City of Placentia Local Hazard Mitigation Plan

November 2023

FOSTER MORRISON CONSULTING

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Executive Summary

This 2023 Local Hazard Mitigation Plan (LHMP) serves as the first LHMP for the City of Placentia. The purpose of hazard mitigation is to reduce or eliminate long-term risk to people and property from hazards. The City prepared this LHMP in order to make the City and its residents less vulnerable to future hazard events.

This LHMP demonstrates the community's commitment to reducing risks from hazards and serves as a tool to help decision makers direct mitigation activities and resources. This LHMP was also developed, among other things, to make the City of Placentia's eligible for certain pre- and post-mitigation grant funding: specifically, the FEMA Hazard Mitigation Grant Program (HMGP), the Building Resilient Infrastructure and Communities (BRIC) Program, and the Flood Mitigation Assistance Program (FMA).

Each year in the United States, natural disasters take the lives of hundreds of people and injure thousands more. Nationwide, taxpayers pay billions of dollars annually to help communities, organizations, businesses, and individuals recover from disasters. These monies only partially reflect the true cost of disasters, because additional expenses to insurance companies and nongovernmental organizations are not reimbursed by tax dollars. Many natural disasters are predictable, and much of the damage caused by these events can be alleviated or even eliminated. The purpose of hazard mitigation is to reduce or eliminate long-term risk to people and property from hazards.

LHMP Plan Development Process

Hazard mitigation planning is the process through which hazards that threaten communities are identified, likely impacts determined, mitigation goals set, and appropriate mitigation strategies determined, prioritized, and implemented. This LHMP documents the hazard mitigation planning process and identifies relevant hazards, risks and vulnerabilities, and strategies the City will use to decrease vulnerability and increase resiliency and sustainability in the community.

This LHMP was prepared pursuant to the requirements of the Disaster Mitigation Act of 2000 (Public Law 106-390), the implementing regulations set forth by the Interim Final Rule published in the Federal Register on February 26, 2002, (44 CFR §201.6) and finalized on October 31, 2007, and the latest FEMA LHMP guidance effective April 2023. The City followed a planning process prescribed by FEMA as detailed in Table ES-1.

Table ES-1 Local Hazard Mitigation Planning Process

DMA Process	Modified CRS Process
1) Organize Resources	
201.6(c)(1)	1) Organize the Planning Effort
201.6(b)(1)	2) Involve the Public
201.6(b)(2) and (3)	3) Coordinate with Other Departments and Agencies

DMA Process	Modified CRS Process
2) Assess Risks	
201.6(c)(2)(i)	4) Identify the Hazards
201.6(c)(2)(ii)	5) Assess the Risks
3) Develop the Mitigation Plan	
201.6(c)(3)(i)	6) Set Goals
201.6(c)(3)(ii)	7) Review Possible Activities
201.6(c)(3)(iii)	8) Draft an Action Plan
4) Implement the Plan and Monitor Progress	
201.6(c)(5)	9) Adopt the Plan
201.6(c)(4)	10) Implement, Evaluate, and Revise the Plan

The planning process began with the organizational phase to establish the Hazard Mitigation Planning Committee (HMPC) comprised of key City representatives, and other local and regional stakeholders; to involve the public; and to coordinate with other departments and agencies. A detailed risk assessment was then conducted followed by the development of a focused mitigation strategy for the City of Placentia Planning Area. Once approved by Cal OES and FEMA, this LHMP will be adopted and implemented by the City over the next five years.

Risk Assessment

A risk assessment was conducted that identified and profiled hazards that pose a risk to the City, assessed the vulnerability of the City of Placentia Planning Area to these hazards, and examined the existing capabilities to mitigate them.

The City of Placentia Planning Area is vulnerable to numerous hazards that are identified, profiled, and analyzed in this Plan. Floods, earthquakes, drought, levee failures, landslides, wildfires, and other severe weather events are among the hazards that can have a significant impact on the City. Table ES-2 details the hazards identified for this City of Placentia LHMP.

Table ES-2 City of Placentia Hazard Identification Assessment

Hazard*	Geographic Extent	Probability of Future Occurrences	Magnitude/ Severity	Significance	Climate Change Influence
Climate Change	Extensive	Highly Likely	Limited	Medium	--
Dam Failure	Significant	Unlikely	Critical	High	Medium
Drought & Water Shortage	Extensive	Highly Likely	Limited	Medium	High
Earthquake, Earthquake Liquefaction, and Earthquake Induced Landslides	Extensive	Likely	Catastrophic	High	Low
Flood: 1%/0.2% annual chance	Significant	Occasional/Unlikely	Limited	Medium	High
Flood: Localized/Stormwater Flooding	Extensive	Highly Likely	Limited	Medium	Medium
Haz Mat Transportation Release	Significant	Unlikely	Critical	Medium	Low
Landslide	Limited	Likely	Limited	Low	Medium
Levee Failure	Significant	Unlikely	Critical	Medium	Medium
Natural Gas Pipeline	Significant	Unlikely	Critical	High	Low
Pandemic	Extensive	Likely	Critical	Medium	Low
Severe Weather: Extreme Heat	Extensive	Highly Likely	Limited	Medium	High
Severe Weather: Heavy Rain and Storms (with thunderstorm winds)	Extensive	Highly Likely	Limited	Medium	High
Severe Weather: High Winds and Tornado	Extensive	Highly Likely	Limited	Medium	Medium
Subsidence	Limited	Unlikely	Limited	Low	Low
Urban Fire	Limited	Highly Likely	Limited	High	Low
Wildfire (with smoke/ air quality)	Limited/Ext	Highly Likely	Limited	Low	High

Geographic Extent
Limited: Less than 10% of planning area
Significant: 10-50% of planning area
Extensive: 50-100% of planning area

Probability of Future Occurrences
Highly Likely: Near 100% chance of occurrence in next year, or happens every year.
Likely: Between 10 and 100% chance of occurrence in next year, or has a recurrence interval of 10 years or less.
Occasional: Between 1 and 10% chance of occurrence in the next year, or has a recurrence interval of 11 to 100 years.
Unlikely: Less than 1% chance of occurrence in next 100 years, or has a recurrence interval of greater than every 100 years.

Magnitude/Severity
Catastrophic: More than 50 percent of property severely damaged; shutdown of facilities for more than 30 days; and/or multiple deaths
Critical: 25-50 percent of property severely damaged; shutdown of facilities for at least two weeks; and/or injuries and/or illnesses result in permanent disability
Limited: 10-25 percent of property severely damaged; shutdown of facilities for more than a week; and/or injuries/illnesses treatable do not result in permanent disability
Negligible: Less than 10 percent of property severely damaged, shutdown of facilities and services for less than 24 hours; and/or injuries/illnesses treatable with first aid

Significance
Low: minimal potential impact
Medium: moderate potential impact
High: widespread potential impact

Climate Change Influence
Low: minimal potential impact
Medium: moderate potential impact
High: widespread potential impact

Mitigation Strategy

Based on the results of the risk assessment, the City in conjunction with the HMPC developed a mitigation strategy for reducing the City's risk and vulnerability to hazards. The resulting Mitigation Strategy for the City of Placentia Planning Area is comprised of LHMP goals and objectives and a mitigation action plan which includes a series of mitigation action projects and implementation measures. Based on the risk assessment, the HMPC identified goals and objectives for reducing the City of Placentia Planning Area's vulnerability to hazards. The goals and objectives of this multi-hazard mitigation plan are:

GOAL 1: Reduce risk and vulnerability of the City of Placentia to natural hazards, including climate change considerations, and prevent injuries, loss of life, and damage to property, economy and the environment.

Objectives

- Promote and enhance community resiliency
- Reduce the effects of climate change on the community to the greatest extent possible
- Reduce risk and vulnerability through the equitable and accessible planning and implementation of hazard mitigation actions and priorities
- Utilize code enhancements and enforcement to reduce hazard impacts

GOAL 2: Provide protection for critical facilities, infrastructure, and community lifelines. Create redundancy and reliability to minimize loss and decrease the impacts of a disaster, and facilitate recovery.

Objectives:

- Identify and implement infrastructure improvements and risk reduction measures
- Promote the use of shared infrastructure with neighboring communities and agencies
- Develop contingency plans to reduce critical facility and infrastructure failures

GOAL 3: Promote public awareness, education, and understanding of natural hazards and the risks they present to quality of life, property and the economy; and encourage individual responsibility to minimize impacts to natural hazards.

Objectives:

- Improve community awareness and promote self-sufficiency and sustainability
- Educate the whole community, including actions to take before, during and after a hazard event to increase resiliency citywide
- Establish and outreach evacuation routes and options for sheltering in place

Goal 4: Build capacity and capabilities to increase disaster resilience for all hazards with a focus on the whole community.

Objectives:

- Identify and implement low cost, manageable mitigation actions and priorities (i.e., the low hanging fruit)
- Increase disaster resilience among historically underserved populations, individuals with a disability or access and functional needs, and communities disproportionately impacted by disasters and climate change
- Leverage and support interagency and public-private coordination and the use of shared resources
- Work closely with ALL connected and applicable agencies
- Establish and utilize mutual and automatic aid to subsidize and reinforce limitations in City equipment and personnel.
- Establish interagency relationships pre-disaster and to ensure continuity of plans
- Integrate mitigation principals into community policies and regulations to support equitable outcomes to benefit the whole community

Actions to support these goals are shown on Table ES-3.

Table ES-3 City of Placentia Planning Area Mitigation Actions

Action Title	Goals Addressed	Address Existing Development	Address Future Development	Continued Compliance with NFIP	Mitigation Type
Multi-Hazard Actions					
Action 1. Integrate Local Hazard Mitigation Plan into Safety Element of General Plan	1, 2, 3, 4	X	X		Prevention
Action 2. StormReady Certification for City of Placentia	1, 2, 3, 4	X	X	X	Prevention Property Protection Public Education Emergency Services
Action 3. Enhance Public Education and Awareness of Hazards and Public Understanding of Hazards and Preparedness for Disaster Events	1, 2, 3, 4	X	X	X	Public Education
Action 4. Review Permitting and Code Enforcement Practices for all Hazards	1, 2, 3, 4	X	X		Prevention
Action 5. Create a Mechanism to Ensure Diversity, Equity, and Inclusion is Implemented in all City Projects (e.g., to Equitably Consider Disadvantaged and Socially Vulnerable Populations)	1, 2, 3, 4	X	X		Prevention
Action 6. Emergency Operations Plan Update	1, 2, 3, 4	X	X		Emergency Services
Action 7. Evacuation Planning and Messaging	1, 2, 3, 4	X	X		Emergency Services
Action 8. Establish Back up Power Sources for Critical Facilities in Placentia	1, 2, 3, 4	X	X		Prevention Property Protection Natural Resource Protection Emergency Services
Climate Change and Severe Weather: Extreme Heat Actions					
Action 9. Develop Climate Action Plan	1, 2, 3, 4	X	X	X	Prevention

Action Title	Goals Addressed	Address Existing Development	Address Future Development	Continued Compliance with NFIP	Mitigation Type
Action 10. Implement Cool Infrastructure Projects	1, 2, 3, 4	X	X		Property Protection
Dam Failure, Floods: 1%/0.5%/0.2% Annual Chance, Floods: Localized Stormwater, Severe Weather: Heavy Rains and Storms Actions					
Action 11. Local Flood Ordinance Revision to meet California Building Code Requirements	1, 2, 4	X	X	X	Prevention
Action 12. Storm Drain Capacity Enhancement Projects	1, 2, 4	X	X	X	Prevention Structural
Earthquake and Earthquake Liquefaction Actions					
Action 13. Earthquake Retrofit / Seismic Assessment of City Infrastructure	1, 2, 4	X	X		Property Protection Structural Projects
Pandemic Actions					
Action 14. Pandemic Planning/Point of Dispensing Model Improvements	1, 2, 3, 4	X	X		Prevention
Severe Weather: Extreme Heat, Heavy Rain and Storms, High Winds, and Drought Actions					
Action 15. Implementation of Urban Tree Management Plan and Program	1, 2, 4	X	X		Prevention Natural Resource Protection
Fire Actions					
Action 16. Adoption and Enforcement of the California Fire Code by Reference with Local Amendments	1, 2, 4	X	X		Prevention
Action 17. Development of Vegetation Management Ordinance	1, 2, 3, 4	X	X		Prevention

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Appendix C: Mitigation Strategy

Appendix D: Adoption Resolution

Appendix E: Threatened and Endangered Species

Appendix F: Critical Facilities

Appendix G: FEMA National Risk Index Report

Abbreviations and Acronyms

Acronym	Definition
AB	Assembly Bill
ACS	American Community Survey
APG	Adaptation Planning Guide
APN	Assessor Parcel Numbers
AQI	Air Quality Index
BAM	Best Available Map
BCEGS	Building Code Effectiveness Grading Schedule
BLM	Bureau of Land Management
BRACE	Building Resilience Against Climate Effects
BRIC	Building Resilient Infrastructure and Communities
CAC	Community Assistance Contact
CAISO	California Independent System Operator
CBC	California Building Code
Cal DWR	California Department of Water Resources
Cal OES	California Office of Emergency Services
CAS	Climate Adaptation Strategy
CAV	Community Assistance Visit
CCHPR	Climate Change and Health Profile Report
CCSM3	Community Climate System Model Version 3
CDAA	California Disaster Assistance Act
CDC SVI	Center for Disease Control Social Vulnerability Index
CDFA	California Department of Food and Agriculture
CDFW	California Department of Fish and Wildlife
CDPH	California Department of Health
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CFS	Cubic Feet per Second
CGS	California Geological Survey
CNNDB	California Natural Diversity Database
CNPS	California Native Plant Society
CNRA	California Natural Resource Agency
CPUC	California Public Utilities Commission
CRS	Community Rating System
CRV	Contents Replacement Values
CVP	Central Valley Project

Acronym	Definition
DAC	Disadvantaged Community Status
DFIRM	Digital Flood Insurance Rate Map
DMA	Disaster Mitigation Act
DSOD	Division of Safety of Dams
EF	Enhanced Fujita
EOP	Emergency Operations Plan
ESF	Emergency Support Function
F	Fujita
FEMA	Federal Emergency Management Agency
FERC	Federal Energy Regulatory Commission
FHSZ	Fire Hazard Severity Zones
FIRM	Flood Insurance Rate Map
FIS	Flood Insurance Study
FMA	Flood Mitigation Assistance
FMMP	Farmland Mapping and Monitoring Program
FRA	Federal Responsibility Area
FRAP	Fire and Resource Assessment Program
GFDL	Geophysical Fluid Dynamics Laboratory
GHG	Greenhouse Gas
GIS	Geographic Information Systems
GRASP	Geospatial Research, Analysis & Services Program
HMGP	Hazard Mitigation Grant Program
HMPC	Hazard Mitigation Planning Committee
IBC	International Building Code
ICC	Increased Cost of Compliance
IPCC	Intergovernmental Panel on Climate Change
IRC	International Residential Code
IRWM	Integrated Regional Water Management
LAFCO	Local Agency Formation Commission
LOMA	Letter of Map Amendment
LOMR	Letter of Map Revision
LHMP	Local Hazard Mitigation Plan
LRA	Local Responsibility Area
MERS	Middle East Respiratory Syndrome
MHDP	Multi-Hazards Demonstration Project
MHI	Median Household Income
MMI	Modified Mercalli Intensity

Acronym	Definition
MPH	Miles Per Hour
MSL	Mean Sea Level
MW	Megawatts
NCDC	National Climactic Data Center
NDMC	National Drought Mitigation Center
NEPA	National Environmental Policy Act
NFIP	National Flood Insurance Program
NIDIS	National Integrated Drought Information System
NOAA	National Oceanic and Atmospheric Administration
NPS	National Park Service
NWS	National Weather Service
OES	The City of Placentia Office of Emergency Services
OHP	Office of Historic Preservation
PA	Public Assistance
PDM	Pre-Disaster Mitigation
PG&E	Pacific Gas and Electric
PM	Particulate Matter
PNAS	Proceedings of the National Academy of Sciences
PSPS	Public Safety Power Shutoff
RCP	Representative Concentration Pathways
RL	Repetitive Loss
SAC-SJ	Sacramento-San Joaquin
SB	Senate Bill
SBA	Small Business Administration
SDAC	Severely Disadvantaged Community
SFHA	Special Flood Hazard Area
SGMA	Sustainable Groundwater Management Act
SH	State Highway
SR	State Route
SRA	State Responsibility Area
SRL	Severe Repetitive Loss
SWP	State Water Project
UBC	Uniform Building Code
UCERF	Uniform California Earthquake Rupture Forecast
ULOP	Urban Level of Flood Protection
URM	Unreinforced masonry
USACE	US Army Corps of Engineers

Acronym	Definition
USDA	US Department of Agriculture
USFS	US Forest Service
USFWS	US Fish and Wildlife Service
USGS	US Geological Survey
WHO	World Health Organization
WSOC	Wildfire Safety Operations Center
WRCC	Western Regional Climate Center
WUI	Wildland Urban Interface

Chapter 1 Introduction

1.1 Purpose

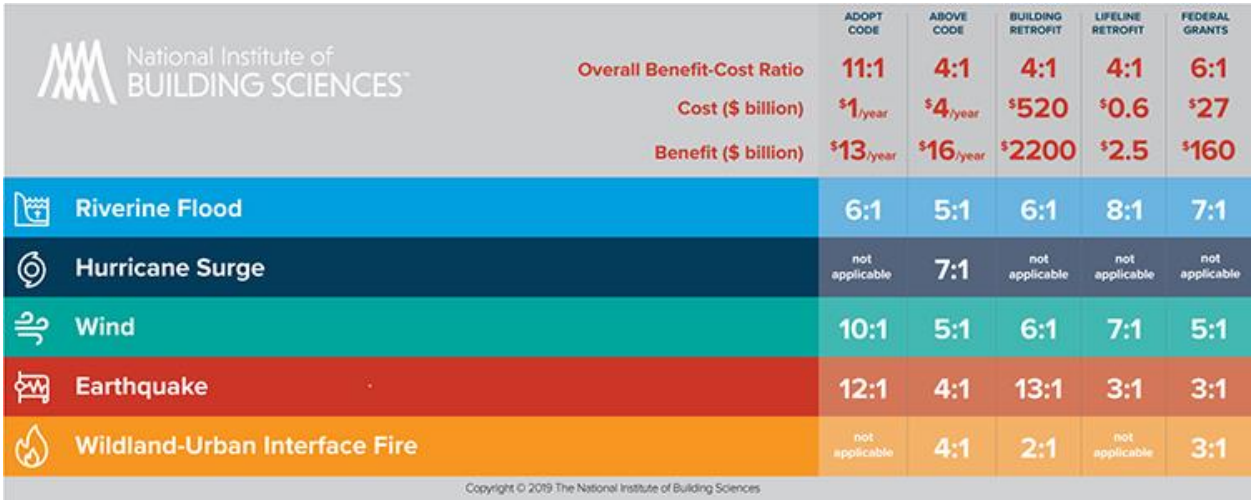
The City of Placentia prepared this Local Hazard Mitigation Plan (LHMP or Plan) to guide hazard mitigation planning to better protect the people and property of the City from the effects of hazard events. This LHMP demonstrates the community's commitment to reducing risks from hazards and serves as a tool to help decision makers direct mitigation activities and resources. This LHMP was also developed so the City can be eligible for certain federal disaster assistance, specifically, the Federal Emergency Management Agency's (FEMA) Hazard Mitigation Grant Program (HMGP), Pre-Disaster Mitigation (PDM) program, Building Resilient Infrastructure and Communities (BRIC) program, and the Flood Mitigation Assistance (FMA) program.

1.2 Background and Scope

Each year in the United States, natural disasters take the lives of hundreds of people and injure thousands more. Nationwide, taxpayers pay billions of dollars annually to help communities, organizations, businesses, and individuals recover from disasters. These monies only partially reflect the true cost of disasters, because additional expenses to insurance companies and nongovernmental organizations are not reimbursed by tax dollars. Many natural disasters are predictable, and much of the damage caused by these events can be alleviated or even eliminated.

Hazard mitigation is defined by FEMA as "any sustained action taken to reduce or eliminate long-term risk to human life and property from a hazard event." The results of a three-year, congressionally mandated independent study to assess future savings from mitigation activities provides evidence that mitigation activities are highly cost-effective. On average, each dollar spent on mitigation saves society an average of $6 in avoided future losses in addition to saving lives and preventing injuries (see Figure 1-1).

Figure 1-1 Natural Hazard Mitigation Savings by Hazard Type and Mitigation Type



Source: National Institute of Building Science Multi-Hazard Mitigation Council 2019 Interim Report

Hazard mitigation planning is the process through which hazards that threaten communities are identified, likely impacts determined, mitigation goals set, and appropriate mitigation strategies determined, prioritized, and implemented. This LHMP documents the City's hazard mitigation planning process and identifies relevant hazards, vulnerabilities, and mitigation strategies the City will use to decrease vulnerability and increase resiliency and sustainability in the community.

This Placentia LHMP is a single jurisdictional plan that geographically covers the entire area within the City's jurisdictional boundaries (i.e., the Planning Area). This Plan was prepared pursuant to the requirements of the Disaster Mitigation Act of 2000 (Public Law 106-390) and the implementing regulations set forth by the Interim Final Rule published in the Federal Register on February 26, 2002, (44 CFR §201.6) and finalized on October 31, 2007. (Hereafter, these requirements and regulations will be referred to collectively as the Disaster Mitigation Act (DMA) or DMA 2000.) This planning effort also follows FEMA's most current Plan Preparation and Review Guidance. While the DMA 2000 emphasized the need for mitigation plans and more coordinated mitigation planning and implementation efforts, the regulations established the requirements that local hazard mitigation plans must meet in order for a local jurisdiction to be eligible for certain federal disaster assistance and hazard mitigation funding under the Robert T. Stafford Disaster Relief and Emergency Act (Public Law 93-288). Because the City is subject to many kinds of hazards, access to these programs is vital.

Information in this LHMP will be used to help guide and coordinate mitigation activities and decisions for local land use policy in the future. Proactive mitigation planning will help reduce the cost of disaster response and recovery to communities and their residents by protecting critical community facilities, reducing liability exposure, and minimizing overall community impacts and disruptions. Placentia has been affected by hazards in the past and is thus committed to reducing future impacts from hazard events and becoming eligible for mitigation-related federal funding.

1.3 Plan Organization

The City of Placentia's Local Hazard Mitigation Plan is organized as follows:

Chapters

- Chapter 1: Introduction
- Chapter 2: Community Profile
- Chapter 3: Planning Process
- Chapter 4: Risk Assessment
- Chapter 5: Mitigation Strategy
- Chapter 6: Plan Adoption
- Chapter 7: Plan Implementation and Maintenance

Appendices

- Appendix A: Planning Process
- Appendix B: References
- Appendix C: Mitigation Strategy
- Appendix D: Adoption Resolution
- Appendix E: Threatened and Endangered Species
- Appendix F: Critical Facilities
- Appendix G: FEMA National Risk Index Report

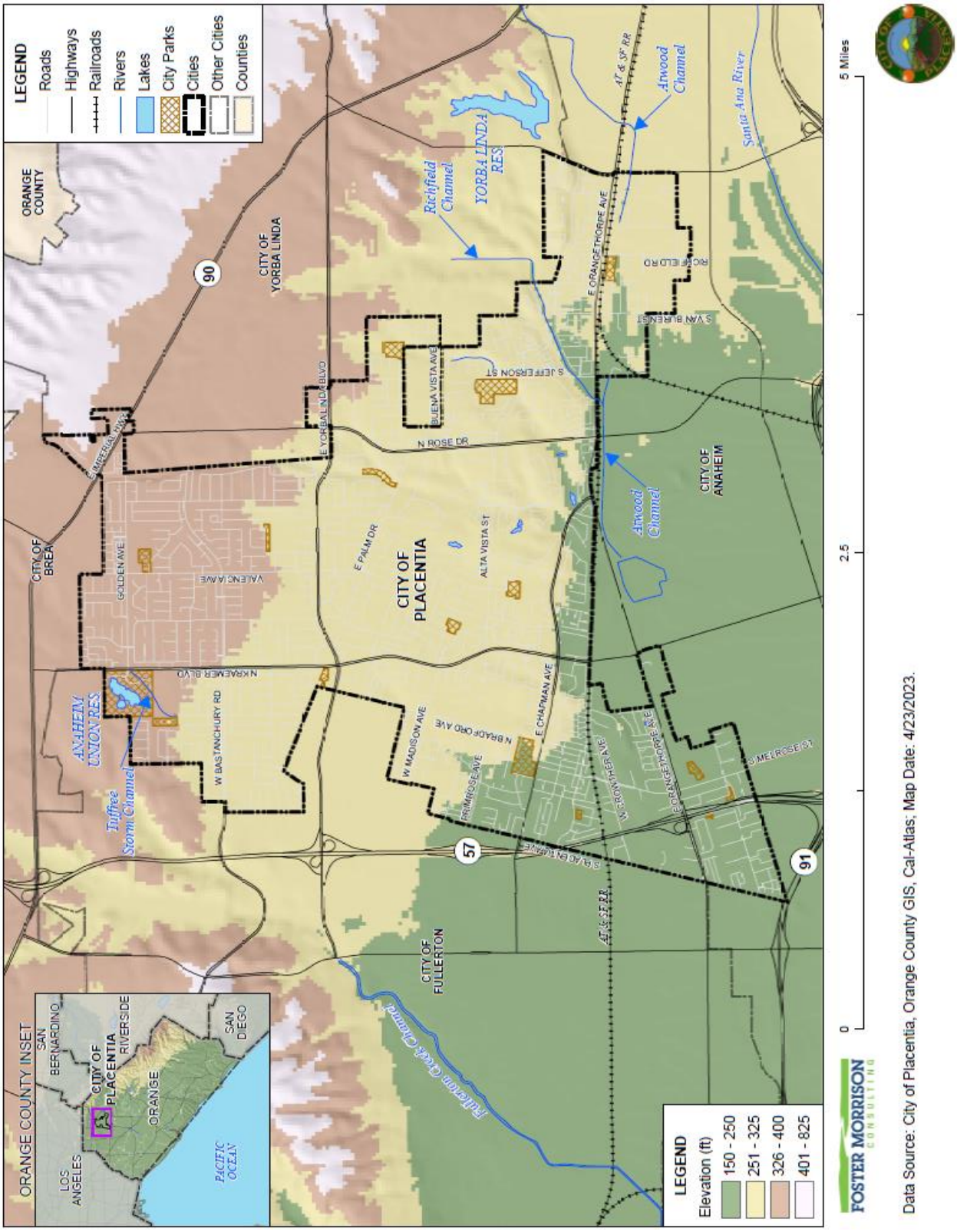
Chapter 2 Community Profile

2.1 City of Placentia Overview

The City of Placentia was incorporated in 1926. The City of Placentia is a charter city, with an elected city council, elected city clerk, and elected treasurer and a professional City Administrator with an annual General Fund budget of over $40 million and a total budget of over $45 million for fiscal year 2022-2023. The City of Placentia is served by various major transportation facilities including two State Highways, major north-south and east-west arterials, and minor north-south and east-west roadways. Placentia also has a major transit provider, the Orange County Transportation Authority (OCTA), and one freight rail line (BNSF), on which the Southern California Regional Rail Authority (SCRRA, or Metrolink) operates a commuter rail line. The California Department of Finance estimates the 2022 population for the City at 51,204.

The City can be seen on Figure 2-1 below.

Figure 2-1 City of Placentia



2.2 History

Incorporated in 1926, the history of the City of Placentia started much earlier than that with the Spanish explorers of the 1760s. The area was first populated by the Gabrielino Native American tribe, also known as the Tongva, referring to the Shoshonean or Takic speaking Native Americans, who lived throughout the region. In 1837, the Mexican Governor granted the Rancho San Juan Cajon De Santa Ana to Juan Ontiveros. The land grant included the area, which today comprises Placentia, Anaheim, Fullerton, La Habra, and Yorba Linda. Daniel Kraemer, credited with being the first non-Spanish settler, arrived in 1865, bought 3,900 acres of land in the area and moved his family out from Illinois. Kraemer, after which Placentia's Kraemer Boulevard, and Kraemer Middle School and Kraemer Memorial Park are named, paved the way for the future City.

Following this Gold Rush period, Albert S. Bradford, seeking a new and prosperous life, boarded a train heading west, when he met Mr. Halladay, a local businessman who persuaded the young Bradford to help manage a ranch in the area. Bradford settled down, called for his wife and children from back east, and in the 1890s moved to the area that later became Placentia. He grew vegetables, then oranges, served on the Chamber of Commerce, and in 1910 he organized locals and persuaded the Santa Fe Railroad to run a line into Placentia, shortening the rail distance to Los Angeles. A station was built, and packing houses were established for the town's growing citrus industry. Mr. Bradford was instrumental in bringing businesses, a post office, and a newspaper to Placentia. He also laid out the town site; and, in his honor, Bradford Avenue retains his name today. His family home is listed on the National Register of Historic Places.

