	$	Ongoing	Medium
3.03	Participate in exercises conducted by the operational area surrounding diseases and pest issues. (Hazards addressed: All)	General Fund, BRIC/ HMGP Grants, Other Grants	Development Services	$	Ongoing	Low
3.04	Continue to work with residents, business owners, and utilities to remove dead, dying, and diseased trees weakened by disease and/or pests. (Hazards addressed: Tree Mortality)	General Fund, BRIC/ HMGP Grants, Other Grants	Development Services	$	Ongoing	High

	Mitigation Action	Potential Funding Sources	Responsible Department	Relative Cost	Time Frame	Priority
3.05	Update City landscape standards to incorporate disease-resistant plant species as part of landscaping projects/ improvements. (Hazards Addressed: Tree Mortality)	General Fund, BRIC/ HMGP Grants, Other Grants	Public Services	$	2023	LOw
3.06	Conduct an Arborist's Evaluation of the City's tree inventory, to locate, identify, and determine the health of tree species within the City.	General Fund, BRIC/ HMGP Grants, Other Grants	Public Services	$$	Ongoing	Mws
		Drought				
4.01	Coordinate closely with Mesa Water District (MWD) on water use and water conservation efforts throughout the City.	General Fund, BRIC/ HMGP Grants, Other Grants	Development Services	$	Ongoing	Medium
4.02	Update "Title 13 Planning, Zoning And Development Chapter VII. Landscaping Standards 13-101" - of the Costa Mesa Municipal Code of Ordinances to reflect the latest advances in best practices in landscape design and irrigation that reduce water use within	General Fund, BRIC/ HMGP Grants,	Development Services	$	Annually	High

	Mitigation Action	Potential Funding Sources	Responsible Department	Relative Cost	Time Frame	Priority
	the City. Continue to update this section to reflect the newest technology, designs, and techniques to increase sustainability of water resources.	Other Grants				
4.03	Use drought-tolerant plants when installing new or significantly redoing 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.	General Fund, BRIC/ HMGP Grants, Other Grants	Public Services	$$	Ongoing	Low
4.04	Work with MWD to develop a focused water leak pilot program to eliminate leaky water mains, sprinklers, and other water fixtures, focusing on areas of the City with the greatest water demand	General Fund, BRIC/ HMGP Grants, Other Grants	Public Services	$	Ongoing	Low
4.05	Develop a Drought Strategic Plan that focuses on reductions in water use for municipal operations and strategies for inclusion into Mesa Water District drought planning programs and processes.	General Fund, BRIC/ HMGP Grants, Other Grants	Public Services	$	TBD	Low
	Energy/Power Shortage					
5.01	Coordinate with utility providers to enhance their assets located within or traversing through the City.	General Fund,	Public Services	$	Ongoing	Low

	Mitigation Action	Potential Funding Sources	Responsible Department	Relative Cost	Time Frame	Priority
		BRIC/ HMGP Grants, Other Grants				
5.02	Establish and routinely update a confidential inventory of critical infrastructure and ensure development activities coordinate with future resilience enhancements by utility providers.	General Fund, BRIC/ HMGP Grants, Other Grants	Development Services/Public Services	$	Annually	High
5.03	Expand access to alternative energy technologies, energy efficiency improvements and appliances, and programs for vulnerable populations to reduce energy consumption and the need for City services during extreme heat events.	General Fund, BRIC/ HMGP Grants, Other Grants	Public Services	$$	2025	Medium
5.04	Install new and harden existing emergency backup generators at critical facilities and infrastructure as deemed necessary.	General Fund, BRIC/ HMGP Grants, Other Grants	Public Services	$$	2023	High
5.05	Install battery backup power supplies for traffic signals, to ensure functionality in the event of power	General Fund,	Public Services	$$	2025	Low