The lack of water in Placentia was one of the principal reasons for its slow development. Prior to the 1870s, Placentia was an arid area without natural water sources. There was no water to develop residential, agriculture or industrial uses. Water ditches for agriculture began to be dug in the 1870s. A primitive irrigation system for agriculture began around 1910, after the railroad was brought in. But even as a water system was installed, and development was more feasible, the people of Placentia eschewed the big stores and shopping areas of their neighboring cities. Having started small and slowly, the community decided it liked it that way. The City grew mostly as a "bedroom" community, with a very modest local economy until the 1970s. The population then surged from 5,000 to its current 51,204 residents.

2.3 Climate and Geography

The climate of the City area is characterized as a Mediterranean coastal with mild, warm, and dry summers while winters are mild and cool. According to the National Oceanic and Atmospheric Association (NOAA) average highs for the region peak in the mid 80's °F, while its mild winters temperatures average in the low 70's. Record highs for the City occurred on September 28, 2010, when the thermometer hit 107.7°. The region is subject to wide variations in annual precipitation, ranging from a low of 3.4 inches to a high of 41.5 inches since 1989. The average annual rainfall is 13.52 inches. Topography in the City is generally flat, with a minimum elevation of 187 ft above mean sea level (msl) to 988 ft above msl.

2.4 Economy

The US Census Bureau tracks economic statistics for the City of Placentia. These are shown in Table 2-1.

Table 2-1 City of Placentia Civilian Employed Population 16 years and Over

Industry	Estimated Employment	Percent
Agriculture, forestry, fishing and hunting, and mining	70	0.3%
Construction	1,1912	7.2%
Manufacturing	2,829	10.7%
Wholesale trade	919	3.5%
Retail trade	2,284	8.7%
Transportation and warehousing, and utilities	1,210	4.6%
Information	313	1.2%
Finance and insurance, and real estate and rental and leasing	1,945	7.4%
Professional, scientific, and management, and administrative and waste management services	3,196	12.1%
Educational services, and health care and social assistance	5,924	22.5%
Arts, entertainment, and recreation, and accommodation and food services	3,277	12.4%
Other services, except public administration	1,410	5.3%
Public administration	1,086	4.1%

Source: US Census Bureau American Community Survey 2021 Estimates

According to the City Economic Development Department, the top employers in the City are:

- Blackburn Daewoo
- Interface rehab
- Hartwell
- Carl Warren & Company
- Coast Southwest
- Progress Group
- BeyondTek IT
- The Bruery
- Clark Law Offices
- N&S

The City General Plan Land Use Element noted that residential uses make up the majority of the City's total acreage. Over half (52%) of the residential units in Placentia are designated as low-density residential. Residential land uses within the City range from low-density single-family development and planned communities to higher density multi-family housing. Commercial and office uses are concentrated along primary arterials in the eastern and western portions of the City, serving Placentia residents and the surrounding region. Industrial and manufacturing uses occur in the southern portion of the City adjacent to the rail line. The combined acreage for commercial, office and industrial/manufacturing areas make up 13%, or 543 acres of the City. Public schools within the City of Placentia utilize approximately 212 acres, or 5% of the City's total acreage. Parks are dispersed throughout the City of Placentia. The facilities are primarily used for community and neighborhood recreational opportunities. Park uses consist of 94 acres, or 2%, of the City's total acreage.

2.5 Population and Socioeconomic Makeup

Placentia has grown into a community of approximately 51,204 residents according to the most recent 2022 estimates. The general layout and land use pattern of the City has stayed relatively consistent throughout the years. The City is almost entirely developed. New development occurs on the limited remaining vacant and underutilized parcels (i.e., parcels that have remaining development capacity pursuant to the Zoning Code). Vacant land within the City of Placentia encompasses 54.5 acres, or 1.3 % of the City's total acreage.

Select social and economic information for the City is shown in Table 2-2.

Table 2-2 Placentia – Select Social and Economic Statistics

Statistic	Number
Populations	
Population under 5	5.6%
Population over 65	13.7%
Median Age	36.9
Racial Makeup	
White	59.9%
Black or African American	2.6%
American Indian or Alaska Native	1.0%
Asian	16.6%
Native Hawaiian or Pacific Islander	0.3%
Other Races	6.7%
Two or more races	12.8%
Income and Poverty	
Median income	$103,041
Mean Income	$124,330
Poverty rate	
All families	5.7%
All people	7.8%
Unemployment Rate (December 2022)	2.6%

Source: 2021 US Census American Community Survey, California Employment Development Department

Chapter 3 Planning Process

Requirements §201.6(b) and §201.6(c)(1): An open public involvement process is essential to the development of an effective plan. In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process shall include:

1) An opportunity for the public to comment on the plan during the drafting stage and prior to plan approval;

2) An opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia, and other private and nonprofit interests to be involved in the planning process; and

3) Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.

[The plan shall document] the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.

The City of Placentia recognized the importance and need of a Local Hazard Mitigation Plan (LHMP) and initiated its development. After identifying City funds, which served as the funding source for this Plan, the City contracted with Foster Morrison Consulting, Ltd. (Foster Morrison) to facilitate and develop this LHMP. Jeanine Foster, a professional planner with Foster Morrison, was the project manager in charge of overseeing the planning process and the development of this LHMP. Chris Morrison, also a professional planner with Foster Morrison, was the lead planner for the development of this LHMP. Brenna Howell, with Howell Consulting, also supported the planning effort as part of the Foster Morrison team. The Foster Morrison's team's role was to:

- Assist in establishing the Hazard Mitigation Planning Committee (HMPC) as defined by the Disaster Mitigation Act (DMA);
- Meet the DMA requirements as established by federal regulations and following FEMA's planning guidance;
- Support objectives under the National Flood Insurance Program's (NFIP) and the Flood Mitigation Assistance (FMA) program;
- Facilitate the entire planning process;
- Identify the data requirements that HMPC participants could provide and conduct the research and documentation necessary to augment that data;
- Assist in facilitating the public input process;
- Produce the draft and final plan documents; and
- Coordinate with the California Office of Emergency Services (Cal OES) and FEMA Region IX plan reviews.

3.1 Local Government Participation

Placentia made a commitment to the development of this 2023 single jurisdictional LHMP, as the participating jurisdiction. The DMA planning regulations and guidance stress that each local government (participating jurisdiction) seeking FEMA approval of their mitigation plan must participate in the planning effort in the following ways:

- Participate in the process as part of the HMPC;
- Detail where within the Planning Area the risk differs from that facing the entire area;
- Identify potential mitigation actions; and
- Formally adopt the plan.

For Placentia, "participation" meant the following:

- Providing facilities for meetings;
- Providing printed materials for meeting attendees;
- Attending and participating in the HMPC meetings;
- Completing and returning the Data Collection Worksheets;
- Collecting and providing other requested data (as available);
- Coordinating information sharing between internal and external agencies;
- Managing administrative details;
- Making decisions on plan process and content;
- Identifying mitigation actions for the Plan;
- Reviewing and providing comments on drafts of the Plan;
- Providing hardcopy Draft documents of LHMP for public review;
- Informing the public, local officials, and other interested stakeholders about the planning process and providing opportunity for them to comment on the Plan;
- Coordinating, and participating in the public input process; and
- Coordinating the formal adoption of the LHMP by the Placentia City Council.

Placentia, seeking FEMA approval of this LHMP, met all of these participation requirements. Multiple representatives from the City attended the HMPC meetings described in Table 3-3 and also brought together an internal planning team to help collect data, identify mitigation actions and implementation strategies, and to review and provide data on Plan drafts. Appendix A provides additional information and documentation of the planning process.

Specific individuals representing City departments participating in this LHMP were actively involved throughout the LHMP development process as identified in Appendix A in the sign-in sheets for the meetings and as evident through the data, information and input provided by HMPC representatives to the development of this LHMP. This Chapter 3 and Appendix A provides additional information and documentation of the planning process and participants to this LHMP, including members of the HMPC.

3.2 The 10-Step Planning Process

Foster Morrison established the planning process for the City of Placentia 2023 LHMP using the DMA planning requirements and FEMA's associated guidance. Specifically, the LHMP was developed pursuant to the requirements of DMA 2000, published at 44 CFR 201.6 and new LHMP guidance effective April 2023, components of the NFIP's CRS program, and other current, applicable federal and state requirements. This plan development process is structured around a four-phase process:

1. Organize Resources;
2. Assess Risks;
3. Develop the Mitigation Plan; and
4. Implement the Plan and Monitor Progress.

Into this process, Foster Morrison integrated the more detailed 10-step planning process used for FEMA's CRS and FMA programs. The modified 10-step process used for this Plan meets the requirements of six major programs: FEMA's Hazard Mitigation Grant Program (HMGP); Pre-Disaster Mitigation (PDM) program and Building Resilient Infrastructure and Communities (BRIC); CRS program; FMA Program; Severe Repetitive Loss (SRL) program; and new flood control projects authorized by the U.S. Army Corps of Engineers (USACE).

Table 3-1 shows how the modified 10-step process fits into FEMA's four-phase process. The sections that follow describe each planning step in more detail.

Table 3-1 Mitigation Planning Processes Used to Develop the Placentia Local Hazard Mitigation Plan

DMA Process	Modified CRS Process
1) Organize Resources	
201.6(c)(1)	1) Organize the Planning Effort
201.6(b)(1)	2) Involve the Public
201.6(b)(2) and (3)	3) Coordinate with Other Departments and Agencies
2) Assess Risks	
201.6(c)(2)(i)	4) Identify the Hazards
201.6(c)(2)(ii)	5) Assess the Risks
3) Develop the Mitigation Plan	
201.6(c)(3)(i)	6) Set Goals
201.6(c)(3)(ii)	7) Review Possible Activities
201.6(c)(3)(iii)	8) Draft an Action Plan
4) Implement the Plan and Monitor Progress	
201.6(c)(5)	9) Adopt the Plan
201.6(c)(4)	10) Implement, Evaluate, and Revise the Plan

3.2.1. Phase 1: Organize Resources

Planning Step 1: Organize the Planning Effort

With Placentia's commitment to participate in the DMA planning process, Foster Morrison worked with the Placentia's Emergency and Health Services Manager, Administration Department, as overall project lead to establish the framework and organization for development of this LHMP. An initial call and internal project kickoff meeting was held with key City representatives in February of 2023 to discuss the organizational and process aspects of this LHMP development process.

The initial kick-off meeting was held on March 9, 2023. Invitations to the kickoff meeting was extended to key City departments as well as to other federal, state, and local stakeholders that might have an interest in participating in the planning process. Representatives from the City and key community stakeholders participated in this LHMP project with additional invitations extended as appropriate throughout the planning process. The list of invitees is included in Appendix A.

The HMPC, comprising key City staff and other government and stakeholder representatives developed this LHMP with leadership from the Placentia Emergency and Health Services Manager, Administration Department, and facilitation by Foster Morrison. Table 3-2 shows who participated on the HMPC.

Table 3-2 Hazard Mitigation Planning Committee

Name	Position	Department
City of Placentia		
Patrick Powers	Emergency and Health Services Manager	Administration
Janice Lee	GIS Technician	Development Services
Joel Cardenas	Public Works Superintendent	Public Works
Amanda Horner	Fire Marshal	Fire
Crystal Adams	Sr. Management Analyst	Fire
Dan Pivaroff	Senior Code Enforcement Officer	Code Enforcement
Edgar Montelongo	Code Enforcement Officer	Code Enforcement
Nicolette Vialpando	Communications and Marketing Analyst	Administration
Veronica Ortiz	Community Services Supervisor	Community Services
Joe Lambert	Director of Development Services	Development Services
Andrew Gonzales	Senior Planner	Development Services
Ward Smith	Mayor	Mayor
Craig Green	–	–
Luis Estevez	Deputy City Administrator	Administration
Matthew Brand	Community Services Coordinator	Development Services

Name	Position	Department
Orange County		
Stefani Waterman	–	OC Animal Care
Ethan Brown	Senior Emergency Management Coord	OCEMD
Beck Levin	Systems Change Advocate	Dayle McIntosh Center of Orange County
Other Agencies/Groups		
Valerie Laktash	Administrative Director of Operations	Placentia Linda Hospital
Cynthia Quimby	Government Relations Manager?	Southern California Edison
Tony Cardenas	Government Relations Manager	Southern California Edison
Reza Afshar	–	Yorba Linda Water District
Craig Green	City Resident/(Former City Councilmember	City Resident
Christopher Pena	Emergency Management Coordinator	City of Yorba Linda
Jannine Wilmoth	Emergency Manager	City of Anaheim
Anselmo Templado	Officer	California Highway Patrol
Mitch Howell	Officer	California Highway Patrol
Jeanine Foster	Owner	Foster Morrison Consulting
Brenna Howell	Owner	Howell Consulting

This list includes all HMPC members that attended one or more HMPC meetings detailed in Table 3-3, as well as those who provided key input into the Plan development process. In addition to providing representation on the HMPC, the City further formulated an internal planning team to collect and provide requested data and to conduct timely reviews of the draft documents. The internal planning team includes both those participating on the HMPC and other City staff.

Meetings

The planning process officially began with an internal project planning call in February 2023 followed by an HMPC kick-off meeting held in Placentia on March 9, 2023. The meetings covered the scope of work and an introduction to the DMA requirements. During the HMPC meetings, participants were provided with data collection worksheets to facilitate the collection of information necessary to support development of the LHMP. Using FEMA guidance, these worksheets were designed to capture information on past hazard events, identify hazards of concern to the City, quantify values at risk to identified hazards, inventory existing capabilities, and to identify possible mitigation actions. A copy of the worksheets for this project are included in Appendix A. The City of Placentia seeking FEMA approval of this LHMP completed and returned the worksheets to Foster Morrison for incorporation into this LHMP.

During the planning process, the HMPC communicated through face-to-face meetings, email, telephone conversations, Dropbox websites, and through a City developed webpage dedicated to the Plan

development process. This later website was developed to provide information to the HMPC, the public and all other stakeholders on the LHMP process. Draft documents were also posted on this website so that the HMPC members and the public could easily access and review them. The LHMP website (shown on Figure 3-1) can be accessed at: https://www.placentia.org/1035/Local-Hazard-Mitigation-Plan.

Figure 3-1 Placentia Local Hazard Mitigation Plan Website

Source: City of Placentia

The HMPC met formally five times during the planning period (December 2018 – January 2020) which adequately covers the four phases of DMA and the 10-Step CRS planning process. The formal meetings held and topics discussed are described in Table 3-3. Invitations, agendas, and sign-in sheets for each of the meetings are included in Appendix A.

Table 3-3 Placentia Internal and HMPC Meetings

Meeting Type	Meeting Topic	Meeting Date(s)	Meeting Location(s)
Placentia Internal Kick-off Meeting	1) Introduction to DMA and the planning process 2) Organize Resources: the role of the HMPC, planning for public involvement, coordinating with other agencies/stakeholders 3) Identification of stakeholders for HMPC	February 7, 2023	Virtual Zoom Meeting
HMPC #1 Kick-off Meeting	1) Introduction to DMA and the planning process 2) Organize Resources: the role of the HMPC, planning for public involvement, coordinating with other agencies/stakeholders 3) Introduction to Hazard Identification	March 9, 2023	City of Placentia City Council Chambers

Meeting Type	Meeting Topic	Meeting Date(s)	Meeting Location(s)
HMPC #2	1) Risk assessment overview and work session - Assess the Hazard - Assess the Problem	May 10, 2023	City of Placentia Front Community Room
Placentia Internal Risk Assessment Meeting	1) Risk Assessment Worksheet review and input 2) Critical Facilities Definition and Mapping status and discussion 3) Review of other project data needs	June 13, 2023	Virtual Zoom Meeting
HMPC #3	1) Review of risk assessment summary 2) Development of mitigation goals 3) Intro to Mitigation Action Strategy - Set Goals - Review possible activities	July 11, 2023	City of Placentia Front Community Room
HMPC #4	1) Review of mitigation alternatives 2) Identify list of mitigation actions by hazard 3) Review of mitigation selection criteria 4) Brainstorm and prioritize mitigation actions 5) Mitigation Action Strategy Implementation and Draft Action Development - Review possible activities - Draft an Action Plan	July 12, 2023	City of Placentia Front Community Room
HMPC #5	1) Review of final HMPC, jurisdictional and public comments and input to Plan 2) Draft an Action Plan 3) Plan maintenance and Implementation Procedures	November 2, 2023	City of Placentia City Council Chambers

Planning Step 2: Involve the Public

Up-front coordination discussions with the City of Placentia established the initial plan for public involvement. Public involvement activities for this LHMP included press releases, social media communications, stakeholder and public meetings, development of an LHMP webpage and associated website postings, and the solicitation of public and stakeholder comments on the draft LHMP through a variety of mechanisms. Information provided to the public included an overview of the LHMP process, including a review of the hazard risk assessment and proposed mitigation strategies for this LHMP. At the planning team kick-off meeting, the HMPC discussed additional strategies for public involvement and agreed to an approach using established public information mechanisms and resources within the City.

Early Public Outreach Activities

Public outreach for this LHMP began at the beginning of the Plan development process with the development of a Placentia webpage and outreach document on the LHMP development process through a variety of mechanisms as described below:

- Outreach on the City of Placentia LHMP website
- Outreach on the City of Placentia website front page
- Outreach on the City of Placentia website Calendar
- Early public meeting press release

- Press release sent to elected City officials
- Outreach on City social media sites: Twitter, Facebook
- Outreach on the City Administrator's online Weekly Briefing at CAWeekly@Placentia.org

The purpose of this outreach was to inform the public and other stakeholders of Placentia's LHMP project and how they could get involved and how to provide comments on the draft LHMP prior to submittal to Cal OES/FEMA. The initial outreach also invited the public and stakeholders to the public kickoff meeting for the project. Information on these outreach efforts can be seen in Appendix A to this LHMP.

Public Meetings

Three public meetings were planned for this LHMP project, during key times of the LHMP development process:

Public Meeting #1: LHMP Kickoff

Public outreach for this LHMP began at the beginning of the Plan development process with the early public outreach activities to inform the public of the purpose of the DMA and the hazard mitigation planning process for the City of Placentia. A press release was also issued at the beginning of the project to invite the public to the public meeting for the kick-off of the LHMP project on March 9, 2023.

Public Meeting #2: Risk Assessment

A second public meeting was held to provide an overview of the hazard risk assessment portion of the LHMP. This meeting was held the evening of the HMPC risk assessment in the City of Placentia Front Community room. This meeting was advertised through the City website and through other public outreach efforts as previously described. This included posting the meeting on the City Administrator's Weekly Briefing, posting meeting details on the LHMP website, and through other social media outreach mechanisms.

Public Meeting #3: Meeting on the Draft LHMP

The first draft of the LHMP was provided to the HMPC in August of 2023, with a public review draft provided in October of 2023. A public meeting was held on November 1, 2023 to present the draft LHMP and to collect public comments on the Plan prior to finalization and submittal to Cal OES/FEMA. The public meeting on the draft LHMP was advertised in a variety of ways to maximize outreach efforts to the public. In addition to a copy of the draft Plan being placed on the City website in advance of these meetings (see Figure 3-1), hard copies of the draft of the Plan were made available to interested parties This can be seen on Figure 3-2.

Figure 3-2 City of Placentia–City Clerk Recorders Front Counter

Documentation to support the public meetings can be found in Appendix A. In addition to advertising for public participation, notices of meetings were sent directly to all persons on the HMPC contact list and also to other agency and key stakeholders with an interest in the Placentia LHMP project. The majority of these people reside in Placentia, Orange County and surrounding communities. Additional outreach for review of the Draft LHMP and final meetings included:

- Notice on the City of Placentia website
- Advertisement on City Facebook page
- Press Release issued by the City of Placentia

The formal public meetings for this project are summarized in Table 3-4.

Table 3-4 Public Meetings

Meeting Type	Meeting Topic	Meeting Date	Meeting Locations
Public Meeting #1	1) Intro to DMA and mitigation planning	March 9, 2023	City of Placentia City Council Chambers

Meeting Type	Meeting Topic	Meeting Date	Meeting Locations
	2) The Placentia LHMP Development Process		
Public Meeting #2	1) Risk Assessment Overview and data needs	May 10, 2023	City of Placentia Front Community Room
Public Meeting #3	1)Presentation of Draft LHMP and solicitation of public and stakeholder comments	November 1, 2023	City of Placentia Front Community Room

Where appropriate, stakeholder and public comments and recommendations were incorporated into the LHMP throughout the Plan development process, including the sections that address mitigation goals and strategies. No public or stakeholder comments were received on the Draft Plan. All press releases, website postings, and public outreach efforts are on file with the Placentia Emergency and Health Services Manager, Administration Department and are also included in Appendix A.

The draft LHMP is currently available online on the Placentia website at: https://www.placentia.org/1035/Local-Hazard-Mitigation-Plan.

Planning Step 3: Coordinate with Other Departments and Agencies

Early in the planning process, the HMPC determined that data collection, mitigation strategy development, and plan approval would be greatly enhanced by inviting other local, state and federal agencies and organizations to participate in the process. Based on their involvement in hazard mitigation planning, their involvement in the Planning Area, and/or their interest as a neighboring jurisdiction, representatives from the following agencies were invited to participate on the HMPC:

- American Red Cross - OC
- Burlington Northern Santa Fe
- Cal OES
- California Highway Patrol
- City of Anaheim
- City of Brea
- City of Fullerton
- City of Yorba Linda
- Dayle McIntosh Center of Orange County
- FEMA Region IX
- Golden State Water District
- Orange County Animal Care
- Orange County Social Services Agency
- Orange County Emergency Management
- Orange County
- Placentia Chamber of Commerce
- Placentia Library District
- Placentia Linda Hospital

- Placentia Park Arts and Rec Commission
- Republic Services
- Southern California Edison
- Southern California Gas
- Streetscape and Transportation Commission
- Yorba Linda Water District

Coordination with key agencies, organizations, and advisory groups throughout the planning process allowed the HMPC to review common problems, development policies, and mitigation strategies as well as identifying any conflicts or inconsistencies with regional mitigation policies, plans, programs and regulations. Coordination involved contacting these agencies and informing them on how to participate in the LHMP development process and if they had any expertise or assistance they could lend to the planning process, risk assessment, or mitigation strategy. These groups and agencies were solicited asking for their assistance and input, telling them how to become involved in the LHMP, and inviting them to HMPC meetings.

In addition, as part of the overall stakeholder and agency coordination effort, the HMPC coordinated with and utilized input to the LHMP from the following agencies:

- Cal-Adapt
- CAL OES
- CAL FIRE
- California Department of Conservation
- California Department of Finance
- California Department of Water Resources
- California Geological Survey
- FEMA Region IX
- Library of Congress
- Metropolitan Water District of Orange County
- National Oceanic and Atmospheric Association
- National Performance of Dams Program
- National Register of Historic Places
- National Resource Conservation Service
- National Response Center
- National Weather Service
- Southern California Edison
- United States Army Corps of Engineers
- United States Bureau of Land Management
- United States Bureau of Reclamation
- United States Geological Survey
- Western Regional Climate Center

Several opportunities were provided for the groups listed above to participate in the planning process. At the beginning of the planning process, invitations were extended to some of these groups to actively participate on the HMPC. Others assisted in the process by providing data directly as requested in the Data

Worksheets or through data contained on their websites or as maintained by their offices. Further as part of the public outreach process, all groups were invited to attend the public meeting and to review and comment on the LHMP prior to submittal to CAL OES and FEMA.

Other Community Planning Efforts and Hazard Mitigation Activities

Coordination with other community and City planning efforts is also paramount to the success of this LHMP. Hazard mitigation planning involves identifying existing policies, tools, and actions that will reduce a community's risk and vulnerability to hazards. Placentia uses a variety of comprehensive planning mechanisms, such as general and master plans and state requirements, to guide growth and development. Integrating existing planning efforts and mitigation policies and action strategies into this LHMP establishes a credible and comprehensive plan that ties into and supports other City programs. The development of this LHMP incorporated information from the following existing plans, studies, reports, and initiatives as well as other relevant data from neighboring communities and other jurisdictions.

- Cal OES plans
- Cal-Adapt Plans
- Community Wildfire Protection Plans
- Environmental Impact Reports
- FEMA mitigation planning documents
- Flood Insurance Studies
- Municipal Water District of Orange County LHMP
- Orange County LHMP
- US Army Corps of Engineers Reports
- US Fish and Wildlife reports
- USGS Reports

Specific source documents are referenced at the beginning of each section of Chapter 4 and in Appendix B. These and other documents were reviewed and considered, as appropriate, during the collection of data to support Planning Steps 4 and 5, which include the hazard identification, vulnerability assessment, and capability assessment. In accordance with DMA requirements and guidance, Best Available Data was used throughout in the development of this LHMP. Where the data from the existing studies and reports is used in this LHMP, the source document is referenced throughout this LHMP. Appendix B, References, provides a detailed list of references used in the preparation of this LHMP.

Coordination with Underserved Communities and Socially Vulnerable Populations

As detailed in FEMA's new 2023 LHMP guidance, the LHMP development process should focus on the Whole Community approach to hazard mitigation planning. Engagement and coordination with a variety of community-based organizations that work directly with or provide support to underserved communities and socially vulnerable populations, including individuals with disabilities and access and functional needs, is a critical component in addressing equity in mitigation planning and implementation. For this LHMP project, significant efforts were made to identify and engage the appropriate community members and groups to support the Plan development process. The City is one of 34 cities within Orange County, California. Similar to most County-City organizational structures, Orange County provides numerous

countywide services to the cities that are often not duplicated at the City level. This often includes the County Public Health Department and associated organizations and groups that provide support and services to these underserved and vulnerable populations. Thus reaching out to the broader County-level community was required to best meet this element.

As part of the planning process, efforts made to identify and engage these groups in the City of Placentia's LHMP project included the following:

- **Listos California -** Anchored at the Governor's Office of Emergency Services (Cal OES) since 2019, Listos California engages a statewide network of community-based organizations, Tribal Governments, and Community Emergency Response Teams across the state to boost resiliency, provide accessible in-language information and advance a new culture of disaster preparedness. The managing director of Listos indicated that they are not allowed to give out any local names/subgrantees to anyone and to look at their website to see a list of participating groups. In Orange County, the only participating group was the Superior Court of Orange County.
- **Ready OC Website**– Orange County's Emergency Preparedness Resource. A primary focus of Ready OC is to assist with disaster planning for those with disabilities and access and functional needs. The site contained lots of good information. The contact information led to Orange County OES.
- **Collaboration Organizations Active in Disaster (COADOC) Website** – The mission of COADOC is to establish and enhance partnerships among community-based and governmental organizations that will collaborate, communicate, and coordinate preparedness, response and recovery for Orange County residents during times of disaster. The contact information led to Orange County OES.
- **Orange County OEM, Access and Functional Needs Operational Area Lead** – The Orange County OEM Access and Functional Needs Operational Lead provided contacts for two Orange County assisted living groups/centers that they often coordinate with: Regional Center of Orange County and the Dayle McIntosh Center. This included providing a contact information for the Systems Change Advocate with the Dayle McIntosh Center.
- **Dayle McIntosh Center** – The Dayle McIntosh Systems Change Advocate reached out and joined the HMPC for the project. They attended meetings, provided key data, and commented on key plan elements such as the Mitigation Strategy Goals.

3.2.2. Phase 2: Assess Risks

Planning Steps 4 and 5: Identify the Hazards and Assess the Risks

Foster Morrison led the HMPC in a research effort to identify, document, and profile all the hazards that have, or could have, an impact the Placentia Planning Area. The HMPC relied on information from the City's Safety Element to the General Plan, the 2018 and 2023 (Draft) State of California Hazard Mitigation Plan, and many other sources to establish the hazards list and associated data for this LHMP. Data collection worksheets were developed and used in this effort to aid in determining hazards and vulnerabilities and where the risk varies across the Planning Area. Geographic information systems (GIS) were used to display, analyze, and quantify hazards and vulnerabilities.

The HMPC also conducted a capability assessment to review and document the City's current capabilities to mitigate risk from and vulnerability to hazards. By collecting information about existing City programs,

policies, regulations, ordinances, and emergency plans, the HMPC could assess those activities and measures already in place that contribute to mitigating some of the risks and vulnerabilities identified. A more detailed description of the risk assessment process, methodologies, and results are included in Chapter 4 Risk Assessment.

NFIP Participation

Also to be noted, DMA requires an assessment of a jurisdiction's continued compliance with the NFIP as part of an LHMP. The City of Placentia, as an eligible NFIP community addressed their continued compliance with the NFIP throughout the LHMP, including the LHMP Planning Process, Risk Assessment, and Mitigation Strategy Phases. Chapter 5 of this LHMP provides a detailed overview of their NFIP program and also includes mitigation measures in further of their floodplain management program.

High Hazard Potential Dam (HHPD) Program

Dams are an aging infrastructure; the average age of dams in the US is 57 years. High hazard potential is a classification standard for any dam whose failure or mis-operation will cause loss of human life and significant property destruction. Many of these high hazard dams lack regular maintenance and improvements and present an ongoing risk to nearby communities. In response to this issue, the Consolidated Appropriations Act, 2019 passed in February appropriated millions for each of fiscal years 2021 through 2026. The purpose of the HHPD program is to provide assistance for repair, removal or rehabilitation of HHPDs, and may include funding for technical, planning, design, and construction activities. The focus on this new program is to provide funding for those dams that pose an unacceptable risk to the public. In order to be eligible for this grant program, all dam risks must be addressed in both state and local hazard mitigation plans, in addition to other eligibility requirements.

The City of Placentia, the single jurisdiction seeking FEMA approval of the Placentia 2023 LHMP is not a current dam owner and thus is not eligible to participate in this program.

3.2.3. Phase 3: Develop the Mitigation Plan

Planning Steps 6 and 7: Set Goals and Review Possible Activities

Foster Morrison facilitated brainstorming and discussion sessions with the HMPC that described the purpose and process of developing planning goals and objectives and a comprehensive range of mitigation alternatives, as well as a method of selecting and defending recommended mitigation actions using a series of selection criteria. This information is included in Chapter 5 Mitigation Strategy. Additional documentation on the process the HMPC used to develop the goals and mitigation strategy is in Appendix C.

Planning Step 8: Draft an Action Plan

Based on input from the HMPC regarding the draft risk assessment and the goals and activities identified in Planning Steps 6 and 7, a complete first draft of the LHMP was developed. This complete draft was provided for HMPC review and comment via a Dropbox web link. HMPC comments were integrated into the second, public review draft, which was advertised and distributed to collect public input and comments.

The HMPC integrated comments and issues from the public, as appropriate, along with additional internal review comments and produced a third draft for review and approval by CAL OES and FEMA Region IX, contingent upon final adoption by the Placentia City Council.

3.2.4. Phase 4: Implement the Plan and Monitor Progress

Planning Step 9: Adopt the Plan

In order to secure buy-in and officially implement the LHMP, this LHMP was adopted by the Placentia City Council using the sample resolution contained in Appendix D.

Planning Step 10: Implement, Evaluate, and Revise the Plan

The true worth of any mitigation plan is in the effectiveness of its implementation. Up to this point in the planning process, all of the HMPC's efforts have been directed at researching data, coordinating input from participating entities, and developing appropriate mitigation actions. Each recommended action includes key descriptors, such as a lead manager and possible funding sources, to help initiate implementation. An overall implementation strategy is described in Chapter 7 Plan Implementation and Maintenance.

Finally, there are numerous organizations within the Placentia Planning Area whose goals and interests interface with hazard mitigation. Coordination with these other planning efforts, as addressed in Planning Step 3, is paramount to the implementation and ongoing success of this LHMP and hazard mitigation in the City and is addressed further in Chapter 7.

Chapter 4 Risk Assessment

Requirement §201.6(c)(2): [The plan shall include] A risk assessment that provides the factual basis for activities proposed in the strategy to reduce losses from identified hazards. Local risk assessments must provide sufficient information to enable the jurisdiction to identify and prioritize appropriate mitigation actions to reduce losses from identified hazards.

As defined by FEMA, risk is a combination of hazard, vulnerability, and exposure. "It is the impact that a hazard would have on people, services, facilities, and structures in a community and refers to the probability of a hazard event resulting in an adverse condition that causes injury or damage."

The City of Placentia (City) risk assessment process identifies and profiles relevant hazards and assesses the exposure of lives, property, infrastructure, the environment, and the economy to these hazards. The process allows for a better understanding of a jurisdiction's potential risk to hazards and provides a framework for developing and prioritizing mitigation actions to reduce risk from future hazard events.

This risk assessment followed the methodology described in the FEMA publication Understanding Your Risks—Identifying Hazards and Estimating Losses (FEMA 386-2, 2002), which breaks the assessment into a four-step process:

1. Identify hazards
2. Profile hazard events
3. Inventory assets
4. Estimate losses

Data collected through this process has been incorporated into the following sections of this chapter:

- **Section 4.1 Hazard Identification: Natural Hazards** identifies the natural hazards that threaten the City and describes why some hazards have been omitted from further consideration.
- **Section 4.2**. **City of Placentia Assets Inventory and Growth and Development Trends** identifies the populations; structures and values; critical facilities and infrastructure, and community lifelines; cultural, historical, and natural resources; and economic and community activities. A discussion of growth and development trends, including future development also resides in this section. This information is not hazard specific and covers the entire City Planning Area.
- **Section 4.3: Hazard Profiles and Vulnerability Assessment** provides an overview of each hazard, its location and extent, and discusses the risk, vulnerability, and impacts of each natural hazard to the City. The hazard profile also describes previous occurrences of hazard events and the probability of future occurrences. The vulnerability assessment evaluates the City's exposure to natural hazards; considering: populations; structures and values; critical facilities and infrastructure, and community lifelines; natural, historic, and cultural resources; economic assets; community activities; and future development trends, and where possible, estimates potential hazard losses.
- **Section 4.4 Capability Assessment** inventories existing mitigation activities and policies, regulations, plans, and programs that pertain to hazards and mitigation in the City and can affect net vulnerability.

- **Section 4.5 Natural Hazard Summary** summarizes the results of the risk assessment and whether a hazard is considered a priority for mitigation strategy planning.

This risk assessment covers the entire geographical extent of the City of Placentia. Hereinafter in this document, this will be referred to as the City Planning Area.

4.1 Hazard Identification: Natural Hazards

Requirement §201.6(c)(2)(i): [The risk assessment shall include a] description of the type…of all natural hazards that can affect the jurisdiction.

A hazard identification evaluation was conducted to determine the natural hazards that threaten the City of Placentia. This section details the methodology and results of this effort.

Data Sources

The following data sources were used for this Hazard Identification portion of the Plan:

- 2019 City of Placentia Safety Element
- 2021 County of Orange and Orange County Fire Authority Hazard Mitigation Plan
- 2023 (Draft) State Hazard Mitigation Plan
- FEMA Disaster Declaration Database
- HMPC input
- National Oceanic and Atmospheric Administration (NOAA) National Climatic Data Center (NCDC) Storm Events Database

4.1.1. Methodology and Results

Using existing natural hazards data and input gained through the kickoff planning meeting, the HMPC agreed upon a list of natural hazards that could affect the City. Hazards data from the California Office of Emergency Services (Cal OES), FEMA, the National Oceanic and Atmospheric Administration (NOAA), the City's General Plan Safety Element, and many other sources were examined to assess the significance of these hazards to the City. The natural hazards evaluated as part of this Plan include those that have occurred historically and/or have the potential to cause significant human and/or monetary losses in the future. Those hazards identified as a high or medium significance are initially considered priority hazards for mitigation planning. Those hazards that occur infrequently or have little or no impact on the Planning Area were determined to be of low significance and not considered a priority hazard. After a review of the risk assessment, Section 4.5 shows the finalized ranking of priority hazards for mitigation planning purposes. Significance of each identified hazard was measured in general terms and focused on key criteria such as frequency and resulting damage, which includes deaths and injuries, as well as property and economic damage. The ability of a community to reduce losses through implementation of existing and new mitigation measures was also considered as to the significance of a hazard.

The following hazards in Table 4-1, listed alphabetically, were identified and investigated for this LHMP Update.

Table 4-1 Placentia Hazard Identification and Comparison

2019 City of Placentia Safety Element	2021 County of Orange and Orange County Fire Authority Local Hazard Mitigation Plan	2023 California State Hazard Mitigation Plan Applicable Hazards*	Proposed City of Placentia 2023 Hazards*
Climate Change	Climate Change	Climate Change and Related Hazards	Climate Change (as a standalone and as it exacerbates other hazards)
Flood & Dam Inundation	Dam Failure	Dam Failure	Dam Failure
–	Drought	Droughts and Water Shortage	Drought & Water Shortage
Geologic and Seismic Safety Concerns	Earthquake	Earthquake (with Subsidence as a separate hazard)	Earthquake (and earthquake liquefaction)
–	Epidemic	Epidemic/Pandemic/Vector-Borne Disease	–
Flood & Dam Inundation	Flood-Storm	Riverine, Stream, and Alluvial Flood	Flood: 1%/0.2% annual chance
–	Flood-Storm	Riverine, Stream, and Alluvial Flood	Flood: Localized/Stormwater Flooding
Geologic and Seismic Safety Concerns	Landslide	Landslide, Debris Flow, and other Mass Movements	Landslide
Flood & Dam Inundation	–	Levee Failure	Levee Failure
Hazardous Materials	–	Hazardous Materials Release	Haz Mat Transportation Release
Geologic and Seismic Safety Concerns	–	Natural Gas Hazards	Natural Gas Pipeline
Extreme Heat (addressed in Climate Change)	–	Extreme Heat	Severe Weather: Extreme Heat
–	–	Severe Wind, Weather, and Storms	Severe Weather: Heavy Rain and Storms (with thunderstorm winds)
Geologic and Seismic Safety Concerns	–	Subsidence	Subsidence
–	Tsunami	Tsunami and Seiche	–
Urban Fires (with High Winds)	–	Severe Wind, Weather, and Storms	Severe Weather: High Winds (outside of storms)
–	Wildland and Urban Fire	Wildfire	Wildfire and Urban Fire (with smoke/ air quality)

Certain natural (non-man-made) hazards were excluded from consideration for this Plan. They are shown in Table 4-2.

Table 4-2 City of Placentia – Excluded Natural Hazards

Hazard Excluded	Why Excluded
Extreme Cold or Freeze	Extreme cold and freeze in the City is very rare. The HMPC felt this hazard was not a concern to the City.
Sea Level Rise, Coastal Flooding, and Erosion	The City is not on the coast. The HMPC felt this hazard was not of concern to the City.
Snow Avalanches	The City does not have measurable snowfall to have avalanche as a hazard. The HMPC felt this hazard was not of concern to the City.
Tsunami and Seiche	The City is not located on the coast or near any large bodies of water. The HMPC felt this hazard was not of concern to the City.
Volcano	Given the location of active or potentially active volcanoes relative to Placentia, the HMPC felt this hazard was not of concern to the City.
Public Safety Power Shutoff	This is included in multiple hazards and was not considered a stand-alone hazard for this Plan, and was detailed in the Vulnerability section.
Terrorism	This is a natural hazards focused plan, and as such was not included in this Plan.
Air Pollution	This is discussed as part of the wildfire smoke issue and not as a standalone hazard.
Energy Shortage	This is a natural hazards focused plan, and as such was not included in this Plan.
Cyber Threats	This is a natural hazards focused plan, and as such was not included in this Plan.
Tree Mortality	Discussed in the drought, extreme heat, and wildfire sections and not as a standalone hazard.
Invasive and Nuisance Species	The HMPC felt this hazard was not of concern to the City.
Civil Disorder	This is a natural hazards focused plan. The HMPC felt this hazard was not of concern to the City.
Well Stimulation	This is a natural hazards focused plan. The HMPC felt this hazard was not of concern to the City.
Oil Spills	This is a natural hazards focused plan. The HMPC felt this hazard was not of concern to the City.
Electromagnetic Pulse Attack	This is a natural hazards focused plan. The HMPC felt this hazard was not of concern to the City.
Radiological Accidents	This is a natural hazards focused plan. The HMPC felt this hazard was not of concern to the City.
Geomagnetic Storms	This is a natural hazards focused plan. The HMPC felt this hazard was not of concern to the City.

The worksheet below was completed by the City to identify, profile, and rate the significance of identified hazards.

Table 4-3 City of Placentia Initial Hazard Identification

Hazard*	Geographic Extent	Probability of Future Occurrences	Magnitude/ Severity	Significance	Climate Change Influence
Climate Change	Extensive	Highly Likely	Limited	Medium	--
Dam Failure	Significant	Unlikely	Critical	High	Medium
Drought & Water Shortage	Extensive	Highly Likely	Limited	Medium	High
Earthquake, Earthquake Liquefaction, and Earthquake Induced Landslides	Extensive	Likely	Catastrophic	High	Low
Flood: 1%/0.2% annual chance	Significant	Occasional/Unlikely	Limited	Medium	High
Flood: Localized/Stormwater Flooding	Extensive	Highly Likely	Limited	Medium	Medium
Haz Mat Transportation Release	Significant	Unlikely	Critical	Medium	Low
Landslide	Limited	Likely	Limited	Low	Medium
Levee Failure	Significant	Unlikely	Critical	Medium	Medium
Natural Gas Pipeline	Significant	Unlikely	Critical	High	Low
Pandemic	Extensive	Likely	Critical	Medium	Low
Severe Weather: Extreme Heat	Extensive	Highly Likely	Limited	Medium	High
Severe Weather: Heavy Rain and Storms (with thunderstorm winds)	Extensive	Highly Likely	Limited	Medium	High
Severe Weather: High Winds and Tornado	Extensive	Highly Likely	Limited	Medium	Medium
Subsidence	Limited	Unlikely	Limited	Low	Low
Urban Fire	Limited	Highly Likely	Limited	High	Low
Wildfire (with smoke/ air quality)	Limited/Ext	Highly Likely	Limited	Low	High

Geographic Extent
Limited: Less than 10% of planning area
Significant: 10-50% of planning area
Extensive: 50-100% of planning area

Probability of Future Occurrences
Highly Likely: Near 100% chance of occurrence in next year, or happens every year.
Likely: Between 10 and 100% chance of occurrence in next year, or has a recurrence interval of 10 years or less.
Occasional: Between 1 and 10% chance of occurrence in the next year, or has a recurrence interval of 11 to 100 years.
Unlikely: Less than 1% chance of occurrence in next 100 years, or has a recurrence interval of greater than every 100 years.

Magnitude/Severity
Catastrophic: More than 50 percent of property severely damaged; shutdown of facilities for more than 30 days; and/or multiple deaths
Critical: 25-50 percent of property severely damaged; shutdown of facilities for at least two weeks; and/or injuries and/or illnesses result in permanent disability
Limited: 10-25 percent of property severely damaged; shutdown of facilities for more than a week; and/or injuries/illnesses treatable do not result in permanent disability
Negligible: Less than 10 percent of property severely damaged, shutdown of facilities and services for less than 24 hours; and/or injuries/illnesses treatable with first aid

Significance
Low: minimal potential impact
Medium: moderate potential impact
High: widespread potential impact

Climate Change Influence
Low: minimal potential impact
Medium: moderate potential impact
High: widespread potential impact

Source: City of Placentia

4.1.2. Disaster Declaration History

One method to identify hazards based upon past occurrences is to look at what events triggered federal and/or state disaster declarations within the City or the County in which the City is located (as disaster declarations are generally declared on a county basis). Disaster declarations are granted when the severity and magnitude of the event's impact surpass the ability of the local government to respond and recover. Disaster assistance is supplemental and sequential. When the local government's capacity has been surpassed, a state disaster declaration may be issued, following the local agency's declaration, allowing for the provision of state assistance. Should the disaster be so severe that both the local and state government's capacity is exceeded, a federal disaster declaration may be issued allowing for the provision of federal disaster assistance.

The federal government may issue a disaster declaration through FEMA, the U.S. Department of Agriculture (USDA), and/or the Small Business Administration (SBA). FEMA also issues emergency declarations, which are more limited in scope and without the long-term federal recovery programs of major disaster declarations. The quantity and types of damage are the determining factors. This section focuses on state and federal disaster and emergency declarations.

Orange County has experienced 44 federal and 41 state declarations since 1950. 19 of the federal declarations were associated with flood events (including heavy rain and storms), 18 from wildfire, 2 from earthquake, 2 from pandemic, 1 for hurricane (for evacuations stemming from Hurricane Katrina in 2005), 1 from landslide, and 1 from post-fire mud and landslides. Regarding state disaster declarations, 21 of the state declarations were associated with flood (including heavy rain and storms), 6 were from wildfire, 3 were agricultural, 3 were economic, 2 were from earthquake, 2 were associated with pandemic, 1 from drought, 1 from high tide, 1 from landslide, and 1 from post-fire mud and landslides. Details of each federal and state disaster declaration are detailed in Table 4-4. A summary of federal and state disaster declarations for Orange County where the City of Placentia is located is shown in Table 4-5.

Table 4-4 Orange County Disaster Declarations 1950-2023

Year	Disaster Name	Disaster Type	Disaster Cause	Disaster #	State Declaration	Federal Declaration
2023	California Severe Winter Storms, Flooding, Landslides, and Mudslides	Flood	Storms	EM-3592	–	3/10/2023
2023	California Severe Winter Storms, Flooding, and Mudslides	Flood	Storms	EM-3591	–	1/9/2023
2022	California Coastal Fire	Fire	Fire	FM-5439	–	5/12/2022
2022	December 2021 Storms	Flood	Storms	2022-03	12/31/2021	–

Year	Disaster Name	Disaster Type	Disaster Cause	Disaster #	State Declaration	Federal Declaration
2020	California Bond Fire	Fire	Fire	FM-5383	–	12/3/2020
2020	California Blue Ridge Fire	Fire	Fire	FM-5380	–	10/26/2020
2020	Covid-19	Pandemic	Pandemic	DR-4482	3/4/2020	1/20/2020
2020	Covid-19	Pandemic	Pandemic	EM-3428	3/4/2020	3/13/2020
2017	California Wildfires	Fire	Fire	DR-4344	10/9/2017	10/10/2017
2017	Canyon 2 Fire	Fire	Fire	FM-5223	–	10/9/2017
2017	Canyon Fire	Fire	Fire	FM-5213	–	9/26/2017
2017	California Severe Winter Storms, Flooding, and Mudslides	Flood	Storms	DR-4305	2/10/2017	3/16/2017
2014	California Drought	Drought	Drought	GP 2014-13	1/17/2014	–
2011	California Winter Storms, Flooding, and Debris and Mud Flows	Flood	Storms	DR-1952	12/21/2010, 12/23/2010, 12/24/2010, 12/30/2010	1/26/2011
2009	49er Fire	Fire	Fire	FM-2832	–	8/31/2009
2008	California Wildfires	Fire	Fire	DR-1810	–	11/18/2008
2008	Freeway Complex Fire	Fire	Fire	FM-2792	–	11/15/2008
2007	California Wildfires	Fire	Fire	DR-1731	–	10/24/2007
2007	California Wildfires	Fire	Fire	EM-3279	–	10/23/2007
2007	Santiago Fire	Fire	Fire	FM-2737	–	10/22/2007
2007	241 Fire	Fire	Fire	FM-2683	–	3/11/2007
2006	Sierra Fire	Fire	Fire	FM-2630	–	2/6/2006
2005	Hurricane Katrina Evacuations	Economic	Hurricane	EM-3248 2005	–	9/13/2005
2005	California Severe Storms, Flooding, Landslides, and Mud and Debris Flows	Flood	Storms	DR-1585	3/16/2005	4/14/2005

Year	Disaster Name	Disaster Type	Disaster Cause	Disaster #	State Declaration	Federal Declaration
2005	California Severe Storms, Flooding, Debris Flows, and Mudslides	Flood	Storms	DR-1577	1/12/2005	2/4/2005
2003	Exotic Newcastle Disease Epidemic	Agricultural	Disease	GP 2003	1/3/2003	–
2002	Antonio Fire	Fire	Fire	FSA-2405	–	5/14/2002
2001	Energy Emergency	Economic	Greed	GP-2001	1/1/2001	–
1998	1998 El Nino Floods	Flood	Storms	DR-1203	Proclaimed	2/19/1998
1997	Floods (Orange)	Flood	Storms	97-04	12/10/1997	–
1996	California Severe Fires	Fire	Fire	EM-3120	–	10/23/1996
1996	1996 Severe Fires	Fire	Fire	96-04	10/22/1996	–
1995	1995 Severe Winter Storms	Flood	Storms	DR-1046	1/6/95-3/14/95	3/12/1995
1995	1995 Severe Winter Storms	Flood	Storms	DR-1044	1/6/95-3/14/95	1/13/1995
1994	Northridge Earthquake	Earthquake	Earthquake	DR-1008	1/17/1994	1/17/1994
1993	California Fires, Mud & Landslides, Soil Erosion, Flooding	Post Fire Mud & Landslides, Soil Erosion, Flooding	Fires and Storms	DR-1005	10/27/93, 10/28/93	10/28/1993
1993	California Severe Storm, Winter Storm, Mud & Landslides, Flooding	Flood	Storms	DR-979	1/7/93 - 2/19/93	2/3/1993
1992	California Snow Storm, Heavy Rain, High Winds, Flooding, Mudslide	Flood	Storms	DR-935	2/12/92, 2/19/92	2/25/1992
1989	Mediterranean Fruit Fly	Agricultural	Insect Pest	GP 1989	11/20/1989	–

Year	Disaster Name	Disaster Type	Disaster Cause	Disaster #	State Declaration	Federal Declaration
1988	California Severe Storms, High Tides, Flooding	Flood	Storms	DR-812	1/21/1988	2/5/1988
1987	California Earthquake and Aftershocks	Earthquake	Earthquake	DR-799	10/2/87 - 10/5/87	10/7/1987
1982	Winter Storms	Flood	Flood	DR-677	12/8/82-3/21/83	2/9/1983
1982	Dayton Hills Fire	Fire	Fire	GP	10/10/1982	–
1982	California Urban Fires	Fire	Fire	DR-657	4/21/1982	4/24/1982
1980	California Burs, Timber Fires	Fire	Fire	DR-635	11/18/1980, 11/25/80	11/27/1980
1980	California Severe Storms, Mudslides, Flooding	Flood	Storms	DR-615	2/21/80, 2/7/80, 2/19/80	2/21/1980
1979	Gasoline Shortage	Economic	OPEC	–	5/8/79 - 11/13/79	–
1978	California Landslides	Landslides	Storms	DR-566	10/5/1978	10/9/1978
1978	California Coastal Storms, Mudslides, and Flooding	Flood	Storms	DR-547	3/9/78, 2/27,78, 2/13/78	2/15/1978
1974	Gasoline Shortage	Economic	OPEC	–	2/28/74, 3/4/74, 3/10/74	–
1972	Exotic Newcastle Disease	Agricultural	Disease	–	4/10/72, 5/22/72	–
1969	1969 Storms	Flood	Storms	DR-253	1/23/69-3/12/69	1/26/1969
1967	Woodson Fire	Fire	Fire	–	1/7/1967	–
1963	High Tides and Heavy Surf	Flood	High Tides	–	Unknown	–
1958	1958 April Storms and Floods	Flood	Storms	DR-82	4/5/1958	4/4/1958

Year	Disaster Name	Disaster Type	Disaster Cause	Disaster #	State Declaration	Federal Declaration
1958	1958 February Storms and Floods	Flood	Storms	CDO 58-03	2/26/1958	–
1955	1955 Floods	Flood	Flood	DR-47	12/22/1955	12/23/1955
1950	1950 Floods	Flood	Flood	OCD 50-01	11/21/1950	–

Source: Cal OES, FEMA

Table 4-5 Orange County Disaster Declarations 1950-2023 Summarized by Disaster Type

Disaster Type	State Declarations		Federal Declarations	
	Count	Years	Count	Years
Agricultural	3	1972, 1989, 2003	0	–
Drought	1	2014	0	–
Earthquake	2	1987, 1994	2	1987, 1994
Economic	3	1974, 1979, 2001	0	–
Fire	6	1967, 1980, 1982 (twice), 1996, 2017	18	1980, 1982, 1996, 2002, 2006, 2007 (four times), 2008 (twice), 2009, 2017 (three times), 2020 (twice), 2022
Flood (with heavy rain and storms)	21	1950, 1955, 1958 (twice), 1969, 1978, 1980, 1982, 1988, 1992, 1993, 1995 (twice), 1997, 1998, 2005 (twice), 2011, 2017, 2021, 2022	19	1955, 1958, 1969, 1978, 1980, 1982, 1983, 1988, 1992, 1993, 1995 (twice), 1998, 2005 (twice), 2011, 2017, 2023 (twice)
High Tides	1	1963	0	
Hurricane	0	–	1	2005
Landslide	1	1978	1	1978
Pandemic	2	2020	2	2020
Post Fire Mud & Landslides, Soil Erosion, Flooding	1	1993	1	1993
Totals	**41**	–	**44**	**–**

Source: Cal OES, FEMA

4.2 City of Placentia Assets Inventory and Growth and Development Trends

Section 4.2 provides an inventory of Citywide assets comprising the City's existing built environment and a discussion of growth and development trends in the City, including areas targeted for future development. With the exception of the discussion on the FEMA National Risk Index that provides a linkage between social vulnerability and the adverse impacts of natural hazards (within the people and populations discussion), this information is not hazard specific and covers the entire City Planning Area.

This section is broken into two parts:

- **Asset Inventory** – The assets inventory identifies the City's total assets, including the people and populations: structures; critical facilities and infrastructure, and community lifelines; natural, historic, and cultural resources; and economic assets and community activities of value. This data is not hazard specific, but is representative of total assets within the City, potentially at risk to identified hazards as discussed in Section 4.3 Hazard Profiles and Vulnerability Assessment.
- **Growth and Development Trends** – A discussion of growth and development trends in the City, both current and future, is presented.

A variety of data was used to define a baseline against which all hazard impacts could be evaluated.

Data Sources

- 2019 City of Placentia General Plan
- 2021-2029 City of Placentia Housing Element
- CalAtlas
- California Department of Finance
- California Department of Fish and Wildlife
- California Department of Parks and Recreation Office of Historic Preservation
- California Natural Diversity Database
- City of Placentia GIS
- Orange County Assessor Data
- Hazus MH 6.0
- State of California Department of Conservation
- US Census Bureau

4.2.1. Asset Inventory

If a catastrophic disaster were to occur in the City, this section describes populations, structures, critical facilities and infrastructure, and other key City assets and resources at risk that comprise the City's existing built environment. Assets inventoried in this baseline assessment include:

- People and Populations
- Structures
- Critical Facilities and Infrastructure, and Community Lifelines
- Natural, Historic, and Cultural Resources
- Economic Assets and Community Activities of Value

People and Populations

The most important asset within any community are the people and populations that reside in the community. This section includes an inventory of past and current populations of the City and also discusses socially vulnerable populations and underserved communities as a subsection of people and populations located within the City and potentially at risk to hazards.

Past and Current Populations

As discussed in Chapter 1 of this LHMP, the estimated population of the City on January 1, 2022, was 51,204, representing an almost forty-fold increase from 1,472 people in 1940. Table 4-6 illustrates the pace of population growth in Placentia dating back to 1940. Large periods of growth in the City occurred from the 60s to the 80s. Growth in the City has slowed down since the 1990's as the City has approached build out.

Table 4-6 City of Placentia - Population Growth 1940-2023

Year	Population	Percent Increase
1940	1,472	–
1950	1,682	14.3%
1960	5,864	248.5%
1970	21,948	274.5%
1980	35,041	59.7%
1990	41,259	17.7%
2000	46,488	12.7%
2010	50,533	8.7%
2020	51,824	7.0%
2022	52,507	1.3%

Sources: California Department of Finance, US Census Bureau

Socially Vulnerable Populations and Underserved Communities

The City is a very socially and economically diverse community, and many residents that are socially or economically disadvantaged or vulnerable due to varying reasons reside within the City. The City and surrounding Orange County are no strangers to large natural disasters which have had a direct impact on the populations of the area. Thus, it is important to consider the potential effects of hazard events and disasters on these more vulnerable populations. Socially vulnerable and disadvantaged communities in the City are discussed by the following sources:

- CDC Social Vulnerability Index
- CA DWR Disadvantaged Community Mapping
- HMPC Input
- FEMA National Risk Index

CDC Social Vulnerability Index

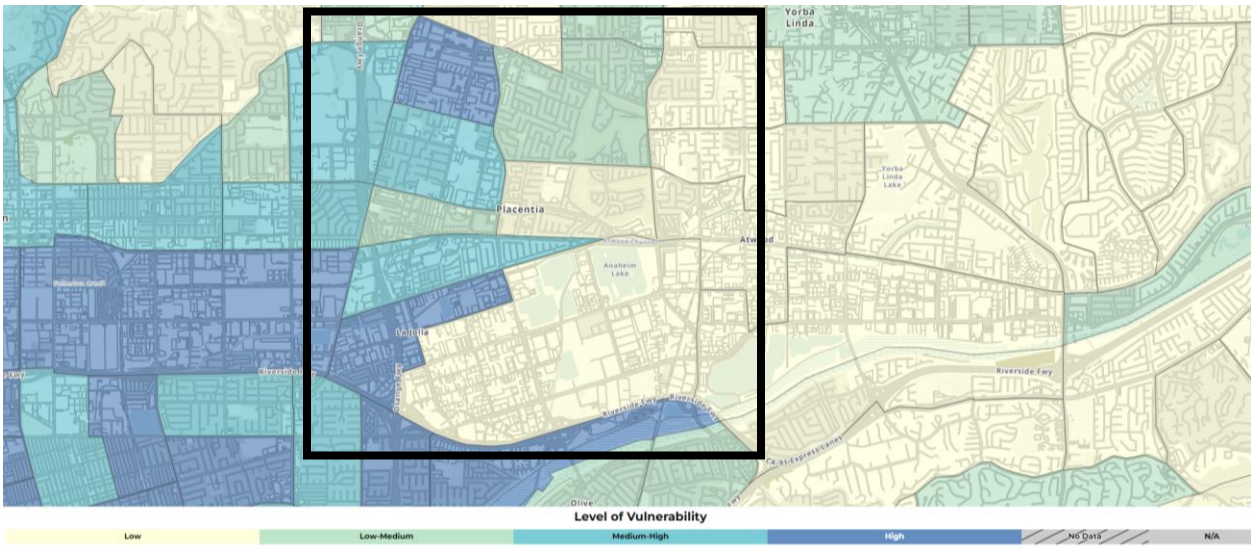
Every community must prepare for and respond to a hazard event, including the range of natural hazards addressed in this Plan from severe weather extremes to large potentially catastrophic events such as wildfires or earthquakes. A number of factors, including poverty, lack of access to transportation, and crowded housing may weaken a community's ability to prevent human suffering and financial loss in a disaster. These factors are known as social vulnerability.