	Mitigation Action	Potential Funding Sources	Responsible Department	Relative Cost	Time Frame	Priority
	failure.	BRIC/ HMGP Grants, Other Grants				
5.06	Monitor changes to PSPS circuits in and around the City that could affect residents, businesses, and organizations, and increase awareness of the affects of these events on the City's resources.	General Fund, BRIC/ HMGP Grants, Other Grants	Police	$	Annually	Low
5.07	Develop a Power Failure Strategic Plan that prioritizes strategies focused on the following: Identification of critical facilities requiring backup power supplies Identification of critical systems requiring backup battery supplies to ensure effective operations during power failure events Development of criteria for backup power supplies and equipment for City owned building and infrastructure Development of code updates/modifications for new development/redevelopments that are energy resilient or include backup power supplies or plug-in ready retrofits. Compilation of funding sources and	General Fund, BRIC/ HMGP Grants, Other Grants	All Departments	$	2022	High

	Mitigation Action	Potential Funding Sources	Responsible Department	Relative Cost	Time Frame	Priority
	strategies for City facility improvements and resources for residents and businesses.					
	Flooding					
6.01	Coordinate with dam owners/operators, state, and federal agencies to collectively identify threats to the City and the region and identify ways to retrofit/strengthen the dams under their control.	General Fund, BRIC/ HMGP Grants, Other Grants	Public Services	$	Ongoing	Low
6.02	Identify potential flood improvements that reduce inundation from both storm flows and potential dam inundation effects	General Fund, BRIC/ HMGP Grants, Other Grants	Public Services	$$	2023	High
6.03	Update the City's Storm Drain Master Plan periodically (in conjunction with the LHMP and CIP) to incorporate new data and/or address emerging issues.	General Fund, BRIC/ HMGP Grants, Other Grants	Public Services	$$$	2022	High
6.04	Investigate the use of permeable paving and landscaped swales for new construction and	General Fund,	Public Services	$$	Ongoing	Medium

	Mitigation Action	Potential Funding Sources	Responsible Department	Relative Cost	Time Frame	Priority
	replacement of City-owned hardscaped areas.	BRIC/ HMGP Grants, Other Grants				
6.05	Conduct frequent cleanings of storm drain intakes, especially before and during rainy season.	General Fund, BRIC/ HMGP Grants, Other Grants	Public Services	$$	Ongoing	Low
6.06	Track areas where ponding frequently occurs during heavy rainfall and install new drains or upgrade existing ones to reduce ponding of water.	General Fund, BRIC/ HMGP Grants, Other Grants	Public Services	$$$	Ongoing	Low
Geological Hazards (Expansive Soil, Erosion, Landslide, Methane Containing Soils)						
7.01	Conduct an analysis of old oil infrastructure in and around Costa Mesa to verify methane releases are not occurring. (Methane Containing Soils)	General Fund, BRIC/ HMGP Grants, Other Grants	Public Services/Development Services	$	2025	Low

	Mitigation Action	Potential Funding Sources	Responsible Department	Relative Cost	Time Frame	Priority
7.02	Ensure effective drainage systems and stabilizing vegetation on and above landslide-prone slopes and bluffs is installed and maintained in areas prone to this hazard. (Landslide, Erosion)	General Fund, BRIC/ HMGP Grants, Other Grants	Public Services/Development Services	$	2023	High
7.03	Adopt guidelines for Methane Containing Soils based on the Orange County Fire Authority (OCFA), Combustible Soil Gas Hazard Mitigation, Guidelines for areas prone to impacts from methane containing soils. (Methane Containing Soils)	General Fund, BRIC/ HMGP Grants, Other Grants	Public Services/Development Services/Fire Department	$	2022	High
7.04	Conduct a methane gas assessment in the southern portion of the City to identify areas with high concentration of methane. As part of the study, the City should identify potential strategies for capture and use of these gases. (Methane Containing Soils)	General Fund, BRIC/ HMGP Grants, Other Grants	Public Services/Development Services/Fire Department	$	2024	Low
	Hazardous Materials					
8.01	Discourage new sensitive land uses, including schools, parks, childcare centers, adult and senior assisted living facilities, and community centers, from locating near identified hazardous material facilities. Discourage or prohibit new hazardous	General Fund, BRIC/ HMGP Grants,	Development Services	$	Ongoing	Low