Social vulnerability refers to the potential negative effects on communities caused by external stresses on human health. Such stresses include natural or human-caused disasters, or disease outbreaks. Reducing social vulnerability can decrease both human suffering and economic loss. The Agency for Toxic Substances and Disease Registry (ATSDR) Geospatial Research, Analysis & Services Program (GRASP) created databases to help emergency response planners and public health officials identify and map communities that will most likely need support before, during, and after a hazardous event. The CDC used these databases to create the CDC Social Vulnerability Index (CDC SVI), which uses 15 U.S. census variables to help local officials identify communities that may need additional support before, during, or after disasters.

CDC SVI uses U.S. Census data to determine the social vulnerability of every census tract. Census tracts are subdivisions of counties for which the Census collects statistical data. The CDC SVI ranks each tract on 15 social factors, including poverty, lack of vehicle access, and crowded housing, and groups them into four related themes. Each tract receives a separate ranking for each of the four themes, as well as an overall ranking. Maps of the four themes for the City of Placentia are shown in the figures below.

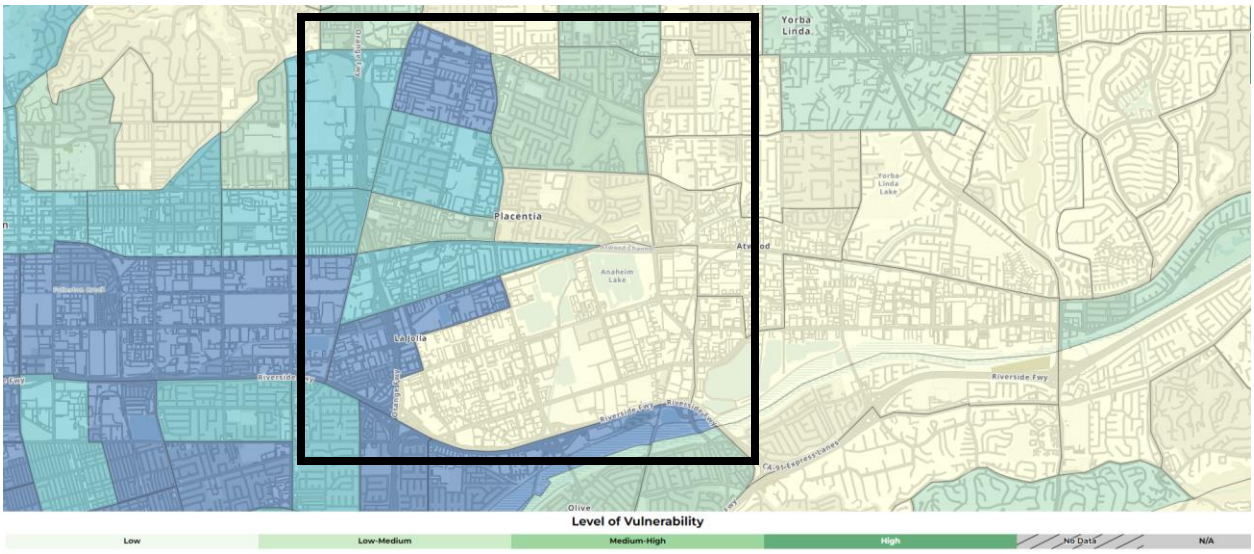
The overall SVI map is shown in Figure 4-1; the socioeconomic SVI for the census tracts in and around the City are shown in Figure 4-2; the household composition SVI is shown in Figure 4-3; the minority and language SVI is shown in Figure 4-4; and the housing and transportation SVI is shown in Figure 4-5. Overall, the maps indicate that, in general, social vulnerability is higher in the western portions of the City.

Figure 4-1 City of Placentia – Overall Social Vulnerability



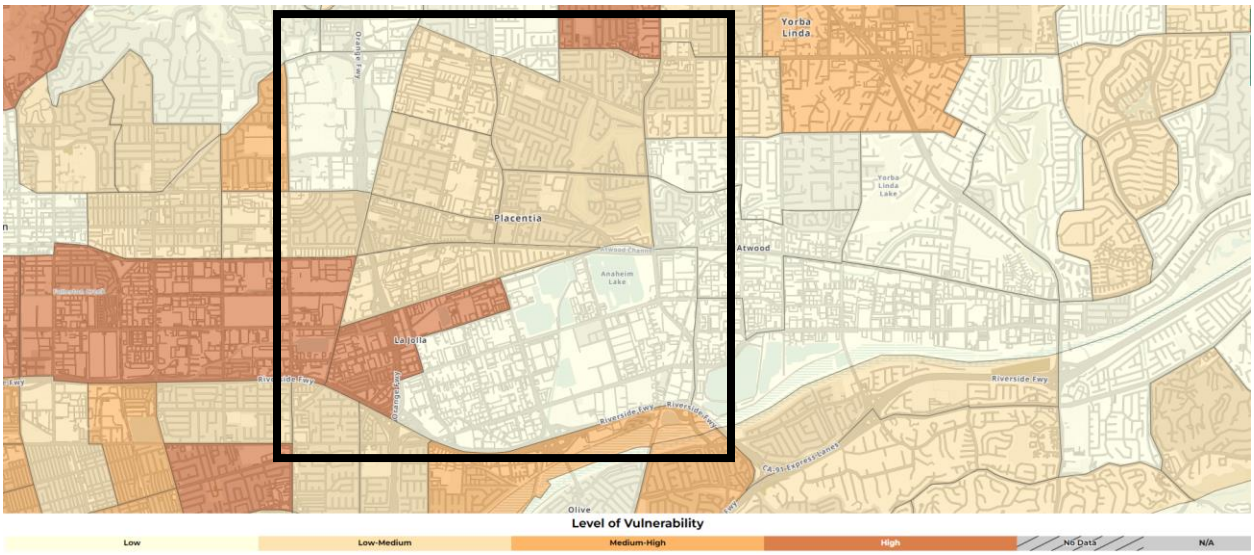
Source: CDC Social Vulnerability Index – map retrieved 03/03/2023
Level of Vulnerability Rating: **Yellow** – Low; **Green** – Low/Medium; **Aqua** – Medium/High; **Blue** – High; **Grey Hatched** – No Data; **Grey** – Not Available

Figure 4-2 City of Placentia – Socioeconomic Status Vulnerability



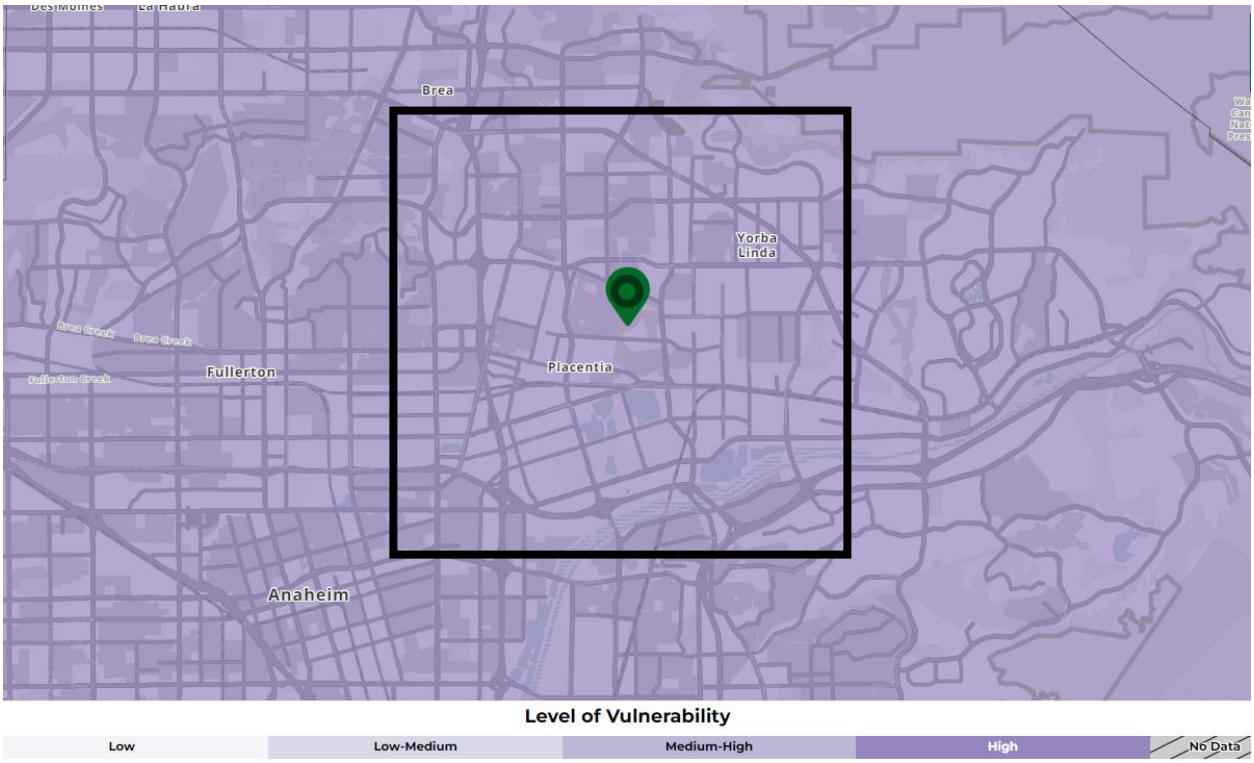
Source: CDC Social Vulnerability Index – map retrieved 03/03/2023
Level of Vulnerability Rating: **Yellow** – Low; **Light Green** – Low/Medium; **Green** – Medium/High; **Dark Green** – High; **Grey Hatched** – No Data; **Grey** – Not Available

Figure 4-3 City of Placentia – Household Composition and Disabilities Social Vulnerability



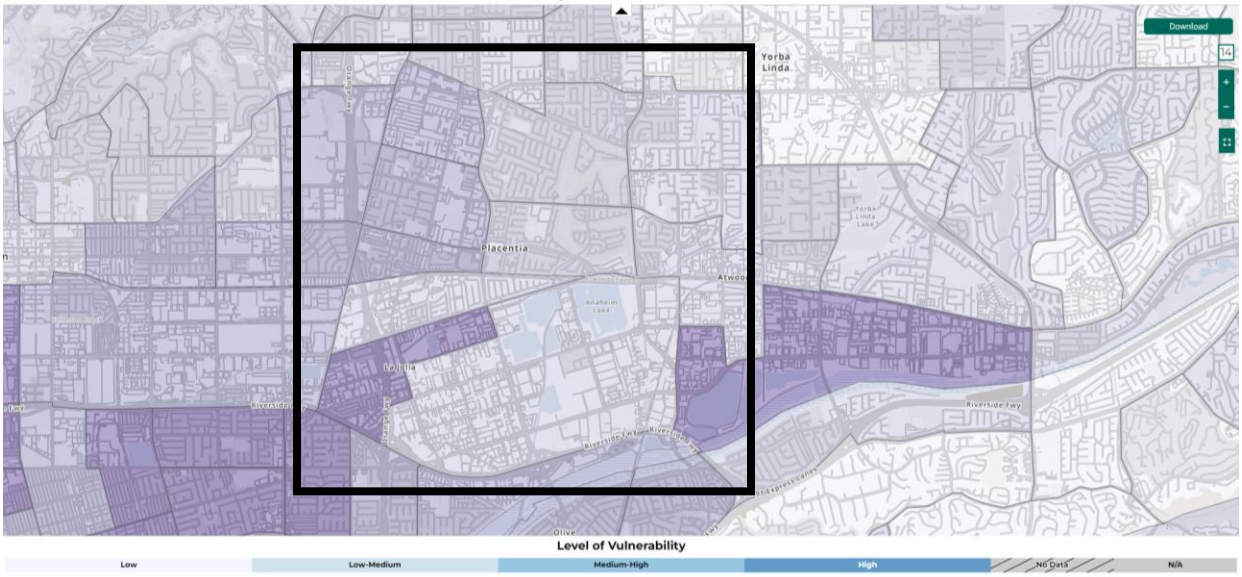
Source: CDC Social Vulnerability Index – map retrieved 03/03/2023
Level of Vulnerability Rating: **Yellow** – Low; **Light Orange**– Low/Medium; **Orange** – Medium/High; **Dark Orange** – High; **Grey Hatched** – No Data; **Grey** – Not Available

Figure 4-4 City of Placentia – Minority/Language Social Vulnerability



Source: CDC Social Vulnerability Index – map retrieved 09/15/2023
Level of Vulnerability Rating: **Yellow** – Low; **Light Purple** – Low/Medium; **Purple** – Medium/High; **Dark Purple** – High; **Grey Hatched** – No Data; **Grey** – Not Available

Figure 4-5 City of Placentia – Housing/Transportation Social Vulnerability



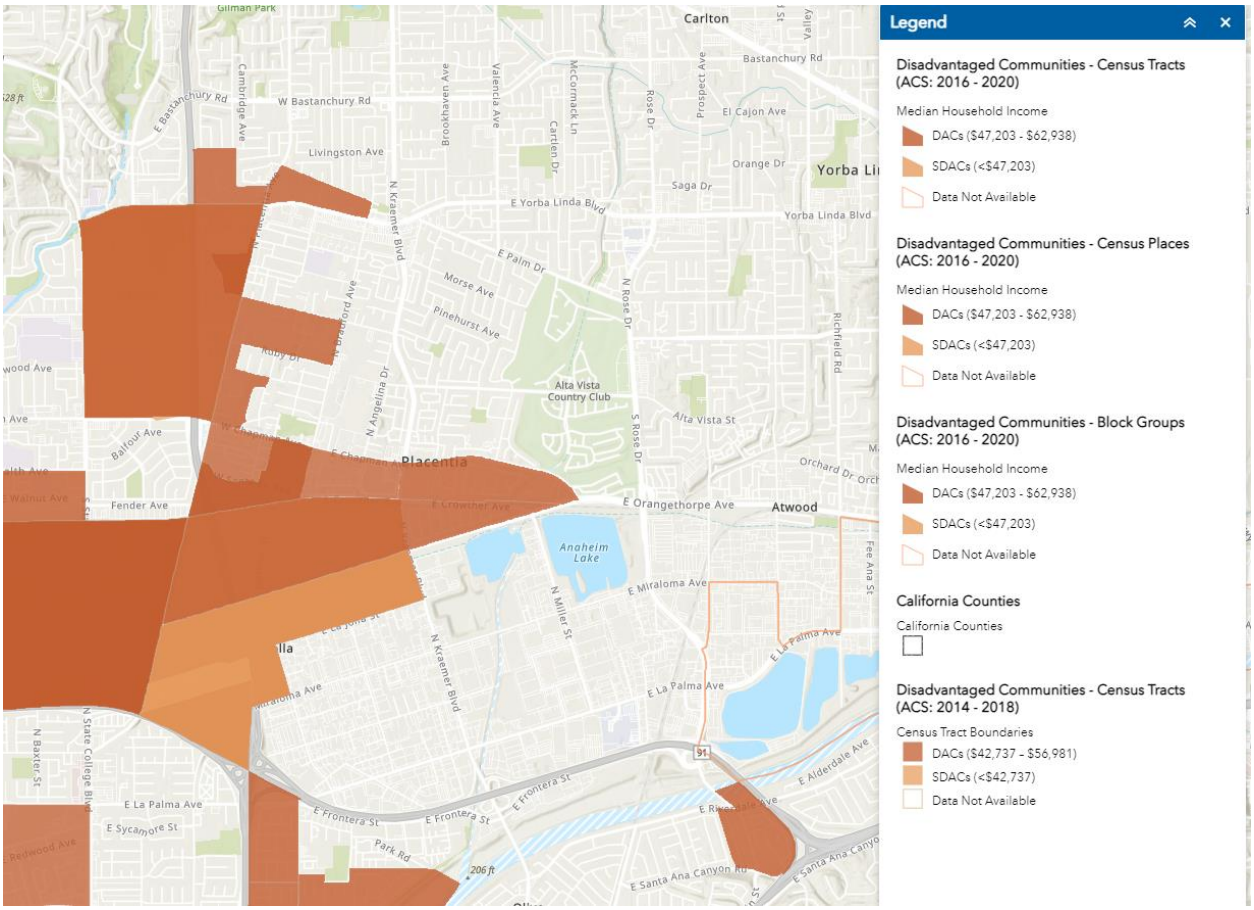
Source: CDC Social Vulnerability Index – map retrieved 03/03/2023
Level of Vulnerability Rating: **Faint Purple** – Low; **Light Purple** – Low/Medium; **Blue** – Medium/High; **Dark Blue** – High; **Grey Hatched** – No Data; **Grey** – Not Available

CA DWR Disadvantaged Community Mapping

CA DWR has developed a web-based application to assist local agencies and other interested parties in evaluating disadvantaged community (DAC) status throughout the State, using the definition provided by Proposition 84 Integrated Regional Water Management (IRWM) Guidelines (2016). A statewide Census Tract GIS Tiger file is used to determine if a census tract is DAC or not by adding American Community Survey Median Household Income data at the census tract level. Only those census geographies that meet the DAC definition are shown on the map (i.e., only those with an annual median household income (MHI) that is less than 80 percent of the Statewide annual MHI (PRC Section 75005(g)). In addition, those census geographies having an annual MHI that is less than 60 percent of the Statewide annual MHI are shown as "Severely Disadvantaged Communities" (SDAC).

The DAC Mapping Tool is an interactive map application that allows users to overlay the following three US Census geographies as separate data layers: Census Place, Census Tract, and Census Block Group. The DAC map for the City is shown in Figure 4-6. In general, the map shows the western portion of the City has a larger portion of disadvantaged communities.

Figure 4-6 City of Placentia– Disadvantaged Communities



Source: CA DWR – map retrieved 03/03/2023

HMPC Input

The primary language in the City is English; however, there is a large representation of the Spanish as well as Asian and Pacific Island speaking communities within the City. Members of the HMPC noted the following with respect vulnerable populations and disadvantaged communities:

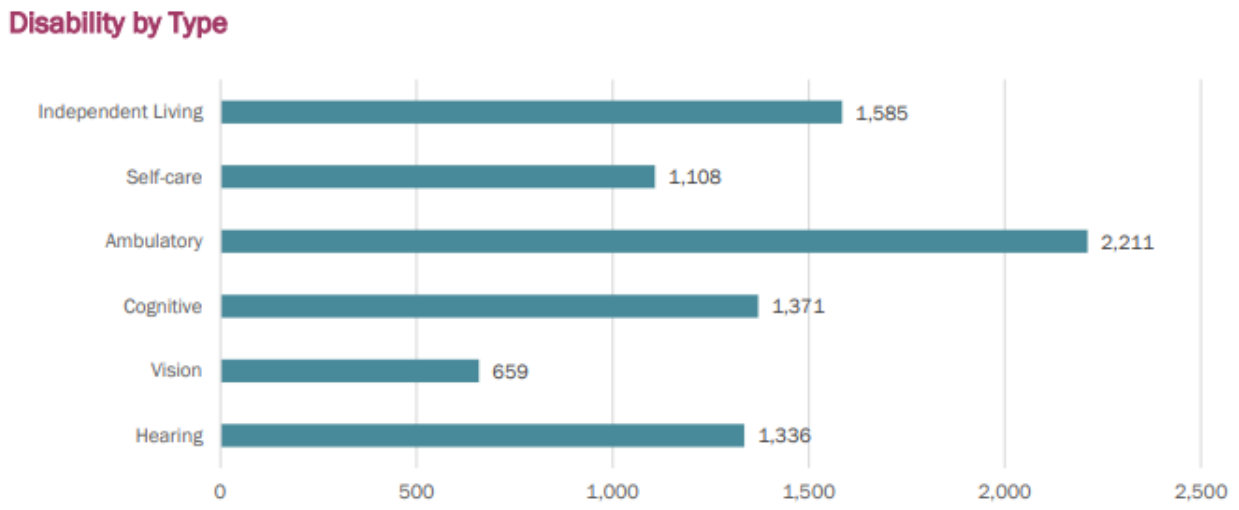
- The La Jolla neighborhood and Old Town Placentia area are designated disadvantaged communities.
- The City does not have encampments for the unsheltered, but there is still an unsheltered population.
- There is also a migrant population living and working in the City.

Additionally, members of the HMPC provided the following data regarding disability statistics. In the City, the US Census Bureau noted that:

- People aged 65+: 13.7%
- People with disabilities who are under 65: 5.1%

The City has multiple types of residents who have a disability. These are shown on Figure 4-7, Figure 4-8, and Figure 4-9.

Figure 4-7 City of Placentia – Disability by Type (all)

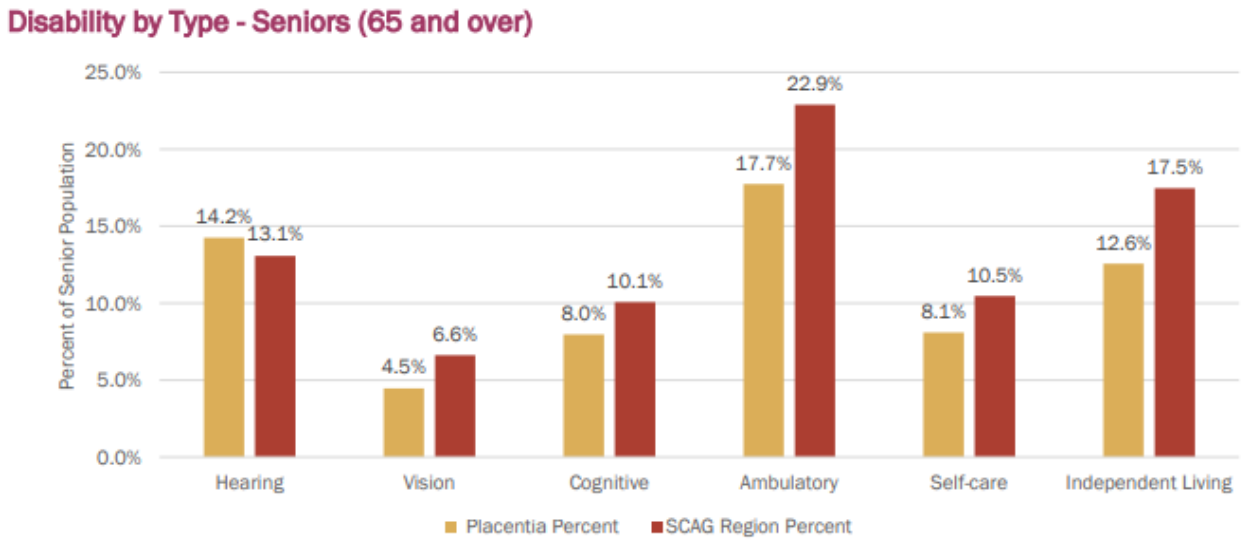


American Community Survey 2014-2018 5-year estimates.

Disability data also provides valuable context for assessing current and future need for accessible housing units. Note that since some disability types are not recorded for children below a certain age, calculating disability as a percentage of total population may not be accurate.

Source: US Census Bureau 2014-2018 American Community Survey

Figure 4-8 City of Placentia – Disability by Type (over 65)



American Community Survey 2014-2018 5-year estimates.

In Placentia, the most commonly occuring disability amongst seniors 65 and older was an ambulatory disability, experienced by 17.7% of Placentia's seniors (and 22.9% of seniors in the SCAG region).

Source: US Census Bureau 2014-2018 American Community Survey

Figure 4-9 City of Placentia – Developmental Disabilities by Residence and Age

Developmental Disabilities

		Placentia
By Residence:	Home of Parent/Family/Guardian	349
	Independent/Supported Living	5
	Community Care Facility	5
	Intermediate Care Facility	17
	Foster/Family Home	11
	Other	5
By Age:	0 - 17 Years	392
	18+ Years	224
TOTAL		1008

CA DDS consumer count by CA ZIP, age group and residence type for the end of June 2019. Data available in 161/197 SCAG jurisdictions.

The California Department of Developmental Services also provides data on developmental disabilities by age and type of residence. These data are collected at the ZIP-code level and were joined to the jurisdiction-level by SCAG. Totals may not match as counts below 11 individuals are unavailable and some entries were not matched to a ZIP code necessitating approximation.

Source: City of Placentia (from SCAG.org)

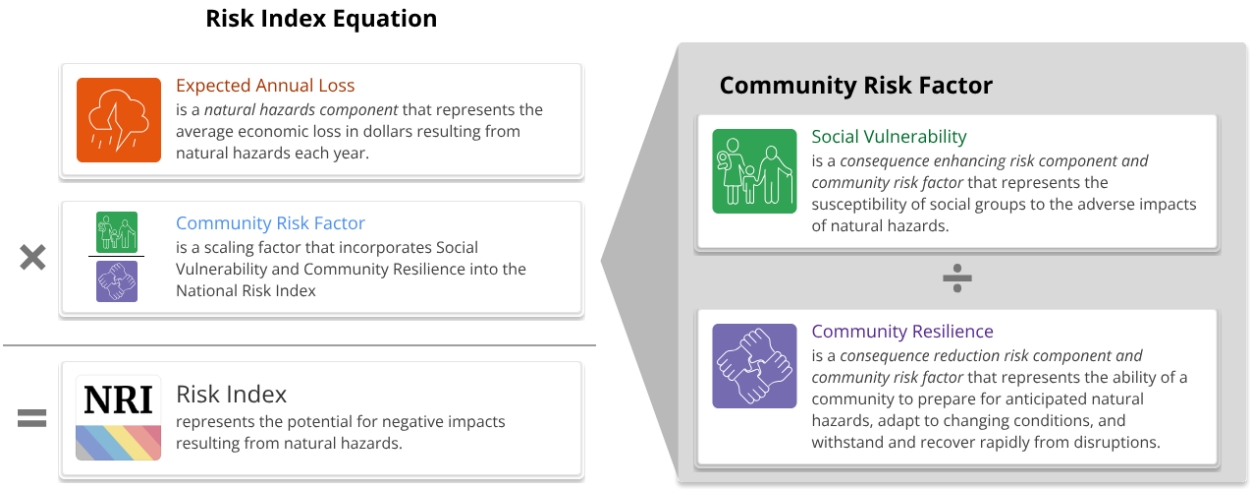
FEMA National Risk Index

Beginning in 2016, FEMA's Natural Hazards Risk Assessment Program (NHRAP) started work on the National Risk Index by adopting an established vision for a multi-hazard view of risk that combines the likelihood and consequence of natural hazards with social factors and resilience capabilities. The goal was to take a broad, holistic view and create a nationwide baseline of natural hazard risk.

A community's susceptibility to natural hazards varies from location to location. The National Risk Index is a dataset and online tool to help illustrate the United States communities most at risk for 18 natural hazards. It was designed and built by FEMA in close collaboration with various stakeholders and partners in academia; local, state and federal government; and private industry. In the National Risk Index, risk is defined as the potential for negative impacts as a result of a natural hazard.

The risk equation behind the Risk Index includes three components (see Figure 4-10): a natural hazards component (Expected Annual Loss), a consequence enhancing component (Social Vulnerability), and a consequence reduction component (Community Resilience).

Figure 4-10 National Risk Index Equation



Source: FEMA National Risk Index

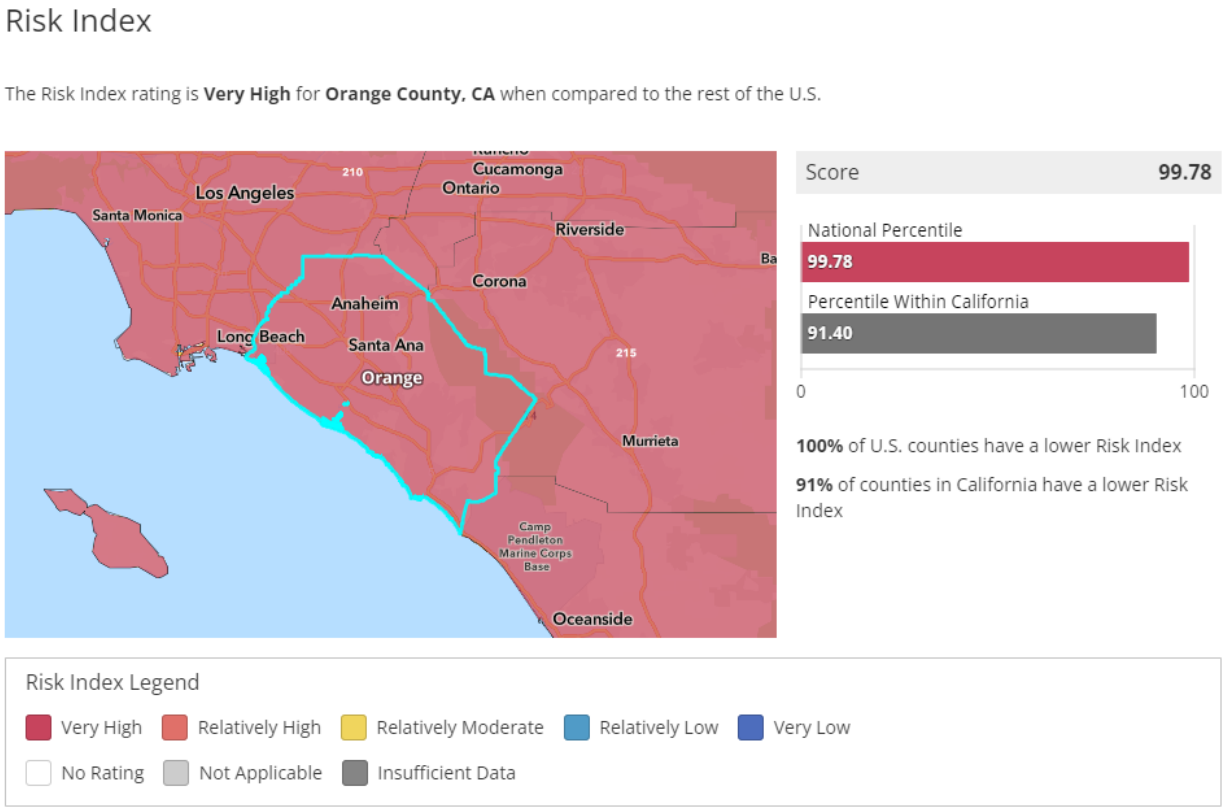
Using these three components, composite Risk Index values and hazard type Risk Index values are calculated for each community (county and Census tract) included in the Index. Risk Index values form an absolute basis for measuring Risk within the National Risk Index, and they are used to generate Risk Index percentiles and ratings across communities.

While not specific to the City of Placentia, data from the National Risk Index for the larger Orange County is seen below. Figure 4-11 shows a summary map and score for the County. As shown, Orange County's Risk Index rating is Very High. Figure 4-12 shows the expected annual loss map and score. As shown, Orange County's expected annual loss rating is Very High. Figure 4-13 shows the social vulnerability map and score. As shown, Orange County has a relatively moderate social vulnerability. Figure 4-14 shows the community resilience map and score. As shown, communities in Orange County (including the City of

Placentia) have a very low ability to prepare for anticipated natural hazards, adapt to changing conditions, and withstand and recover rapidly from disruptions.

The Orange County FEMA National Risk Index Report is included in its entirety in Appendix G.

Figure 4-11 FEMA National Risk Index – Summary Map and Score for Orange County

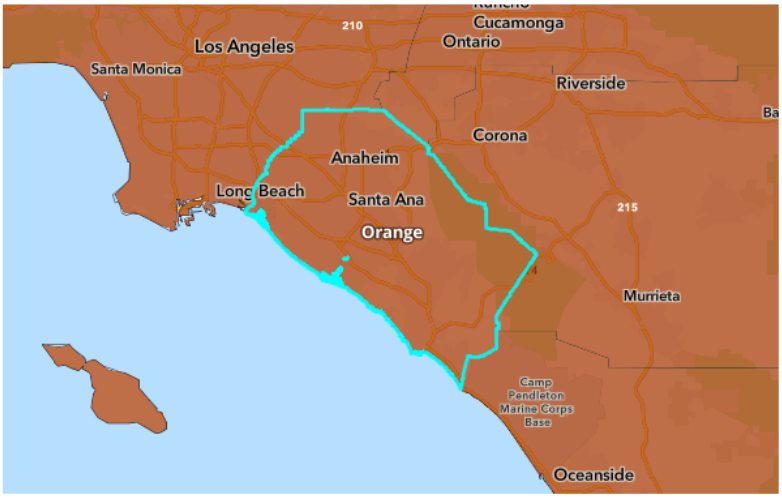


Source: FEMA National Risk Index, retrieved 9/8/2023.

Figure 4-12 FEMA National Risk Index – Expected Annual Loss Map and Score for Orange County

Expected Annual Loss

In **Orange County, CA**, expected loss each year due to natural hazards is **Very High** when compared to the rest of the U.S.



Score	99.81

National Percentile
99.81
Percentile Within California
91.40
0 100

100% of U.S. counties have a lower Expected Annual Loss

91% of counties in California have a lower Expected Annual Loss

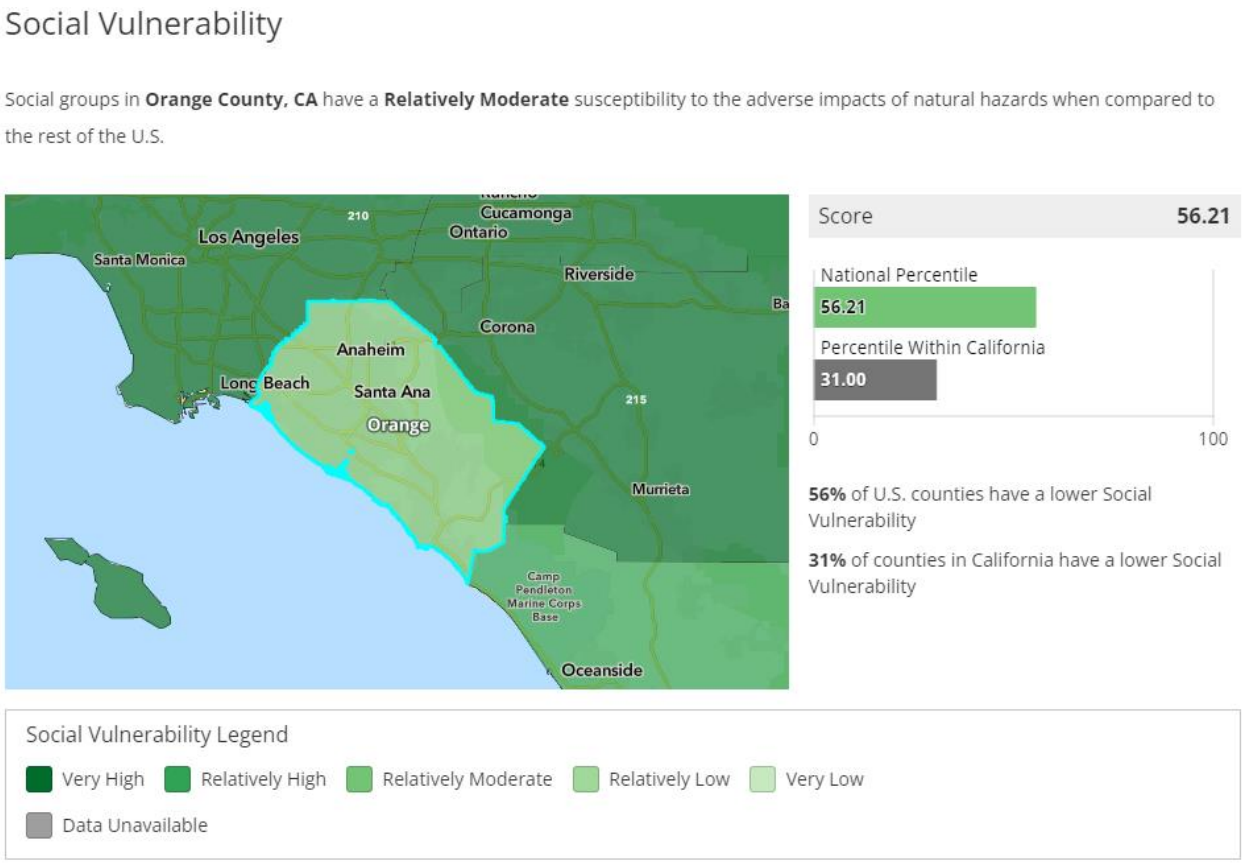
Expected Annual Loss Legend

Very High | Relatively High | Relatively Moderate | Relatively Low | Very Low
No Expected Annual Losses | Not Applicable | Insufficient Data

Composite Expected Annual Loss	**$989,276,586.32**
Composite Expected Annual Loss Rate National Percentile	**76.8**

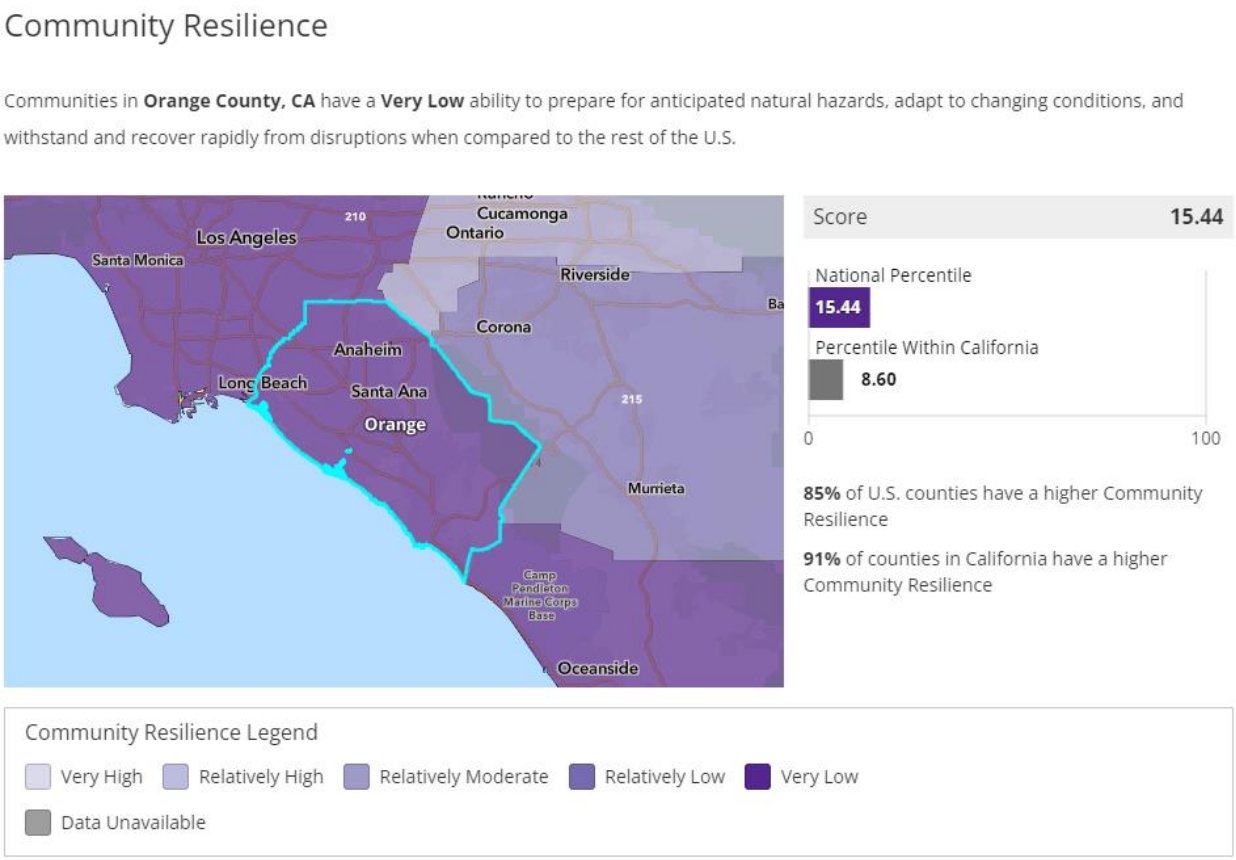
Building EAL	**$732,036,877.76**	Population EAL	**22.16** fatalities
Building EAL Rate	**$1 per $737.93 of building value**	Population EAL Rate	**1 per 143.65K people**
Agriculture EAL	**$151,844.48**	Population Equivalence EAL	**$257,087,864.08**
Agriculture EAL Rate	**$1 per $623.23 of agriculture value**		

Figure 4-13 FEMA National Risk Index – Social Vulnerability Map and Score for Orange County



Source: FEMA National Risk Index, retrieved 9/8/2023.

Figure 4-14 FEMA National Risk Index – Community Resilience Map and Score for Orange County



Source: FEMA National Risk Index, retrieved 9/8/2023.

Structures

Structures for this section include buildings used for a variety of purposes and reflect the City's existing built environment. Depending on the nature and extent of a hazard event or disaster, all structures may be exposed to some level of risk, where certain buildings or concentrations of buildings are more vulnerable. This section captures the structures, and associated land and contents values, that comprise the City's existing built environment.

Parcel and Structure Inventory and Assessed Values

An inventory of structures located within the City was developed utilizing the City's parcel inventory combined with assessed values of land and structures within the City of Placentia. The City GIS parcel layer and Orange County 2022 Assessor data obtained from the City was used for the basis of this analysis. This data provided by Placentia represents best available data.

While conducting an inventory of Structure assets within the City is a key element of this asset inventory, understanding the total assessed value of Placentia's structures and built environment is a starting point to understanding the overall value of identified assets in the City. When the total assessed values are combined

with potential values associated with other community assets such as area populations, public and private critical infrastructure, historic and cultural resources, and natural resources, and other identified assets, the big picture emerges as to what is potentially at risk and vulnerable to the damaging effects of natural hazards within the City.

Methodology

Placentia's 2022 Parcel/Assessor Data was used as the basis for the inventory of assessed values for both improved and unimproved parcels within the City. This data provides the land and improved (structure) values assessed for each parcel. Other GIS data, such as jurisdictional boundaries, roads, streams, and area features, was also obtained from the City of Placentia, Orange County GIS, and state sources to support citywide mapping and analysis of structures and values within the City.

Within the GIS parcel layer (Parcels_Placentia.shp), there were 13,020 total parcels. ArcGIS was utilized to locate 434 duplicate parcel polygons. Parcels with identical APNs and identical assessor values were spatially joined to represent one polygon and to avoid duplication of assessed values. The merging of duplicates resulted in a total of 12,803 parcels. Often parcels are spatially split in preparation of recording subdivided parcels; however, the assessor data associated with these duplicated parcels had not been subdivided.

Data Limitations & Notations

Although based on best available data, the resulting information should only be used as an initial guide to overall values in the City. In the event of a disaster, structures and other infrastructure improvements are at the greatest risk of damage. Depending on the type of hazard and resulting damages, the land itself may not suffer a significant loss. For that reason, the values of structures and other improvements are of greatest concern. Also, it is critical to note a specific limitation to the assessed values data within the City, created by Proposition 13. Instead of adjusting property values annually, no adjustments are made until a property transfer occurs. As a result, overall property value information is likely significantly low and does not reflect current market, replacement, or true potential loss values for properties within the City.

Land Use Categories

The City of Placentia provided a General Plan dataset containing a land use code which provides detailed descriptive information about how each property is generally used, such as residential, commercial, or industrial. The land use codes were refined and categorized into the following land use categories and linked back to the Assessor data. The final land use categories for the City of Placentia include:

- Agricultural
- Commercial
- Industrial
- Miscellaneous
- Residential
- Tax Exempt
- Unknown

The following should be noted:

- The Tax Exempt land use is a direct designation from the Land Use code provided by the City of Placentia.
- The Unknown land use is derived from the absence of a Land Use code.
- The Unknown parcels contain no assessor value and appear to be easements and/or right of way areas.
- The Miscellaneous land use is a direct designation from the Land Use code 999 and Land Use Description of Miscellaneous.

Once land uses were grouped into categories, the number of total and improved parcels and land and improved values were inventoried for the City by land use.

Estimated Content Replacement Values

Placentia's assigned land use categories were used to develop estimated content replacement values (CRVs) that are potentially at loss from hazards. FEMA's standard CRV factors, derived from Hazus, were utilized to develop more accurate loss estimates for the total assets inventory and for all mapped hazard analyses. FEMA's CRV factors estimate content values as a percent of improved structure value by land use. Table 4-7 shows the breakdown of the different land uses in Placentia and their estimated CRV factors.

Table 4-7 City of Placentia – Content Replacement Factors by Land Use

Placentia Land Use Categories	Hazus Land Use Categories	Hazus Content Replacement Values
Agricultural	Agricultural	100%
Commercial	Commercial	100%
Industrial	Institutional	150%
Miscellaneous	Miscellaneous	100%
Residential	Residential	50%
Tax Exempt	Tax Exempt	150%
Unknown	Unknown, ROW, easements	100%

Source: Hazus 6.0

Placentia Parcel and Structure Asset Inventory with Values Results

Table 4-8 shows the total number of parcels with land and improved structure values in the City of Placentia, and also includes estimated CRVs (using CRV multipliers from Table 4-7). Inclusion of contents values are important as potential losses to the City include the value of land, structures, and their contents. Table 4-9 breaks down Table 4-8, and shows structures and values by land use type.

Table 4-8 City of Placentia – Summary of Parcel and Structure Inventory with Assessed Values

Jurisdiction	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
City of Placentia	12,803	11,913	$4,572,903,451	$2,700,479,982	$1,772,063,504	$9,066,632,391

Jurisdiction	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Grand Total	12,803	11,913	$4,572,903,451	$2,700,479,982	$1,772,063,504	$9,066,632,391

Source: Orange County 2022 Parcel/Assessor Data

Table 4-9 City of Placentia – Parcel and Structure Inventory with Assessed Values by Land Use

Land Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Agricultural	19	2	$1,249,173	$223,742	$223,742	$1,696,657
Commercial	241	215	$284,399,396	$232,574,449	$232,574,449	$757,481,233
Industrial	237	216	$334,480,160	$220,089,648	$330,134,472	$897,925,442
Miscellaneous	3	0	$76,908	$0	$0	$76,908
Residential	12,005	11,429	$3,882,834,378	$2,162,257,425	$1,081,128,766	$7,126,251,922
Tax Exempt	196	51	$69,863,436	$85,334,718	$128,002,075	$283,200,229
Unknown	102	0	$0	$0	$0	$0
Grand Total	**12,803**	**11,913**	**$4,572,903,451**	**$2,700,479,982**	**$1,772,063,504**	**$9,066,632,391**

Source: Orange County 2022 Parcel/Assessor Data

Critical Facilities and Infrastructure, and Community Lifelines

Beyond just buildings, it is important to identify the critical facilities and community lifelines that are critical for life safety and the economy. This is done for the City of Placentia in the below sections.

Critical Facilities and Infrastructure

The operation of critical facilities and infrastructure during and after a disaster is crucial. Their ability to keep functioning affects both the severity of the impacts and the speed of recovery.

Critical facilities and infrastructure commonly include all public and private facilities and infrastructure that a community considers essential for the delivery of vital services and for the protection of the community. They usually include emergency response facilities (fire stations, police stations, rescue squads, and emergency operation centers [EOCs]), custodial facilities (jails and other detention centers, long-term care facilities, hospitals, and other health care facilities), schools, emergency shelters, utilities (water supply, wastewater treatment facilities, and power), communications facilities, and any other assets determined by the community to be of critical importance for the protection of the health and safety of the population.

The City of Placentia has developed a definition of critical facilities for the City based on the definition of critical facilities under the National Flood Insurance Program's (NFIP) Community Rating System (CRS), which utilizes definitions under the American Society of Civil Engineers (ASCE) 7 Standard, Minimum Design Loads for Buildings and Other Structures and the International Codes' definition for Category III and IV buildings.

Critical Facility: A structure or other improvement that, because of its function, size, service area, or uniqueness, has the potential to cause serious bodily harm, extensive property damage, or disruption of vital socioeconomic activities if it is destroyed or damaged or if its functionality is impaired. Critical facilities include health and safety facilities, utilities, government facilities and hazardous materials facilities.

Critical facilities commonly include all public and private facilities that the City of Placentia considers essential for the delivery of vital services and for the protection of the community, and are characterized into three primary categories:

- **Essential Services Facilities**. Those that are vital to disaster response activities or critical to the health and safety of the public before, during, and after a disaster event, such as a hospital, emergency operations center, utilities, police stations, fire stations, vehicle and equipment storage facilities, or shelters.
- **At-Risk Populations**. Those facilities that house larger groups that may need special assistance to ensure the health and safety of the public before, during, and after a disaster event, such as public and private primary and secondary schools, before and after school care centers with 12* or more students, daycare centers with 12* or more children, group homes, and assisted living residential or congregate care facilities with 12* or more residents.
- **Hazardous Materials Facilities**. Those facilities that, if adversely impacted during a disaster event, would make the disaster and its impacts much worse, such as a hazardous materials facility, power generation facility, water utilities, or wastewater treatment plant.

*The number 12 may be modified to reflect any City of Placentia licensing or reporting requirements for group facilities.

Using this definition, those critical facilities that fall within the City can be seen in Figure 4-15 and summarized by facility type in Table 4-10. More detailed information on each critical facility and the mapped hazards they are at risk to can be found in Appendix F.

Figure 4-15 City of Placentia – Critical Facilities Inventory

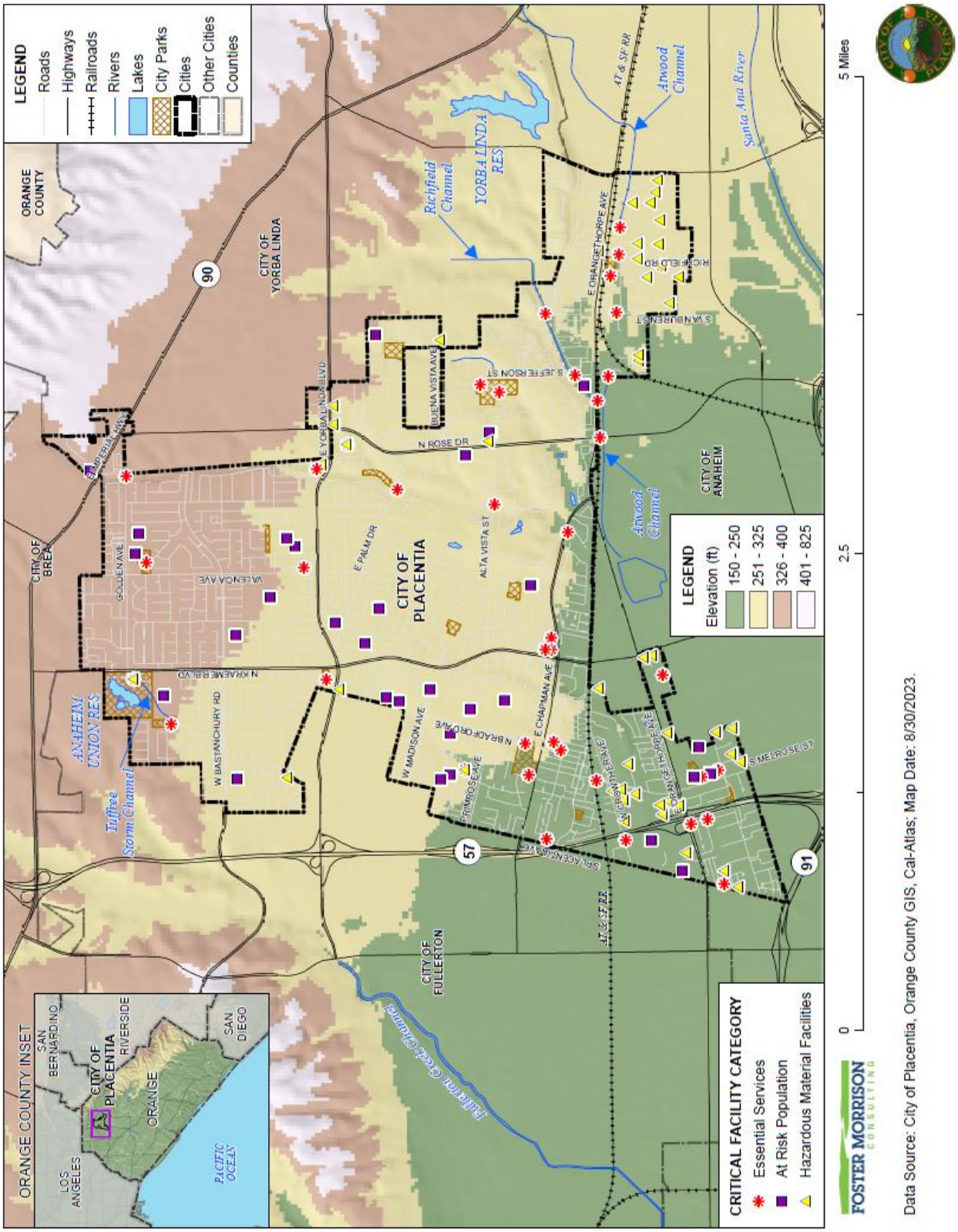


Table 4-10 City of Placentia – Critical Facilities Inventory Summary by Facility Type

Critical Facility Category	Critical Facility Type	Facility Count
Essential Services Facilities	Bridge	18
	City Facility	14
	Electric Substation	1
	Fire Station	2
	Hospital	1
	Police Station	1
	Water Facilities	2
	Water Treatment Facilities	1
	Essential Services Facilities Total	**40**
Essential Services Facilities	Daycare Center	9
	Primary/Secondary School	17
	Rehabilitation Center	1
	Senior Apartment	2
	Senior Assisted Living	2
	Senior Hospice	1
	At Risk Population Facilities Total	**32**
Hazardous Material Facilities	Gas Station	5
	Hazardous Material Business	35
	Hospital	2
	Oil Tank Farm	1
	Propane Tank Facility	1
	Water Utilities	3
	Hazardous Material Facilities Total	**47**
Grand Total		**119**

Source: City of Placentia GIS

Critical facilities will be discussed in detail in the mapped hazards below, and in general in the unmapped hazards.

Community Lifelines

Assessing the vulnerability of the City of Placentia to natural hazards and disasters also involves reviewing and inventorying the lifelines in place that could be affected. It is important to include these items in hazard discussions as the continuous operation of critical government and business functions is essential to human health and safety and/or economic security. Information on community lifelines include:

- Lifelines are the most fundamental services in the community that, when stabilized, enable all other aspects of society to function.

- FEMA has developed a construct for objectives-based response that prioritizes the rapid stabilization of Community Lifelines after a disaster.
- The integrated network of assets, services, and capabilities that provide lifeline services are used day-to-day to support the recurring needs of the community and enable all other aspects of society to function.
- When disrupted, decisive intervention (e.g., rapid re-establishment or employment of contingency response solutions) is required to stabilize the incident.

For this Plan, Community Lifelines includes the following (as defined by FEMA):

- **Safety and Security** – Law Enforcement/Security, Fire Service, Search and Rescue, Government Service, Community Safety
- **Food, Hydration, Shelter** – Food, Water, Shelter, Agriculture
- **Health and Medical –** Medical Care, Public Health, Patient Movement, Medical Supply Chain, Fatality Management
- **Energy –** Power Grid, Fuel
- **Communications** – Infrastructure, Responder Communications, Alerts Warnings and Messages, Finance, 911 and Dispatch
- **Transportation** – Highway/Roadway/Motor Vehicle, Mass Transit, Railway, Aviation, Maritime
- **Hazardous** Material **–** Facilities, HAZMAT, Pollutants, Contaminants
- **Water Systems** – Potable Water Infrastructure, Wastewater Management

In the City of Placentia, these community lifelines are all in place and functional as part of regular government operations. It should also be noted that these community lifelines collectively include many of the individual components of other community assets inventoried for this LHMP including structures, critical facilities and infrastructure, natural resources, and economic assets.

Specific information on these community lifelines in the City of Placentia and how they may be affected by a hazard event or disaster are discussed in more detail in each hazard section below.

Natural, Historic, and Cultural Resources

Assessing the vulnerability of the City of Placentia to natural hazards and disasters also involves inventorying the natural, historic, and cultural assets of the area. This step is important for the following reasons:

- Environmental and natural resources add to a community's identity and quality of life. They also help the local economy through agriculture, tourism and recreation. They support ecosystem services, such as clean air and water.
- Conserving the environment may help people mitigate risk. It can also protect sensitive habitats, develop parks and trails, and build the economy.
- Natural resources can have beneficial functions that reduce the impacts of natural hazards, such as wetlands and riparian habitat, which help absorb and attenuate floodwaters.
- The community may decide that these types of resources warrant a greater degree of protection due to their unique and irreplaceable nature and contribution to the overall economy.

- If these resources are impacted by a disaster, knowing so ahead of time allows for more prudent care in the immediate aftermath, when the potential for additional impacts are higher.
- The rules for reconstruction, restoration, rehabilitation, and/or replacement are often different for these types of designated resources.

Natural Resources

The City Planning Area contains a variety of natural resources. The sections below discuss key natural resources that fall within the City that are potentially at risk to a hazard event or natural disaster. It should be noted that the General Plan Conservation Element did not individually list endangered species or critical habitat.

Wetlands and their Natural and Beneficial Functions

Wetlands are habitats in which soils are intermittently or permanently saturated or inundated. Wetland habitats vary from rivers to seasonal ponding of alkaline flats and include swamps, bogs, marshes, vernal pools, and riparian woodlands. Wetlands are considered to be waters of the United States and are subject to the jurisdiction of the U.S. Army Corps of Engineers as well as the California Department of Fish and Wildlife (CDFW). Where the waters provide habitat for federally endangered species, the U.S. Fish and Wildlife Service may also have authority.

Wetlands are a valuable natural resource for communities providing beneficial impact to water quality, wildlife protection, recreation, and education, and play an important role in hazard mitigation. Wetlands provide drought relief in water-scarce areas, where the relationship between water storage and streamflow regulation is vital and reduce flood peaks and slowly release floodwaters to downstream areas. When surface runoff is dampened, the erosive powers of the water are greatly diminished. Furthermore, the reduction in the velocity of inflowing water as it passes through a wetland helps remove sediment being transported by the water.