	Mitigation Action	Potential Funding Sources	Responsible Department	Relative Cost	Time Frame	Priority
	material facilities from locating near sensitive land uses.	Other Grants				
8.02	Pursue full alignment of the General Plan with policies and actions outlined in state and regional plans such as the California Accidental Release Prevention (CalARP) Program and the Orange County Fire Authority Hazardous Materials Area Plan.	General Fund, BRIC/ HMGP Grants, Other Grants	Development Services	$	Annually	High
8.03	Continuously inspect businesses and other properties storing hazardous materials and create an inventory of storage locations that require updates, maintenance, or renovation.	General Fund, BRIC/ HMGP Grants, Other Grants	County Health (CUPA)	$	Ongoing	Medium
8.04	Discourage new sensitive land uses, including schools, parks, childcare centers, adult and senior assisted living facilities, and community centers, from locating near identified hazardous material facilities. Discourage or prohibit new hazardous material facilities from locating near sensitive land uses.	General Fund, BRIC/ HMGP Grants, Other Grants	Public Services/Development Services	$	Ongoing	Low
	Human Caused Hazards					
9.01	Coordinate with the Orange County Intelligence Assessment Center (OCIAC) to monitor potential incidents resulting in civil disturbance events (riots,	General Fund, BRIC/	Police/Fire Departments	$	Ongoing	Low

	Mitigation Action	Potential Funding Sources	Responsible Department	Relative Cost	Time Frame	Priority
	mass shootings, etc.). (Hazards addressed: Mass-Casualty Incidents, Civil Disturbance)	HMGP Grants, Other Grants				
9.02	Disseminate information on cyber threats or potential terrorist activity to City staff and continually follow up with information on further developments in the situation. (Hazards addressed: Human-Caused Hazards)	General Fund, BRIC/ HMGP Grants, Other Grants	IT Department	$	Annually	Medium
9.03	Regularly update cyber security software and educate business owners and residents on current internet-based threats. (Hazards addressed: Cyber Threats	General Fund, BRIC/ HMGP Grants, Other Grants	IT Department	$	Annually	Medium
9.04	Retrofit all critical facilities, City administration buildings, and other buildings the City may deem to be important in the future with counterterrorism design elements and building materials. (Hazards addressed: Human-Caused Hazards)	General Fund, BRIC/ HMGP Grants, Other Grants	Public Services/Police Department	$$$	2025	High
9.05	Establish a backup location for the City's Traffic Control Management System and install back up emergency power to ensure system operation	General Fund, BRIC/	Development Services/ Public Services	$$$	2023	High

	Mitigation Action	Potential Funding Sources	Responsible Department	Relative Cost	Time Frame	Priority
	during an emergency. (Multi-Hazard	HMGP Grants, Other Grants				
9.06	Conduct a cyber threat assessment for the Traffic Control Management System and determine system vulnerabilities.	General Fund, BRIC/ HMGP Grants, Other Grants	Development Services	$$-$$$	Ongoing	Low
	Seismic Hazards					
10.01	Encourage the installation of resilient (seismically appropriate) piping for new or replacement pipelines, in close coordination with local water, natural gas, and other providers.	General Fund, BRIC/ HMGP Grants, Other Grants	Development Services/Public Services	$	Ongoing	Low
10.02	Assess soft story conditions for apartment buildings constructed prior to 1980.	General Fund, BRIC/ HMGP Grants, Other Grants	Development Services	$$	2025	Medium
10.03	Conduct an educational campaign and incentives to	General	Development Services	$$	TBD	Low

	Mitigation Action	Potential Funding Sources	Responsible Department	Relative Cost	Time Frame	Priority
	encourage the use of reinforced chimneys, anchored rooftop-mounted equipment, window film, and other preventative measures to reduce damage to private buildings.	Fund, BRIC/ HMGP Grants, Other Grants				
10.04	Encourage community groups and industry representatives assist in outreach to residents and businesses to obtain earthquake insurance.	General Fund, BRIC/ HMGP Grants, Other Grants	City Manager's Office	$	Ongoing	Low
10.05	To the extent feasible, construct all new and significantly retrofitted City-owned facilities to remain operational in the event of a major earthquake.	General Fund, BRIC/ HMGP Grants, Other Grants	Public Services/Development Services	$$$	Ongoing	High
10.06	Retrofit key critical facilities with seismically rated window film treatments that ensure glass windows do not shatter during a strong seismic event.	General Fund, BRIC/ HMGP Grants, Other Grants	Public Services	$$	2024	High
10.07	Install flexible jointing and pipelines across fault	General	Public	$	Ongoing	Low

	Mitigation Action	Potential Funding Sources	Responsible Department	Relative Cost	Time Frame	Priority
	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.	Fund, BRIC/ HMGP Grants, Other Grants	Services/Development Services `			
	Severe Weather					
11.01	Notify residents through public service announcements a couple of days in advance of a severe weather event. Focus on media methods that target vulnerable populations, such as elderly, sick, lower-income, or persons with limited mobility to better ensure they have adequate time to prepare. (Hazards addressed: Severe Weather)	General Fund, BRIC/ HMGP Grants, Other Grants	City Manager's Office/ Public Services	$	Ongoing	Medium
11.02	Expand use of public facilities (libraries, community centers, etc.) as warming/cooling centers for vulnerable populations during extreme weather events, and assess facility needs in order to automatically open these facilities as severe weather centers when conditions require. (Hazards addressed: Severe Weather)	General Fund, BRIC/ HMGP Grants, Other Grants	Community Services/Public Services	$$	2023	High
11.03	Increase the use and construction of shade structures within new developments, City facilities, parks, and trails to reduce urban heat island impacts. (Hazards Addressed: Extreme Heat)	General Fund, BRIC/ HMGP Grants,	Public Services	$$$	Ongoing	Medium

	Mitigation Action	Potential Funding Sources	Responsible Department	Relative Cost	Time Frame	Priority
		Other Grants				
11.04	Evaluate the long-term capacity of designated cooling centers and shelters in the City to provide sufficient relief from extreme heat. Assess the need to expand services as the frequency, length, and severity of future heatwaves potentially change as a result of climate change. (Hazards addressed: Extreme Heat)	General Fund, BRIC/ HMGP Grants, Other Grants	Community Services/Public Services	$$	2024	Medium
11.05	Upgrade HVAC within City facilities to more efficient systems that may include split systems or decentralized systems that allow for heating and cooling the spaces needed, not entire buildings. (Hazards addressed: Extreme Heat)	General Fund, BRIC/ HMGP Grants, Other Grants	Public Services	$$$	Ongoing	Low
11.06	Conduct outreach to residents and businesses prior to severe winds (Santa Ana Wind events) on proper tree maintenance and identification of potentially hazardous trees. (Hazards addressed: Severe Wind)	General Fund, BRIC/ HMGP Grants, Other Grants	Development Services	$	Annually	Medium
	Urban Fire					
12.01	Promote the proper maintenance and separation of power lines from trees and other hazards.	General Fund,	Public Services/ Development Services/	$	Ongoing	Medium

	Mitigation Action	Potential Funding Sources	Responsible Department	Relative Cost	Time Frame	Priority
		BRIC/ HMGP Grants, Other Grants	Fire Department			
12.02	Provide information and resources to residents citywide on ways to improve resilience to home fires, including procedures for fallen powerlines.	General Fund, BRIC/ HMGP Grants, Other Grants	Public Services/ Development Services/ Fire Department	$	Annually	Low
12.03	Conduct regular vegetation management activities to reduce fire hazard risks, such as clearing out dead vegetation in parks, open spaces, rights-of-way, and other areas that could become fuel for fires.	General Fund, BRIC/ HMGP Grants, Other Grants	Public Services/ Development Services/ Fire Department	$$	Ongoing	Medium
12.04	Establish thresholds for fire sprinkler installation in retrofitted buildings and structures undergoing use changes or remodel.	General Fund, BRIC/ HMGP Grants, Other Grants	Public Services/ Development Services/ Fire Department	$	2022	Medium
12.05	Promote the planting of fire-resistant landscaping in all new developments and significant landscape	General Fund,	Public Services/ Development Services/	$	Ongoing	Low

	Mitigation Action	Potential Funding Sources	Responsible Department	Relative Cost	Time Frame	Priority
	retrofits in accordance with State and local recommendations, such as high-moisture, low-resin trees, shrubs, and ground cover.	BRIC/ HMGP Grants, Other Grants	Fire Department			

*** Relative Cost Categories:**

Less than $60,000 | $$ $60,001 to $199,999 | $$$ Greater than $200,000