Wetlands are often found in floodplains and depressional areas of a watershed. Many wetlands receive and store floodwaters, thus slowing and reducing downstream flow. Wetlands perform a variety of ecosystem functions including food web support, habitat for insects and other invertebrates, fish and wildlife habitat, filtering of waterborne and dry-deposited anthropogenic pollutants, carbon storage, water flow regulation (e.g., flood abatement), groundwater recharge, and other human and economic benefits.

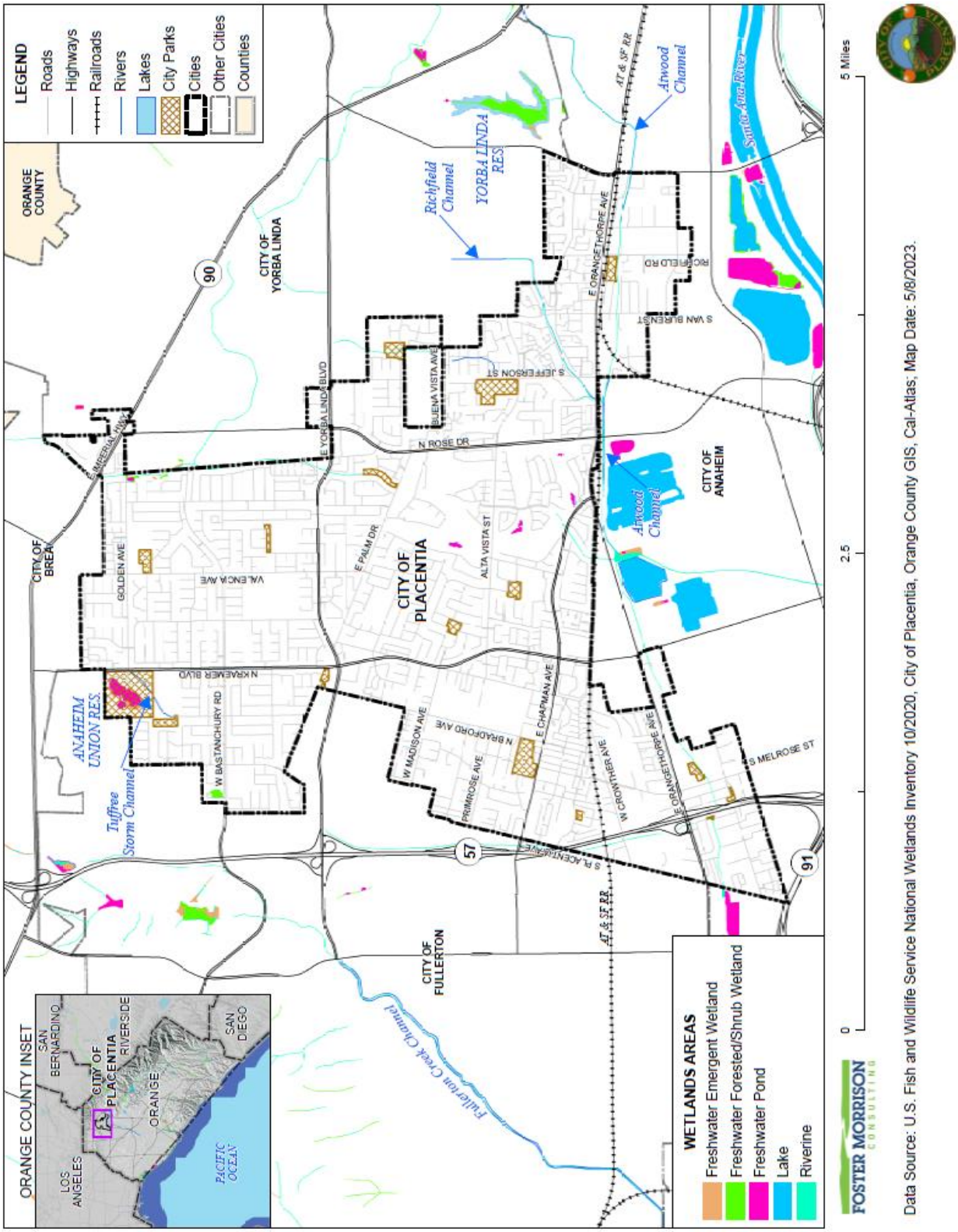
Wetlands, and other riparian and sensitive areas, provide habitat for insects and other invertebrates that are critical food sources to a variety of wildlife species, particularly birds. There are species that depend on these areas during all parts of their lifecycle for food, overwintering, and reproductive habitat. Other species use wetlands and riparian areas for one or two specific functions or parts of the lifecycle, most commonly for food resources. In addition, these areas produce substantial plant growth that serves as a food source to herbivores (wild and domesticated) and a secondary food source to carnivores.

Wetlands slow the flow of water through the vegetation and soil, and pollutants are often held in the soil. In addition, because the water is slowed, sediments tend to fall out, thus improving water quality and reducing turbidity downstream.

These natural floodplain functions associated with the natural or relatively undisturbed floodplain that moderates flooding, such as wetland areas, are critical for maintaining water quality, recharging groundwater, reducing erosion, redistributing sand and sediment, and providing fish and wildlife habitat. Preserving and protecting these areas and associated functions are a vital component of sound floodplain management practices for the City.

Wetlands in the City are shown in Figure 4-16.

Figure 4-16 City of Placentia – Wetland Areas



Critical Species

To further understand natural resources that may be particularly vulnerable to a hazard event, as well as those that need consideration when implementing mitigation activities, it is important to identify critical species (i.e., threatened and endangered species) in the City. A threatened species is a species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range. An endangered species is any species of fish, plant life, or wildlife that is in danger of extinction throughout all or most of its range. Both threatened and endangered species are protected by law and any future hazard mitigation projects are subject to these laws. Candidate species are plants and animals that have been proposed as endangered or threatened but are not currently listed. There are many federal threatened, endangered, or candidate species in or near the City. The California Natural Diversity Database was searched for listed species. The City contained 251 species. These species are summarized in Table 4-11. Additional species-specific information for the City is included in Appendix E. It should be noted that the General Plan Conservation Element did not individually list endangered species or critical habitat.

Table 4-11 City of Placentia– Threatened and Endangered Species

Type	Number
Animals - Amphibians	3
Animals – Birds	78
Animals – Crustaceans	2
Animals – Fish	6
Animals – Insects	13
Animals - Mammals	23
Animals – Mollusks	6
Animals – Reptiles	12
Community – Aquatic	1
Community – Terrestrial	14
Plants – Vascular	93
Total	**251**

Source: California Natural Diversity Database. Retrieved 2/10/2023.

Historic and Cultural Resources

The City of Placentia has many historic and cultural resources, areas and properties. To inventory these resources, information was collected from these primary sources:

- The California Department of Parks and Recreation Office of Historic Preservation (OHP)
- The 2002 City Historical Resource Survey
- The 2019 City of Placentia General Plan Conservation Element

OHP Historic Resources

The California OHP is responsible for the administration of federally and state mandated historic preservation programs to further the identification, evaluation, registration, and protection of California's irreplaceable archaeological and historical resources. OHP administers the National Register of Historic Places, the California Register of Historical Resources, California Historical Landmarks, and the California Points of Historical Interest programs. Each program has different eligibility criteria and procedural requirements.

- The **National Register of Historic Places** is the nation's official list of cultural resources worthy of preservation. The National Register is part of a national program to coordinate and support public and private efforts to identify, evaluate, and protect historic and archeological resources. Properties listed include districts, sites, buildings, structures, and objects that are significant in American history, architecture, archeology, engineering, and culture. The National Register is administered by the National Park Service, which is part of the U.S. Department of the Interior.
- **California Historical Landmarks** are sites, buildings, features, or events that are of statewide significance and have anthropological, cultural, military, political, architectural, economic, scientific or technical, religious, experimental, or other value. Landmarks #770 and above are automatically listed in the California Register of Historical Resources.
- The **California Register of Historical Resources** program encourages public recognition and protection of resources of architectural, historical, archeological, and cultural significance and identifies historical resources for state and local planning purposes; determines eligibility for state historic preservation grant funding; and affords certain protections under the California Environmental Quality Act. The Register is the authoritative guide to the state's significant historical and archeological resources.
- **California Points of Historical Interest** are sites, buildings, features, or events that are of local (city or county) significance and have anthropological, cultural, military, political, architectural, economic, scientific or technical, religious, experimental, or other value. Points designated after December 1997 and recommended by the State Historical Resources Commission are also listed in the California Register.

Based on these sources, there are four historic properties in the City. This is shown in Table 4-12.

Table 4-12 City of Placentia – Historic Resources

Resource Name (Plaque Number)	National Register	State Landmark	State Register	Point of Interest	Date Listed
Bradford, A. S., House (N676)	X				10/3/1978
First Macadamia Tetraphylla Planted in California (P589)				X	3/1/1982
Key, George, Ranch (N351)	X				4/21/1975
Placentia Mutual Orange Association Packing House (P631)				X	5/31/1984

Source: California Department of Parks and Recreation Office of Historic Preservation, http://ohp.parks.ca.gov/

It should be noted that these lists may not be complete, as they may not include those currently in the nomination process and not yet listed. Additionally, as defined by the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA), any property over 50 years of age is considered a historic resource and is potentially eligible for the National Register. Thus, in the event that the property is to be altered, or has been altered, as the result of a major federal action, the property must be evaluated under the guidelines set forth by CEQA and NEPA. Structural mitigation projects are considered alterations for the purpose of this regulation.

1998/2002 City Historical Resource Survey

In 1988, the Placentia Historical Committee/City of Placentia commissioned a survey of all buildings over 40 years of age. This effort documented 357 buildings and sites that were over 40 years of age. The list was narrowed down to 35 National Register of Historic Places possibilities, but was never submitted to the State Office of Historic Preservation. The Placentia Historical Committee worked with the City to complete a new, updated list in 2002. Table 4-13 details these properties. Not all properties could be matched with a current APN to be able to digitize their locations. Figure 4-17 shows the location of the properties from this survey that could be mapped in GIS.

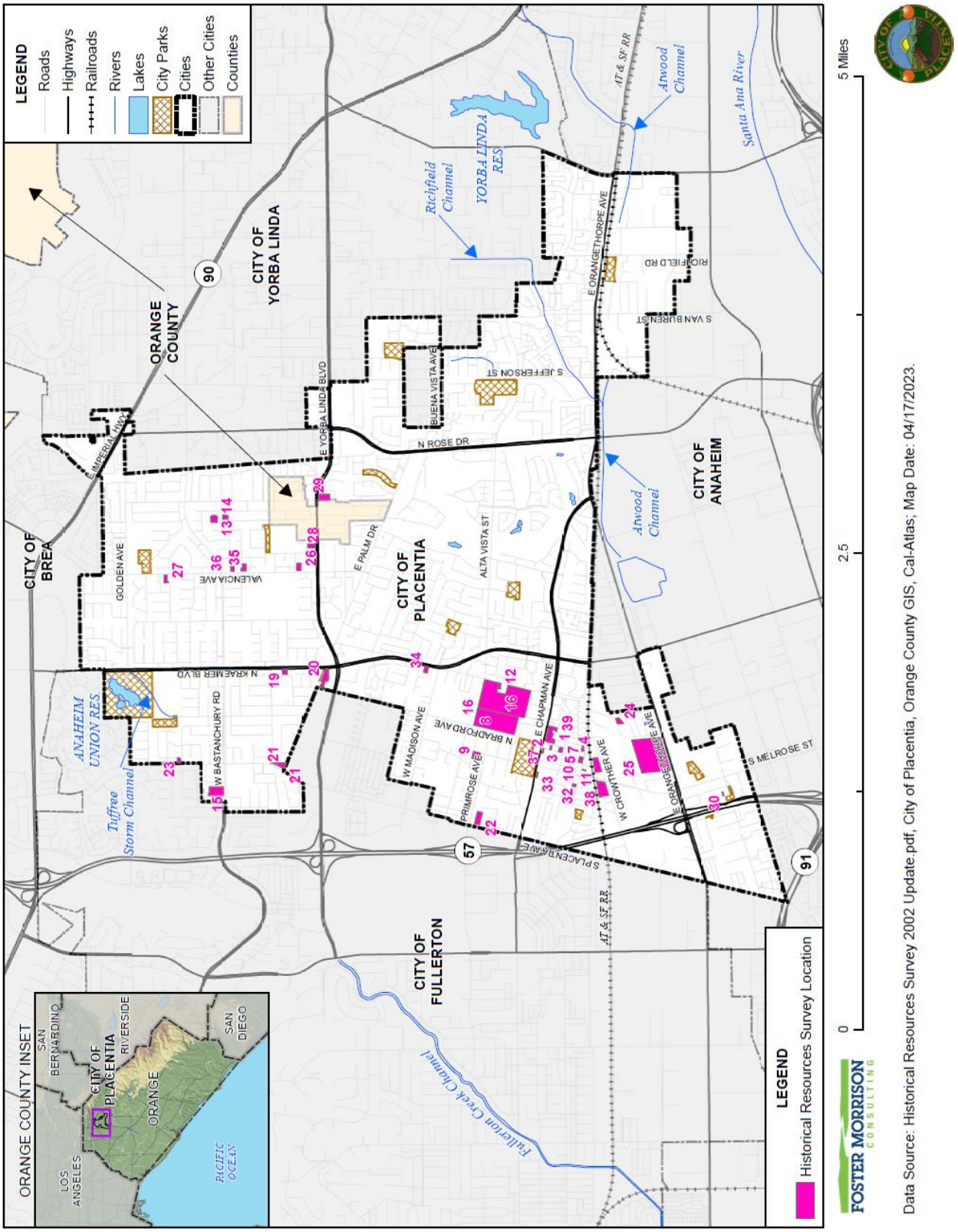
Table 4-13 City of Placentia - Historical Resources Survey Properties

Number	Name	Address
1	Cavalry Church	102 S BRADFORD
2	Old Placentia City Hall	110 S BRADFORD
3	Old Placentia Library	145 S BRADFORD
4	Kraemer Building	238 S BRADFORD
5	-Unknown-	149 SANTA FE
6	Not Mapped - no match to APN/Address	–
7	-Unknown-	141 SANTA FE
8	Rospaw-Abbott House	111 ORANGE GROVE
9	Fuller Ranch	200 ORANGE GROVE
10	Placentia Co-op Association	220 SANTA FE
11	Placentia Orange Growers Association	207 W CROWTHER AVE
12	Gilbert Kraemer House	525 ANGELINA DR
13	Berkenstock House	829 BERKENSTOCK
14	Basten House	830 BERKENSTOCK
15	Key Ranch	625 W BASTANCHURY RD
16	Valencia High School (incl. Bradford School)	512 BRADFORD AVE
16	Valencia High School (incl. Bradford School)	645 N ANGELINA DR
17	Not Mapped - no match to APN/Address	–
18	Not Mapped - no match to APN/Address	–
19	John Tuffree House	1612 KINGSTON RD
20	A.S. Bradford House	136 PALM DR

Number	Name	Address
21	Nenno House	503 W PALM DR
21	Nenno House	1620 N PLACENTIA
22	Lewis Lemke House	414 N PLACENTIA
23	-Unknown-	425 FLEMING
24	Alec House	560 PORTER WAY
25	Ranney Ranch	161 E ORANGETHORPE
26	John Wagner House	1542 VALENCIA
27	Johm Lemke House	2131 VALENCIA
28	Joseph Wagner House	705 E YORBA LINDA BL
29	Charles Wagner House	902 E YORBA LINDA BL
30	Gonzales House	952 GONZALES
31	Not Mapped - no match to APN/Address	–
32	Simon House	341 SANTA FE
33	DIaz Bungalow #1-4	324 W CHAPMAN
34	E Boynton House	1027 N KRAEMER BL
35	Harrison H Hale House	1802 VALENCIA
36	Roy L Hale House	1838 VALENCIA
37	-Unknown-	–
38	Placentia Mutual Orange Association	341 MELROSE
39	Telephone Exchange Building	117 S BRADFORD

Source: City of Placentia Historical Resources Survey 2002 Update

Figure 4-17 City of Placentia - Historical Resources Survey



2019 City of Placentia General Plan

It was noted in the 2019 General Plan Conservation Element that the City of Placentia has many historic structures that serve as reminders of the City's unique history, some of which were included in the 2002 Survey. The 2019 Placentia General Plan identified the following structures and areas as historically significant:

- **Santa Fe District** – Santa Fe Avenue between Bradford Avenue and Main Street – Santa Fe Avenue was the first commercial street in the townsite, stretching from a train depot (demolished in 1976) at Bradford Avenue to the two-story bank building at Main Street. To serve the growing area after the railroad was completed in 1910, there was a Chamber of Commerce, a grocery store, feed store, post office, a lumber yard, barber shop, blacksmith shop and livery stable, a reading and recreation room which grew into the library, a hardware store, a hotel and many other stores. In 1989, the area was named Placita Santa Fe.
- **Old Placentia Library District Building** – 143 S. Bradford Avenue – The Edwin T. Powell Building, at the corner of Bradford Avenue and Center, is the former library building constructed by the Placentia Library District in 1926 at a cost of $30,000. The architect was Carlton Winslow who had gained worldwide recognition for his design of the Los Angeles City Library. This building is considered one of the most interesting small structures in the town and served the citizens until the new library was constructed in 1974. Currently, the senior center is housed in the City-owned building.
- **Old City Hall** - 120 S. Bradford Avenue – The City Hall Building, in use until a new Civic Center was dedicated in 1974, was built with federal assistance in the 1930s and replaced a building on Bradford Avenue, just north of Santa Fe. The City retains ownership to the portion of the site containing the fire station.
- **Kraemer Memorial Park** - 201 N. Bradford Avenue – Mr. and Mrs. Edward Backs donated the site for Kraemer Park to the City of Placentia in 1954. Angeline Backs asked that the public park be named in honor of her father, Samuel Kraemer and her mother, Angelina Yorba Kraemer. A family tree is outlined in three brass tablets, located in a memorial near the entrance to the Backs Building facing Bradford Avenue. Trees planted throughout the park were donated and dedicated to other City pioneers.
- **Veteran's Memorial Fountain** – Chapman Avenue and Walnut Street – The Veteran's Memorial Fountain was donated to the City by Edward and Angeline Backs. Constructed at a cost of $250,000, it is dedicated to our nation's veterans. The sculptor was John Edward Svenson who cast the dolphins in Norway. The dolphins have since been removed and are being stored. Arthur Barton, landscape architect for Kraemer Park, designed the courtyard that surrounds the fountain.
- **Water Tower** – Chapman Avenue and Main Street – The 50,000-gallon water tower, which today bears the markings of Placentia's All America City Award, is currently empty and stands as a historic landmark. It was constructed in 1935, replacing earlier towers built to serve the original town site.
- **Valencia High School** – 500 N. Bradford Avenue – The first high school in Placentia was Valencia and it was rebuilt after a fire to its present form in 1935 with some later additions. It is a good example of Moderne Style sometimes called Art Deco. Bradford Elementary School was built in 1912 as a replacement for the original Placentia school on Chapman and Placentia Avenues.

Economic Assets and Community Activities of Value

Assessing the vulnerability of the City of Placentia to natural hazards and disasters also involves inventorying the economic assets and community activities of value to the Planning Area.

Economic Assets

After a disaster, economic resiliency is one of the major drivers of a speedy recovery. Each community has specific economic drivers. These include:

- Primary Economic Sectors
- Major employers
- Commercial Centers

According to the 2019 City of Placentia General Plan Economic Development Element, when the City was incorporated in 1926, the tax base was very different than today, with a focus on property tax. During the ensuing 90 years and with the vast changes at the State level, cities today (including Placentia) find themselves dependent on sales tax. Sales tax is one of the largest economic drivers in the City. Currently only about 5% of land in the City is actively used for retail. The nearby Cal State Fullerton University, with its population of 60,000 students, staff, and visitors, in the adjacent City of Fullerton, provides an opportunity to Placentia's businesses to expand their markets and cater to this active population. While not directly next door, Disneyland is also in the vicinity of the City. Disneyland drives some regional tourism to the City.

According to the City Economic Development Department, the top employers in the City are:

- Blackburn Daewoo
- interface rehab
- Hartwell
- Carl Warren & Company
- Coast Southwest
- Progress Group
- BeyondTek IT
- The Bruery
- Clark Law Offices
- N&S

The City noted that it is mostly a residential City. The City does have multiple areas of commercial development distributed throughout the City. Many of these are small businesses. The HMPC noted that Placentia's myriad of businesses are their biggest economic assets and a revenue driver for the City.

These economic assets are discussed in general terms in the individual hazard sections below.

Community Activities of Value

Inventorying economic assets in the City of Placentia and their vulnerability to natural hazards and disasters also involves inventorying activities that have value to the community. This includes activities that are important to a community, like long-standing traditions such as a festival or fair. Some areas rely on seasonal industries to sustain them throughout the year. Many of these activities also provide economic benefits to the City. A hazard event that cancels or shortens these can affect a community's livelihood and can make disaster recovery more difficult or prolonged. This includes activities such as:

- Festivals and Fairs
- Sporting Events
- Tourism

In the City of Placentia Heritage Days are celebrated with the Placentia Parade. Placentia hosts a Certified Farmer's Market on a seasonal basis. In December of every year, a Tamale Festival is held. No large sports teams are located in Placentia, but the City is not far from Cal State Fullerton, and Anaheim (home to the California Angels and the Anaheim Mighty Ducks). There is sizable regional tourism associated with Disney and other nearby attractions, as well as its overall location in Southern California.

These are discussed in general terms in the individual hazard sections below.

4.2.2. Growth and Development Trends

As part of the planning process, the HMPC looked at trends in growth and development, both current and future, and examined these trends both as a whole and in the context of hazard-prone areas, and how the changes in growth and development affect loss estimates and vulnerability over time.

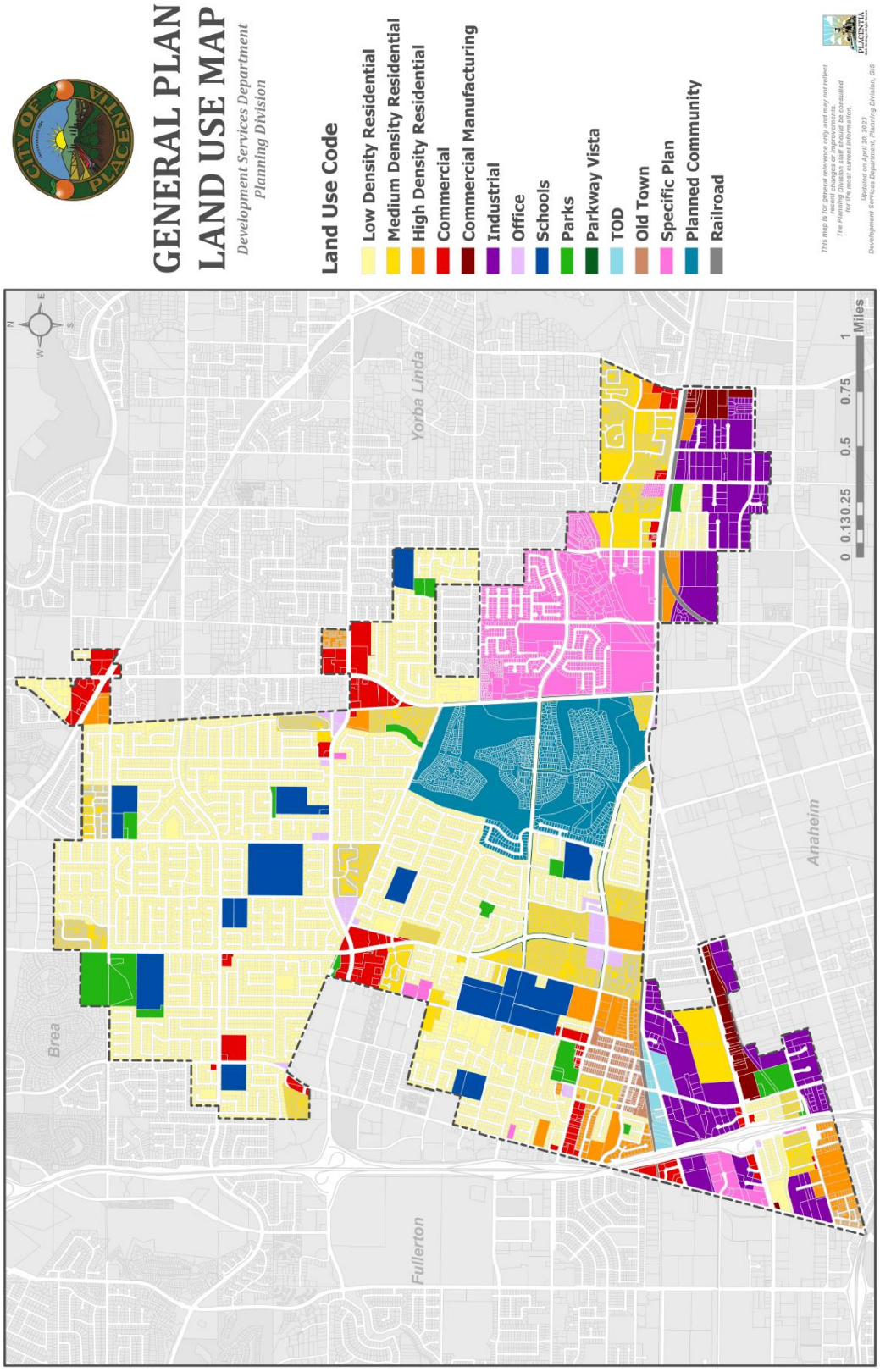
Land Use

State planning law requires that the land use element of a general plan include a statement of the standard population density, building intensity, and allowed uses for the various land use designations in the plan (Government Code Section 65302(a)). The City's land use designations are generally described below and mapped on the Land Use Diagram (Figure 4-18). The Placentia Municipal Code provides detailed land use and development standards for development.

The Municipal Code works hand in hand with the City's General Plan Land Use Element. The purpose of the Land Use Element is to provide goals, policies, actions, diagrams and standards to guide future land use decisions in Placentia. While all elements of the General Plan have equal weight under California law, in some respects this Element is the most far-reaching. It informs all other elements of the General Plan, shaping the future transportation network and the location of future housing sites, and influencing public facility requirements and park and recreation needs. It defines the City's future open space system and responds to natural resource conservation issues and safety hazards. It establishes the basic pattern of development in the City for the next 20-25 years, including land uses and densities, and presents the policies and actions to ensure that future development will enhance the quality of life for all Placentia residents.

Future land use for the City of Placentia from the City of Placentia General Plan Land Use Element is shown on Figure 4-18.

Figure 4-18 City of Placentia – Land Use Diagram



Source: City of Placentia General Plan Land Use Element (updated in 2023)

Population Trends and Projections

The City is expected to continue to increase in population. The City's population has grown quickly in the past, with a recent slowing as shown on Table 4-6 above. Population projects from the Cal State Fullerton Center for Demographic Research for the City are shown on Table 4-14. As shown, the City is expected to see slow and steady growth through 2050.

Table 4-14 City of Placentia – Future Population Projections

Location	2025	2030	2035	2040	2045	2050
Placentia	52,825	54,420	56,112	56,635	56,859	56,705

Source: Cal State Fullerton Center for Demographic Research – Orange County Projections 2022

Future Development Areas

The City of Placentia identified 24 areas where future growth and development or redevelopment is expected to occur over the next five years covered by this LHMP. These developments range from small to moderate sized developments and are detailed in Table 4-15. This table includes by future development area, a project description, project submittal and hearing date, as well as a project status. The first column aligns with the numbering of the future development areas on Figure 4-19.

Table 4-15 City of Placentia – Future Development Areas and Project Status

Future Development Area #/Address	Project Case No.	Project Description	Project Submittal	Public Hearing Date	Project Status
1 - Rose Drive and Alta Vista Street	ZCA 2017-09; DPR 2017-03; UP 2017-09; VTTM 18176	Development of a 10,500-square foot commercial retail building and 54, single family detached residential homes located on an 8.45-acre lot.	8/29/17	Approved by City Council on 7/24/18	All residential phases complete. Certificates of Occupancy issued. Awaiting Commercial building plan submittal
2- 455 S. Van Buren Street	ZC 2018-01; DPR 2018-01; TTM 19104	Development of 139, three-story townhome units on an approximately 5.57-acre site. Zoning of parcel to change from Manufacturing (M(O)) to High-Density Residential (R-3).	1/11/18	Approved by the City Council on 4/20/2021	Construction of Models and Phases I & II are complete. Construction of Phase III is in progress.
3 - Orchard Drive and Highland Avenue	DPR 2018-03; UP 2018-04; TTM 18129	Development of four, three-story, multi-family buildings consisting of 16 residential townhomes located on a 1.24-acre unimproved vacant lot.	3/13/18	Approved by Planning Commission 7/10/18	Building Permits Issued. Under Construction

Future Development Area #/Address	Project Case No.	Project Description	Project Submittal	Public Hearing Date	Project Status
4 - 505 W. Crowther Avenue	DPR 2018-04	Development of a five-story, 418 Unit apartment building with a seven-story parking structure on a 4.4-acre site.	3/20/18	Approved by Planning Commission 5/8/18	Construction of parking garage complete. Construction of apartments in process
5 - 1474 N. Kraemer Boulevard (Phase II improvement)	UP 2019-05	Establish and operate a drive-thru for an eating and drinking establishment, in conjunction with a comprehensive façade remodel for the Village Plaza shopping center.	10/14/19	Approved by Planning Commission 12/10/19	Under Construction
6 - 207-209 Crowther Avenue	DPR 2020-03; DA 2020-01, MND 2020-03	The development of a mixed-use community including 189 mixed-income apartment units and 1,500 S.F. of retail on a 2.13-acre site on City owned property.	3/3/20	Approved by the City Council on 6/1/21	In Plan Check
7 – 1314 N. Angelina Avenue	DPR 2020-01; GPA 2020-01; ZC 2020-01	Development of an affordable senior housing project consisting of two, two-story buildings, one with 33 units and one with 32 units and a new parish hall for an existing church.	4/2/20	Approved by the City Council on 12/1/20	Building Permit Issued, Under Construction
8 - E. Orangethorpe Avenue and N. Lakeview Avenue (Cobblestone Village)	UP 2020-07; DPR 2020-02	A request to construct a 4,311-square foot multi-tenant commercial building with site improvements.	8/24/20	Approved by the Planning Commission on 7/13/21	Ready for Building Permit Issuance
9 - 119 S. Main Street	SPR 2021-06	Construction of a new two-story 2,870 square foot duplex, with a four-car garage.	6/21/21	N/A	Building permits issued and construction in progress
10 – 777 W. Orangethorpe Avenue	DPR 2021-02; SPA 2021-01; EA 2021-01	A 248-unit development consisting of a five-story, 249,557 gross sq. ft. residential building with 2,703 sq. ft. of ground floor commercial space and a seven-level, 151,900 gross sq. ft. wrapped parking structure located on a 2.72-acre lot.	6/24/21	TBD	Under Entitlement Review. CEQA Review in progress.

Future Development Area #/Address	Project Case No.	Project Description	Project Submittal	Public Hearing Date	Project Status
11 - 17000 La Paloma Avenue	SPR 2022-01; TPM 2019-175	Construction of three 2,532 square foot, two-story, single-family houses on three recently subdivided parcels	3/14/22	N/A	Site Plan Review approved. Awaiting plan check submittal
12 -1804 N. Placentia, Unit A	UP 2023-02	A request to permit a Type 47 (beer & wine) alcohol license for an existing restaurant.	3/24/22	TBD	In process
13 – 500 S. Placentia Avenue	SPR 2022-03	Construction of a new ground mount PV solar system, carport PV solar system, battery energy storage system and associated equipment to an existing commercial building.	6/21/22	N/A	Site Plan Review Approved 1/10/23. In Plan Check
14 - 503 & 513 S. Van Buren Street (346-164-23, 346-164-24)	DPR 2022-03, TTM 19251, UP 2022-04	To permit the development of two, three-story townhome buildings for a total of 12 condominium units on approximately 0.379-acre site.	6/30/22	Approved at Planning Commission 12/13/22. Tentative Tract Map approved at City Council 1/10/23	In Plan Check
15- 503 & 513 S. Van Buren Street (346-164-23, 346-164-24)	TPM 2022-128	Subdivide an existing 2.37-acre property into two parcels measuring 0.68-acres (Parcel 1) and 1.81-acres (Parcel 2).	8/30/22	TBD	Submittal deemed incomplete 12/5/22
16 - 421 Nevin Place	TTM 19233	A request to subdivide a 1.76-acre parcel into six parcels for the purpose of future single-family home development.	2/27/23	Tentative Planning Commission date set for 4/11/23	Deemed Complete
17 - 4861 Hamer Dr.	ADU 2023-02	To permit the proposed garage conversion of a new 395-square foot ADU + 704-square foot expansion and interior remodeling of existing residence (master and guest bedroom) in a R-1 residential single-family housing zoning district	3/13/23	No Planning Commission date set.	Initial plan check completed 3/29/23. Deemed incomplete.
18- 474 N. Bradford	ADU 2023-04	Accessory dwelling unit to be built on the site of an existing residence at 437 N. Bradford Ave, within an R-2, low-medium density multiple zoning family district.	3/21/23	No Planning Commission date set.	Preliminary review underway as of 3/29/23.

Future Development Area #/Address	Project Case No.	Project Description	Project Submittal	Public Hearing Date	Project Status
19 - 1952 & 1958 E. Veterans Way (346-337-33 & 35)	DPR 2022-01, TTM 19183, UP 2022-01	To permit the subdivision to establish 39, three-story residential condominiums on approximately 1.3 acres.	4/14/22	Approved by Planning Commission 2/14/2023.	Tentative Tract to go to City Council 3/21/23.
20 - SE Corner of Rose at Alta Vista St	SPA 2022-01, DPR 2022-04, TTM 19250, MND 2022-01	To permit a new residential planned community consisting of 100 single-family detached homes.	9/12/2022	Tentative Planning Commission date set for 4/11/23	Under Entitlement Review
21 - 1474 N. Kraemer Blvd (Phase I)	PC# 23-431	Tenant improvement (TI) to former Pizza Rev restaurant at SE corner of Kraemer Blvd and Yorba Linda Blvd.	3/27/2023	No Planning Commission date set.	Initial plan check completed 6/23/23. Corrections were sent.
22 - 860 S. Placentia Ave	DPR 2021-03; UP 2021-04	Construction of a new 34,275 square foot warehouse building and a new 34,063 square foot maintenance building at an existing 6.28-acre lot.	7/29/2021	Approved at Planning Commission 7/12/22.	Demo permits issued with Building Permits ready for issuance
23 - 929 Gonzales St	SPR 2022-04	Construction of a new 2,166 square ft. single-family home with a 482-square foot, two-car garage on an approximately 3,673-square foot lot.	10/13/2022	N/A	Under Entitlement Review
24 – 664 N Rose Ave	UP 2023-01	A request to permit a Computer Code Programming Center, within an existing multi-tenant space within the Specific Plan 7 (SP-7) Zoning District.	2/6/2023	No Planning Commission date set.	Deemed Complete. Notice of Public Hearing notices mailed out 3/29/23.

Source: City of Placentia

GIS Analysis

The City of Placentia identified 24 areas where future growth and development is expected to occur over the next five years. The following methodology was used in determining parcel counts and acreages within the 19 future development areas identified in the City. Using the parcel APNs associated with each of these areas as provided by the City, the 24 areas were identified and intersected with the City parcel layer to determine the parcel counts and acreage within each future development area. Figure 4-19 shows the locations of future development areas. Table 4-16 shows the summary of parcels and acreages of each of these future development areas in the City.

Figure 4-19 City of Placentia – Future Development Areas

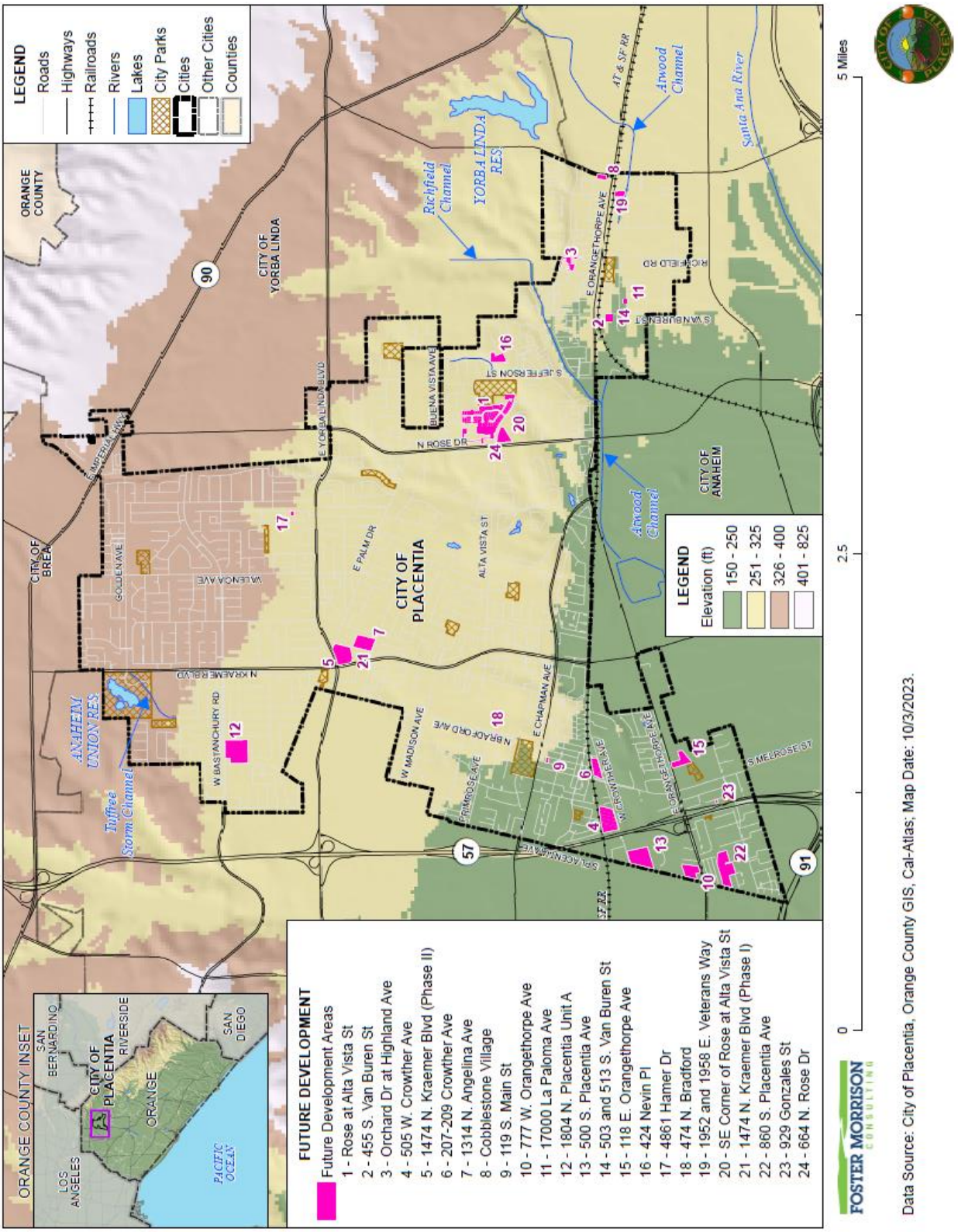


Table 4-16 City of Placentia – Future Development Area Parcel and Acre Counts

Map #	Future Development Areas	Total Parcel Count	Improved Parcel Count	Total Acres
1	Rose at Alta Vista St	65	0	10.86
2	455 S. Van Buren St	1	1	0.17
3	Orchard Dr at Highland Ave	1	0	1.15
4	505 W. Crowther Ave	6	1	5.60
5	1474 N. Kraemer Blvd (Phase II)	1	1	4.67
6	207-209 Crowther Ave	4	1	2.09
7	1314 N. Angelina Ave	1	1	3.84
8	Cobblestone Village	1	0	0.59
9	119 S. Main St	1	1	0.15
10	777 W. Orangethorpe Ave	1	1	2.72
11	17000 La Paloma Ave	1	0	0.26
12	1804 N. Placentia Unit A	1	1	8.17
13	500 S. Placentia Ave	1	1	5.82
14	503 & 513 S. Van Buren St	2	2	0.38
15	118 E. Orangethorpe Ave	1	1	2.38
16	424 Nevin Pl	1	0	1.78
17	4861 Hamer Dr	1	1	0.17
18	474 N. Bradford	1	1	0.19
19	1952 & 1958 E. Veterans Way	1	0	0.78
20	SE Corner of Rose at Alta Vista St	1	0	8.25
21	1474 N. Kraemer Blvd (Phase I)	1	1	4.67
22	860 S. Placentia Ave	1	1	6.28
23	929 Gonzales St	1	0	0.08
24	664 N. Rose Dr	1	1	3.88
Grand Total		**97**	**17**	**74.94**

Source: City of Placentia GIS

4.3 Hazard Profiles and Vulnerability Assessment

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

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

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

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

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

The natural hazards identified in Section 4.1 Hazard Identification, are profiled individually in this section. The Hazard Profiles set the stage for the Vulnerability Assessment, where the vulnerability or exposure is quantified, as data allows, for each of the identified hazards.

Hazard Profiles Methodology

Each hazard is profiled in the following format:

- **Hazard/Problem Description**—This section gives a description of the hazard and associated issues followed by details on the hazard specific to the City. Where known, this includes information on the hazard extent, location, seasonal patterns, speed of onset/duration, and magnitude and any secondary effects.
- **Past Occurrences**—This section contains information on historical incidents, including impacts where known. Hazard research, searchable databases, historical incident worksheets, and other input from the HMPC were used to capture information on past occurrences.
- **Probability of Future Occurrence**—The frequency of past events is used in this section to gauge the probability of future occurrences. Where possible, frequency was calculated based on existing data. It was determined by dividing the number of events observed by the number of years on record and multiplying by 100. This gives the percent chance of the event happening in any given year (e.g., three droughts over a 30-year period equates to a 10 percent chance of experiencing a drought in any given year). The probability of future occurrences is categorized into one of the following classifications:
  - ✓ **Highly Likely**—Near 100 percent chance of occurrence in next year or happens every year.
  - ✓ **Likely**—Between 10 and 100 percent chance of occurrence in next year or has a recurrence interval of 10 years or less.

- ✓ **Occasional**—Between 1 and 10 percent chance of occurrence in the next year or has a recurrence interval of 11 to 100 years.
- ✓ **Unlikely**—Less than 1 percent chance of occurrence in next 100 years or has a recurrence interval of greater than every 100 years.

- **Climate Change**—This section contains the effects of climate change (as applicable). The possible influence of climate change on the hazard is discussed.

Vulnerability Assessment Methodology

With Placentia's hazards identified and profiled, a vulnerability assessment was conducted to describe the vulnerability and impact that each hazard would have on the City. The vulnerability assessment focuses on evaluating the City's hazard vulnerability to both its existing built environment and relative to the City's growth and development trends including areas targeted for future development or redevelopment. For the existing built environment, the vulnerability assessment quantifies, to the extent feasible using best available data, various assets at risk to identified hazards and estimates potential losses. For areas of the City where growth and development will occur, a discussion of how future development will be affected by each hazard and considerations for development is included. This approach is discussed further below.

As part of the vulnerability assessment, an estimate of the vulnerability of the City Planning Area to each identified hazard, in addition to the estimate of risk of future occurrence, is provided in each of the hazard-specific sections that follow. Vulnerability is measured in general, qualitative terms and is a summary of the potential impact based on past occurrences, spatial extent, and damage and casualty potential. It is categorized into the following classifications:

- **Extremely Low**—The occurrence and potential cost of damage to life and property is very minimal to nonexistent.
- **Low**—Minimal potential impact. The occurrence and potential cost of damage to life and property is minimal.
- **Medium**—Moderate potential impact. This ranking carries a moderate threat level to the general population and/or built environment. Here the potential damage is more isolated and less costly than a more widespread disaster.
- **High**—Widespread potential impact. This ranking carries a high threat to the general population and/or built environment. The potential for damage is widespread. Hazards in this category may have occurred in the past.
- **Extremely High**—Very widespread with catastrophic impact.

Existing Built Environment and Assets at Risk

Vulnerability can be quantified in those instances where there is a known, identified hazard area, such as a mapped floodplain. In these instances, the numbers and types of assets subject to the identified hazard can be counted and their values, if known, tabulated. Other information can be collected in regard to the hazard area, such as the location of populations, critical facilities, historic structures, and valued natural resources. Together, this information conveys the impact, or vulnerability, of the City Planning Area to that hazard.

The vulnerability assessment identified 7 hazards in the City Planning Area for which specific geographical hazard areas have been defined and for which sufficient data exists to support a quantifiable vulnerability

analysis. These 7 hazards are dam failure, earthquake (shaking, liquefaction, and earthquake induced landslide), flood (1% and 0.2% annual chance), hazardous materials transport, landslide, levee failure, and wildfire. These hazards were analyzed using GIS, Orange County Assessor's Data, and other City data.

The vulnerability and potential impacts from the 10 hazards that do not have specific mapped areas or the data to support additional vulnerability analysis are discussed in more general terms. These include:

- Climate Change
- Drought and Water Shortage
- Flood: Localized/Stormwater
- Natural Gas Pipeline
- Pandemic
- Severe Weather: Extreme Heat
- Severe Weather: Heavy Rain and Storms
- Severe Weather: High Winds and Tornadoes
- Subsidence
- Urban Fire

For all of these hazards, whether mapped or unmapped, the following assets were inventoried, first for the City as a whole in Section 4.2 Placentia Assets Inventory and Growth and Development Trends, and then discussed within each hazard section that follows below:

- People and Populations
- Structures
- Critical Facilities and Infrastructure, and Community Lifelines
- Natural, Historic, and Cultural Resources
- Economic Assets and Community Activities of Value

Growth and Development Trends

For all hazards, a discussion of how growth and future development may be affected by each hazard is included in each of the hazard specific sections below.

Power Outages/Failure: A Common Vulnerability of all Hazards

An additional impact or vulnerability common to most all hazards is power outage or power failure. The US power grid crisscrosses the country, bringing electricity to homes, offices, factories, warehouses, farms, traffic lights and even campgrounds. According to statistics gathered by the Department of Energy, major blackouts are on the upswing. Over the past two decades, blackouts impacting at least 50,000 customers have increased 124 percent. The electric power industry does not have a universal agreement for classifying disruptions. Nevertheless, it is important to recognize that different types of outages are possible so that plans may be made to handle them effectively. Electric power disruptions can be generally grouped into two categories: intentional and unintentional.

Intentional Disruptions

There are four types of intentional disruptions:

- **Planned**: Some disruptions are intentional and can be scheduled based on maintenance or upgrading needs.
- **Unscheduled**: Some intentional disruptions must be done "on the spot." in response to an emergency.
- **Demand-Side Management**: Some customers (i.e., on the demand side) have entered into an agreement with their utility provider to curtail their demand for electricity during periods of peak system loads.
- **Load Shedding**: When the power system is under extreme stress due to heavy demand and/or failure of critical components, it is sometimes necessary to intentionally interrupt the service to selected customers to prevent the entire system from collapsing, resulting in rolling blackouts.

The California Independent System Operator (CAISO) is tasked with managing the power distribution grid that supplies most of California, except in areas served by municipal utilities. CAISO is thus the entity that coordinates statewide flow of electrical supply. CAISO uses a series of stage alerts to the media based on system conditions. The alerts are:

- Stage 1 – reserve margin falls below 7 percent.
- Stage 2 – reserve margin falls below 5 percent.
- Stage 3 – reserve margin falls below 1.5 percent.

Rotating blackouts become a possibility when Stage 3 is reached. Rotating outages and/or blackouts such as those experienced in 2000/2001, 2006, and 2020 can occur due to losses in transmission or generation and/or extremely severe temperatures that lead to heavy electric power consumption.

Unintentional Disruptions

Unintentional or unplanned disruptions are outages that come with essentially no advance notice. This type of disruption can be the most problematic. The following are categories of unplanned disruptions:

- Accident by the utility, utility contractor, or others
- Malfunction or equipment failure
- Equipment overload (utility company or customer)
- Reduced capability (equipment that cannot operate within its design criteria)
- Tree contact other than from storms
- Vandalism or intentional damage
- Weather, including lightning, wind, earthquake, flood, and broken tree limbs taking down power lines
- Wildfire that damages transmission lines

Climate Change and Power Outages/Failures (Energy Shortage)

Changing climate is expected to bring more frequent and intense natural disasters. Key climate parameters are starting to move outside of historically observed variability at a rate that makes historical data a poor predictor of future climate. For example, the warmest years on record in California occurred in 2014, 2015, 2016, 2019, 2020, and 2022. In addition, the 2016-2017 year broke the record as the wettest ever recorded in the northern Sierra Nevada Mountains. The winter of 2022-2023 also was one of the wettest recorded.

Changes in temperatures, precipitation patterns, extreme events, and sea level rise have the potential to decrease the efficiency of thermal power plants and substations, decrease the capacity of transmission lines,

render hydropower less reliable, spur an increase in electricity demand, and put energy infrastructure at risk of flooding.

With climate warming, higher costs from increased demand for cooling in the summer are expected to outweigh the decreases in heating costs in the cooler seasons. Hotter temperatures in California will mean more energy (typically measured in "cooling-degree days") needed to cool homes and businesses both during heat waves and on a daily basis, during the daytime peak of the diurnal temperature cycle. During future heat waves, historically cooler coastal cities (e.g., San Francisco and Los Angeles) are projected to experience greater relative increases in temperature, such that areas that never before relied on air conditioning will experience new cooling demands.

Secondary impacts of energy shortages are most often felt by vulnerable populations. For example, those who rely on electric power for life-saving medical equipment, such as respirators, are extremely vulnerable to power outages. Also, during periods of extreme heat emergencies, the elderly and the very young are more vulnerable to the lack of or loss of cooling systems requiring power sources.

Additional impacts from a power disruption affect remote areas. This can affect evacuation messaging and coordination difficulties, and a reduction in firefighting capabilities due to lack of water access in more remote areas (especially for those on wells).

Public Safety Power Shutoff (PSPS)

A new intentional disruption type of power shortage/failure event has been occurring in California. In recent years, several wildfires have started as a result of downed power lines or electrical equipment. This was the case for the Camp Fire in 2018. As a result, California's three largest energy companies (including Southern California Edison or SCE), at the direction of the California Public Utilities Commission (CPUC), are coordinating to prepare all Californians for the threat of wildfires and power outages during times of extreme weather. To help protect customers and communities during extreme weather events, electric power may be shut off for public safety in an effort to prevent wildfire. This is called a Public Safety Power Shutoff (PSPS).

Public Safety Power Shutoff Criteria

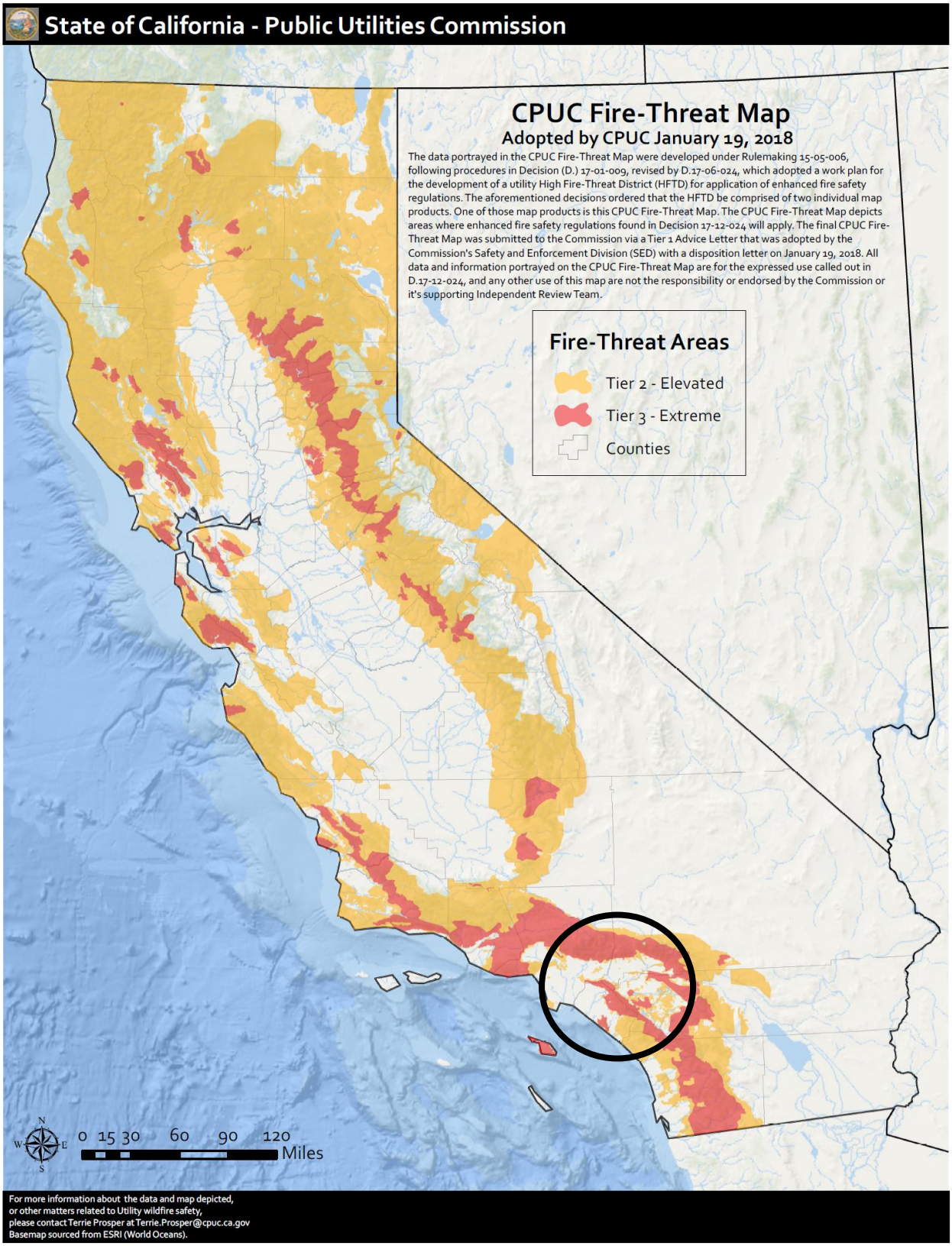
The Wildfire Safety Operations Center (WSOC) monitors fire danger conditions across Southern California Edison service area. Some of those factors include:

- A Red Flag Warning declared by the National Weather Service
- Low humidity levels generally 20% and below
- Forecasted sustained winds generally above 25 mph and wind gusts in excess of approximately 45 mph, depending on location and site-specific conditions such as temperature, terrain and local climate
- Condition of dry fuel on the ground and live vegetation (moisture content)
- On-the-ground, real time observations from SCE's WSOC and field observations from SCE crews

The most likely electric lines to be considered for shutting off for safety will be those that pass through areas that have been designated by the CPUC as at elevated (Tier 2) or extreme (Tier 3) risk for wildfire (seen on Figure 4-21). This includes both distribution and transmission lines. The specific area and number

of affected customers will depend on forecasted weather conditions and which circuits SCE needs to turn off for public safety. Although a customer may not live or work in a high fire-threat area, their power may also be shut off if their community relies upon a line that passes through an area experiencing extreme fire danger conditions. This means that any customer who receives electric service from SCE should be prepared for a possible PSPS. PSPS events, while preventative in nature, can cause a variety of issues related to the lack of power to those impacted by the PSPS. For the City, a significant concern is the impact to their communication systems as well as on other critical facilities, infrastructure and services. As seen on Figure 4-20, the City is outside the Tier 2 and Tier 3 areas but is not far from a Tier 3 area.

Figure 4-20 State of California Tier 2 and 3 Areas



SCE noted that extreme weather threats can change quickly. When possible, SCE will provide customers with advance notice prior to turning off the power, as well as updates until power is restored. Timing of notifications (when possible) are:

- Approximately 48 hours before power is turned off
- Approximately 24 hours before power is turned off
- Just before power is turned off
- During the public safety outage
- Once power has been restored

According to records provided by the City and SCE, there have been no PSPS events since 2018. According to the 2022 Placentia Reliability report supplied by SCE, it was noted that there are two PSPS circuits in Placentia – the Vera Cruz and Cancun circuits. They mostly serve customers outside the City, but a small segment of customers in the northeast tip of the City are served by these circuits. SCE has done hardening work on the Vera Cruz in recent years which will mitigate PSPS thresholds and has also installed an additional switch which allows us to segment the circuit during wind events to keep power on for more customers.

Hazard Profiles and Vulnerability Assessment by Hazard

The following sections provide the hazard profile and vulnerability assessments for each of the hazards identified in Section 4.1 Hazard Identification. ***The severe weather hazards are discussed first to paint the picture of the City's climate and hazard environment which often lead to other hazards such as flood and wildfire. The remainder of the hazards follow alphabetically.***

Data Sources

The following data sources formed the basis for the Hazard Profile and Vulnerability Assessment portion of the Plan:

- 2019 City of Placentia General Plan
- 2023 Draft California State Hazard Mitigation Plan
- CA DWR Best Available Maps
- CAL FIRE GIS datasets
- Cal OES
- Cal-Adapt
- Cal-Adapt – Annual Average of Acres Burned
- Cal Adapt – Extended Drought Scenarios
- Cal-Adapt – Number of Extreme Heat Days by Year
- Cal-Adapt – Precipitation: Decadal Averages Map
- California Adaptation Planning Guide
- California Climate Adaptation Strategy (CAS) – 2021
- California Department of Water Resources
- California Department of Water Resources (CA DWR) Division of Safety of Dams
- California Department of Water Resources Best Available Maps
- California Department of Water Resources Division of Safety of Dams

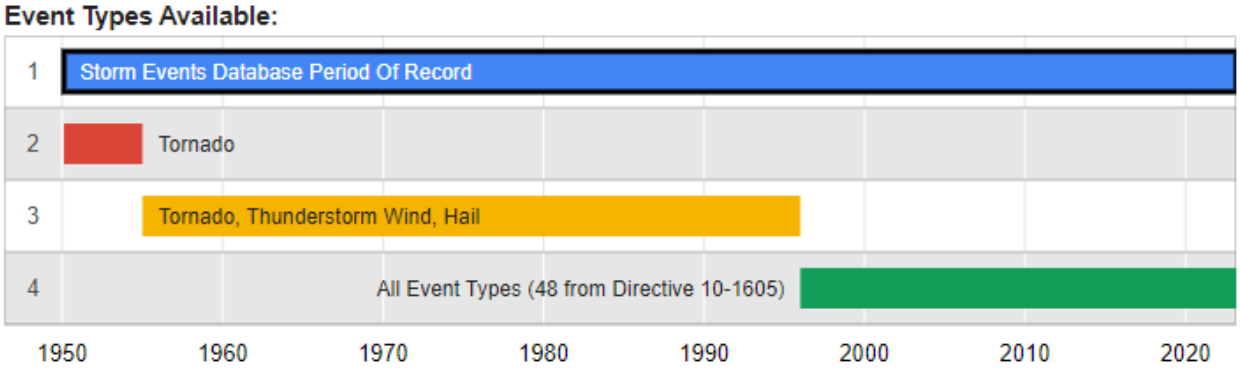
- California Division of Mines and Geology
- California Geological Survey
- California Office of Emergency Services – Dam Inundation Data
- California's Drought of 2007-2009, An Overview. State of California Natural Resources Agency, California Department of Water Resources.
- Climate Change and Health Profile Report – Orange County
- City of Placentia GIS
- City of Placentia staff
- Existing plans and studies
- FEMA
- FEMA: Building Performance Assessment: Oklahoma and Kansas Tornadoes
- FEMA's HAZUS-MH 6.0 GIS-based inventory data
- IPCC Fifth Assessment Synthesis Report (2014)
- Kenward, Alyson PhD, Adams-Smith, Dennis, and Raja, Urooj. Wildfires and Air Pollution – The Hidden Health Hazards of Climate Change. Climate Central. 2013.
- Levees in History: The Levee Challenge. Dr. Gerald E. Galloway, Jr., P.E., Ph.D., Water Policy Collaborative, University of Maryland, Visiting Scholar, USACE, IWR.
- Liu, J.C., Mickley, L.J., Sulprizio, M.P. et al. Climatic Change. 138: 655. doi:10.1007/s10584-016-1762-6. 2016.
- Multi-Hazard Identification and Risk Assessment, FEMA 1997
- National Drought Mitigation Center
- National Drought Mitigation Center – Drought Impact Reporter
- National Integrated Drought Information System
- National Levee Database
- National Oceanic and Atmospheric Administration's National Climatic Data Center
- National Weather Service
- Natural Resource and Conservation Service
- NOAA Storm Prediction Center
- Personal interviews with planning team members and staff from the City
- Proceedings of the National Academy of Sciences
- Public Health Alliance of Southern California
- Public Policy Institute of California
- Science Magazine
- Southern California Edison
- Statewide GIS datasets from other agencies such as Cal OES, FEMA, USGS, CGS, Cal Atlas, and others
- U.S. Census Bureau 2020 Household Population Estimates
- U.S. Fish and Wildlife Service
- U.S. Fish and Wildlife Service's National Wetlands Inventory maps
- U.S. Forest Service GIS datasets
- U.S. Geological Survey
- U.S. Occupational Safety and Health Administration
- United States Geological Survey Open File Report 2015-3009
- University of California
- US Army Corps of Engineers
- US Fish and Wildlife Service

- USGS Bulletin 1847
- USGS National Earthquake Information Center
- USGS Publication 2014-3120
- Vaisala National Lightning Detection Network
- Western Regional Climate Center
- Written descriptions of inventory and risks provided by City staff

4.3.1. Severe Weather: General

Severe weather is generally any destructive weather event, but usually occurs throughout the City as localized storms that bring heavy rain and strong winds. The NOAA's National Climatic Data Center (NCDC) has been tracking severe weather since 1950. Their Storm Events Database contains data on the following events shown on Figure 4-21.

Figure 4-21 NCDC Storm Events Database Period of Record



Event Types Available:
Add more info about event types here. Link to collections page/tab when referencing data collection source.

1. Tornado: From 1950 through 1954, only tornado events were recorded.

2. Tornado, Thunderstorm Wind and Hail: From 1955 through 1992, only tornado, thunderstorm wind and hail events were keyed from the paper publications into digital data. From 1993 to 1995, only tornado, thunderstorm wind and hail events have been extracted from the Unformatted Text Files.

3. All Event Types (48 from Directive 10-1605): From 1996 to present, 48 event types are recorded as defined in NWS Directive 10-1605.

Source: NCDC

This database contains severe weather events that occurred in Orange County between January 1, 1950, and October 31, 2022. These events affected the County, and most likely had some effect on the City as well. Table 4-17 summarizes these events for Orange County.

*Table 4-17 Orange County NCDC Storm Events 1/1/1950-10/31/2022**

Event Type	Number of Events	Deaths	Deaths (indirect)	Injuries	Injuries (indirect)	Property Damage	Crop Damage
Coastal Flood	8	0	0	2	0	$75,000	$0
Debris Flow	11	1	0	0	1	$388,500	$0
Dense Fog	67	0	0	0	1	$0	$0
Drought	26	0	0	0	0	$0	$0
Dust Devil	1	0	0	0	0	$0	$0
Excessive Heat	28	0	0	0	0	$0	$0
Flash Flood	51	2	2	0	0	$64,730,000	$480,000
Flood	49	0	0	0	3	$40,735,000	$242,000
Frost/Freeze	3	0	0	0	0	$0	$0
Funnel Cloud	37	0	0	0	0	$0	$0
Hail	13	1	0	0	0	$80,600	$0
Heat	24	1	0	0	0	$0	$0
Heavy Rain	37	1	0	19	0	$36,820,000	$0
Heavy Snow	3	0	0	0	0	$30,000	$0
High Surf	54	1	0	7	0	$275,000	$0
High Wind	199	1	0	0	0	$633,000	$5,500
Lightning	4	0	0	0	0	$62,000	$0
Rip Current	26	14	0	18	0	$20,000	$0
Storm Surge/Tide	3	0	0	0	0	$242,500	$0
Strong Wind	23	0	0	0	0	$560,000	$15,000
Thunderstorm Wind	34	0	0	0	0	$1,246,000	$20,000
Tornado	31	0	0	13	0	$13,994,500	$0
Tsunami	2	0	0	0	0	$0	$0
Waterspout	13	0	0	0	0	$0	$0
Wildfire	38	0	0	30	3	$91,635,000	$100,000
Winter Storm	3	0	0	0	0	$0	$0
Winter Weather	2	0	0	0	0	$0	$0
Total	**790**	**22**	**2**	**89**	**8**	**$251,527,100**	**$862,500**

Source: NCDC

*Note: Losses reflect totals for all impacted areas, some of which fell outside of the City and outside of Orange County.

The NCDC table above summarizes severe weather events that occurred in greater Orange County. Only a few of the events actually resulted in state and federal disaster declarations. It is interesting to note that different data sources capture different events during the same time period, and often display different information specific to the same events. While the City recognizes these inconsistencies, they see the value this data provides in depicting Placentia's "big picture" hazard environment.

As previously mentioned, many of Orange County's state and federal disaster declarations have been a result of severe weather. For this Plan, severe weather is discussed in the following subsections:

- Extreme Heat
- Heavy Rains and Storms
- High Winds and Tornadoes

The remainder of the hazards follow alphabetically.

4.3.2. Severe Weather: Extreme Heat

Hazard Profile

This hazard profile contains multiple sections that detail how this hazard can affect the City. These sections include a hazard/problem description; description of location and extent; past occurrences of this hazard; and how climate change can affect this hazard.

Hazard/Problem Description

According to information provided by FEMA, extreme heat is defined as temperatures that hover 10 degrees or more above the average high temperature for the region and last for several weeks. Heat kills by taxing the human body beyond its abilities. According to the US Center for Disease Control (CDC), in a normal year, about 658 Americans succumb to the demands of summer heat. In the 40-year period from 1936 through 1975, nearly 20,000 people were killed in the United States by the effects of heat and solar radiation. In the heat wave of 1980, more than 1,250 people died. According to NASA, 2021 was one of the hottest years on record. Recently in California, records were set across the state during a September 2022 heat event. Extreme heat can also significantly impact natural resources and can increase the risk of wildfires.

Heat disorders generally have to do with a reduction or collapse of the body's ability to shed heat by circulatory changes and sweating or a chemical (salt) imbalance caused by too much sweating. When heat gain exceeds a level at which the body can remove it, or when the body cannot compensate for fluids and salt lost through perspiration, the temperature of the body's inner core begins to rise, and heat-related illness may develop. Elderly persons, small children, low-income households, individuals with chronic medical issues, outdoor workers, and even athletes are particularly susceptible to heat issues.

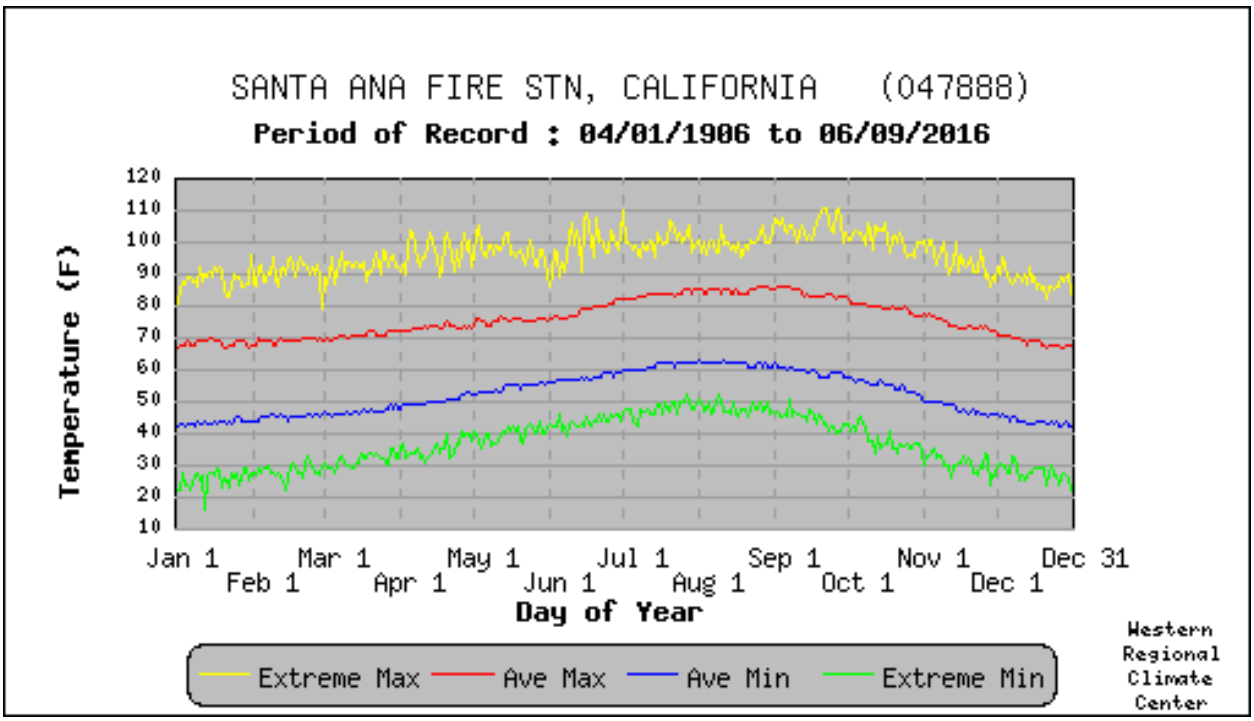
Location and Extent

Extreme heat events occur on a regional basis. The City has many extreme heat days due to its location in Southern California. All portions of the City are at risk to extreme heat. The Western Regional Climate Center (WRCC) and National Weather Service (NWS) maintain data on weather normal and extremes in the western United States. WRCC data goes further back in time (with a period of record from 1906 to 2016), while the NWS data is more recent (with a period of record from 1991 to 2022). The use of both datasets gives a more comprehensive look at weather normal and extremes. WRCC and NWS data for the City is summarized below.

Santa Ana Fire Station WRCC Weather Station, Period of Record 1906 to 2016

According to the WRCC, monthly average maximum temperatures in the warmest months (June through September) range from the upper-70s to the mid-80s. The highest recorded daily extreme was 112°F on June 14, 1917. In a typical year, maximum temperatures exceed 90°F on 24.8 days. Figure 4-22 shows the average daily high temperatures and extremes for the City. Table 4-18 shows the record high temperatures by month for the City.

Figure 4-22 City of Placentia — Daily Temperature Averages and Extremes



Source: Western Regional Climate Center, www.wrcc.dri.edu/. Retrieved 3/6/2023.

Table 4-18 City of Placentia – Record High Temperatures 1906 to 2016

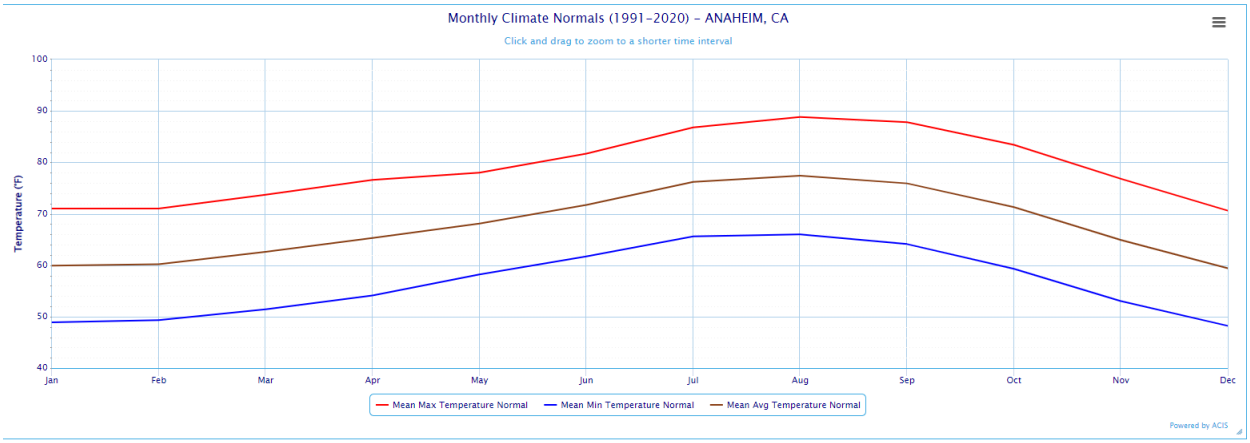
Month	Record High	Date	Month	Record High	Date
January	96°	1/31/2003	July	110°	7/1/1985
February	95°	2/20/1995	August	105°	8/10/1935
March	98°	3/25/1988	September	111°	9/21/1939
April	104°	4/5/1989	October	106°	10/16/1958
May	105°	5/3/2004	November	101°	11/1/1966
June	112°	6/14/1917	December	95°	12/3/1958

Source: Western Regional Climate Center

Anaheim, CA NWS Station

According to the NWS, monthly average maximum temperatures in the warmest months (June through September) range from the mid- to upper-70s. The highest recorded daily extreme was 109°F on September 5, 2020, and September 27, 2010. Figure 4-23 shows the average daily high temperatures and extremes for the City. Table 4-19 shows the record high temperatures for the City.

Figure 4-23 Daily Temperature Averages and Extremes, 1991-2022



Month	Mean Max Temperature Normal (°F)	Mean Min Temperature Normal (°F)	Mean Avg Temperature Normal (°F)
January	71.0	48.9	59.9
February	71.0	49.3	60.2
March	73.7	51.4	62.6
April	76.6	54.1	65.3
May	78.0	58.2	68.1
June	81.7	61.7	71.7
July	86.8	65.6	76.2
August	88.8	66.0	77.4
September	87.8	64.1	75.9
October	83.4	59.3	71.3
November	76.8	53.0	64.9
December	70.6	48.2	59.4
Annual	78.8	56.7	67.7

Source: National Weather Service XMAC site. Retrieved 5/9/2023.

Table 4-19 Record High Temperatures (Descending) 1942 to 2021

Temperature	Date
109.0°	9/5/2020
109.0°	9/27/2010
108.0°	9/5/2004
108.0°	9/30/1999
107.0°	9/4/2022
107.0°	9/28/2010
107.0°	9/26/2010
107.0°	9/3/2007
107.0°	7/23/2006
107.0°	7/22/2006

Period of record: 4/21/1942 to 1/15/2021

Heat emergencies are often slower to develop, taking several days of continuous, oppressive heat before a significant or quantifiable impact is seen. The NWS has in place a system to initiate alert procedures (advisories or warnings) when extreme heat is expected to have a significant impact on public safety. The expected severity of the heat determines whether advisories or warnings are issued. The NWS HeatRisk forecast provides a quick view of heat risk potential over the upcoming seven days. The heat risk is portrayed in a numeric (0-4) and color (green/yellow/orange/red/magenta) scale which is similar in approach to the Air Quality Index (AQI) or the UV Index. This can be seen in Table 4-20.

Table 4-20 National Weather Service HeatRisk Categories

Category	Level	Meaning
Green	0	No Elevated Risk
Yellow	1	Low Risk for those extremely sensitive to heat, especially those without effective cooling and/or adequate hydration
Orange	2	Moderate Risk for those who are sensitive to heat, especially those without effective cooling and/or adequate hydration
Red	3	High Risk for much of the population, especially those who are heat sensitive and those without effective cooling and/or adequate hydration
Magenta	4	Very High Risk for entire population due to long duration heat, with little to no relief overnight

Source: National Weather Service

The NWS office in Los Angeles can issue the following heat-related advisory as conditions warrant.

- **Heat Advisories** are issued during events where the HeatRisk is on the Orange/Red threshold (Orange will not always trigger an advisory)
- **Excessive Heat Watches/Warnings** are issued during events where the HeatRisk is in the Red/Magenta threshold

Extreme heat is made worse when it is experienced over a longer duration of time.

Past Occurrences

Disaster Declaration History

There have been no FEMA or Cal OES disaster declarations in Orange County related to extreme heat, as shown in Table 4-4.

NCDC Events

The NCDC has tracked heat and extreme heat events since 1996 for Orange County. 52 events were recorded as shown in Table 4-21. More events have likely occurred, without being reported to the NCDC database. Specifics on damages in the City were not included in the database.

*Table 4-21 City of Placentia – Orange County Heat Events 1/1/1996-10/31/2022**

Event Type	Number of Events	Deaths	Deaths (indirect)	Injuries	Injuries (indirect)	Property Damage	Crop Damage
Excessive Heat	28	0	0	0	0	$0	$0
Heat	24	1	0	0	0	$0	$0
Total	**52**	**1**	**0**	**0**	**0**	**$ 0**	**$ 0**

Source: NCDC

*Deaths, injuries, and damages are for the entire event, and may not be exclusive to the City or Orange County.

Hazard Mitigation Planning Committee Events

The City noted a 2015 extreme heat event occurring during the Heritage Day Parade in Placentia. A KTLA website article from October 10, 2015, described the event:

> ***Heritage Day Parade in Placentia had to be stopped after at least 61 people came down with heat-related illnesses, according to the city's Police Department. Police and the Orange County Fire Authority responded to the 2150 block of Kramer Boulevard at about 11:45 a.m. after multiple people were reported to have fallen ill along the parade route, fire officials said. The location was near a middle school. A triage station was set up at the scene. Forty units from the Fire Authority, and Fullerton, Brea, and Anaheim fire departments were assisting in treating the patients. Nineteen people were transported by ambulance, according to police.***

The HMPC noted that other Heritage Day Parade incidents have occurred. Much of this is attributed to the use of woolen band marching uniforms, combined with the Parade being held during the hot summer months. This has caused multiple other cases of heat exhaustion during Heritage Day.

The City noted that other effects related to extreme heat can be felt during times of drought (discussed in Section 4.3.7) and can contribute to the wildfire hazard (discussed in Section 4.3.14) and PSPS events (discussed above in Section 4.3.1).

Probability of Future Occurrences

Highly Likely—Extreme Heat is likely to continue to occur annually in the City. According to the WRCC, temperatures at or above 90°F occur on 24.8 summer days in the City each year.

Climate Change and Extreme Heat

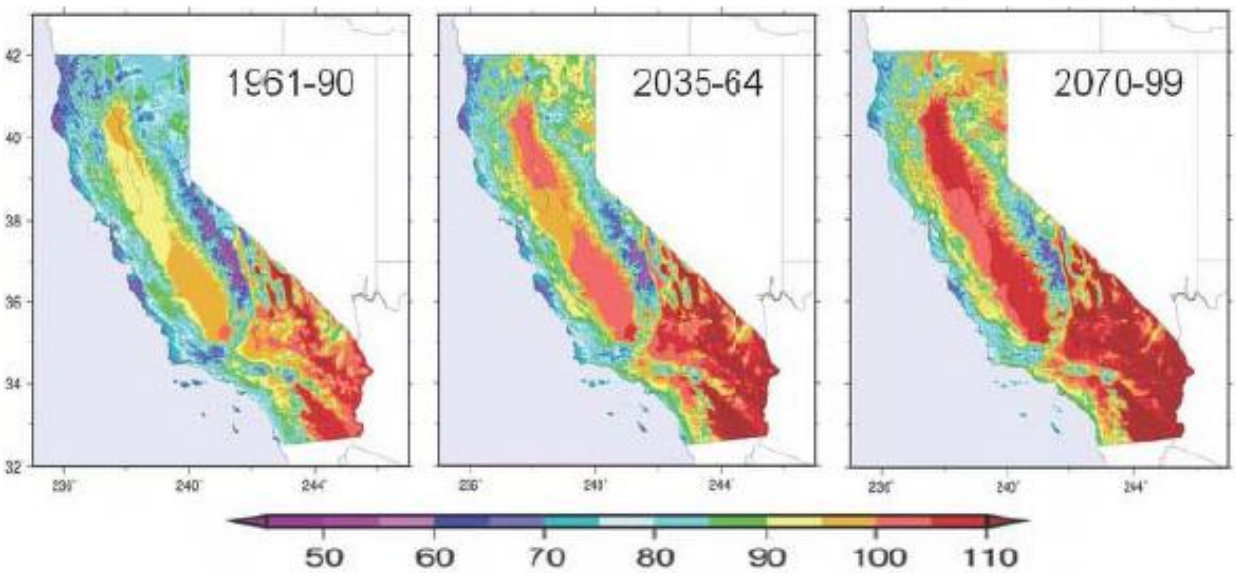
Climate change and its effect on extreme heat in and around the City is discussed by three sources:

- California Climate Adaptation Strategy (CAS) – 2021
- Climate Change and Health Profile Report (CCHPR) – Orange County (2017)
- Cal-Adapt

Climate Adaptation Strategy

The 2021 CAS, citing a California Energy Commission study, states that "over the past 15 years, heat waves have claimed more lives in California than all other declared disaster events combined." This study shows that California is getting warmer, leading to an increased frequency, magnitude, and duration of heat waves. These factors may lead to increased mortality from excessive heat, as shown in Figure 4-24.

Figure 4-24 California Historical and Projected Temperature Increases – 1961 to 2099



Source: Dan Cayan; California Climate Adaptation Strategy

As temperatures increase, populations in California and the City will likely face increased risk of death from dehydration, heat stroke, heat exhaustion, heart attack, stroke and respiratory distress caused by extreme heat. According to the 2021 CAS report and the 2023 (Draft) State Hazard Mitigation Plan, by 2100, hotter temperatures are expected throughout the State, with projected increases of 3-5.5°F (under a lower emissions scenario) to 8-10.5°F (under a higher emissions scenario). These changes could lead to an increase in health issues and deaths related to extreme heat in the City.

Climate Change and Health Profile Report – Orange County

The CCHPR noted for Orange County that increased temperatures manifested as heat waves and sustained high heat days directly harm human health through heat-related illnesses (mild heat stress to fatal heat stroke) and the exacerbation of pre-existing conditions in the medically fragile, chronically ill, and vulnerable. Increased heat also intensifies the photochemical reactions that produce smog and ground level ozone and fine particulates (PM2.5), which contribute to and exacerbate respiratory disease in children and adults. Increased heat and carbon dioxide enhance the growth of plants that produce pollen, which are associated with allergies. Increased temperatures add to the heat load of buildings in urban areas and exacerbate existing urban heat islands adding to the risk of high ambient temperatures.

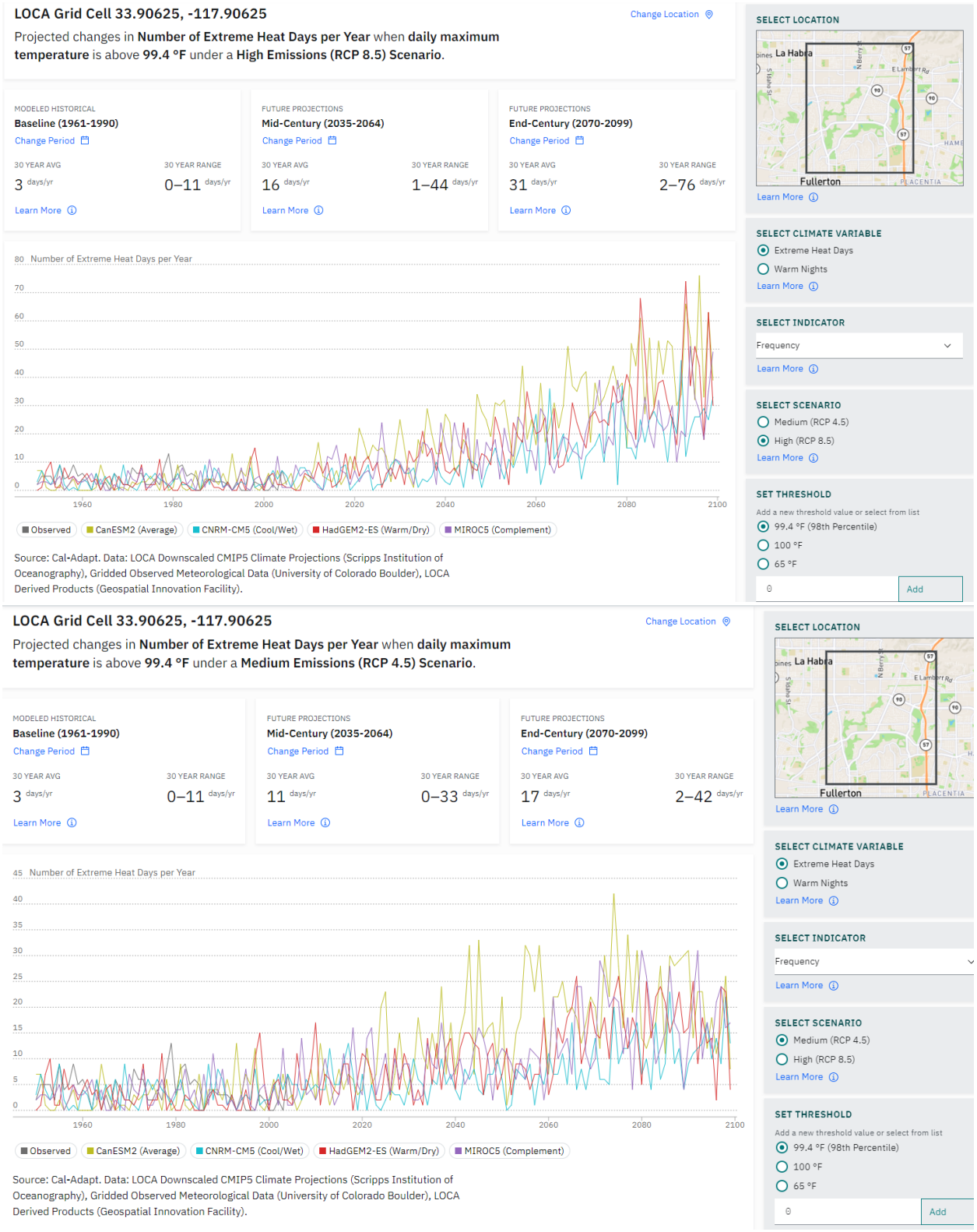
Cal-Adapt

Cal Adapt also noted that overall temperatures are expected to rise substantially throughout this century. During the next few decades, scenarios project average temperature to rise between 1 and 2.3°F; however, the projected temperature increases begin to diverge at mid-century so that, by the end of the century, the temperature increases projected in the higher emissions scenario (RCP 8.5) are approximately twice as high as those projected in the lower emissions scenario (RCP 4.5).

These projections also differ depending on the time of year and the type of measurement (highs vs. lows), all of which have different potential effects to the state's ecosystem health, agricultural production, water use and availability, and energy demand. Future temperature estimates from Cal-Adapt for the City are shown in Figure 4-25 for Orange County. Each show the following:

- The upper chart shows the number of days in a year when daily maximum temperature is above the extreme heat threshold of 90.0°F. Data is shown for the City under the RCP 8.5 scenario in which emissions continue to rise strongly through 2050 and plateau around 2100.
- The lower chart shows the number of days in a year when daily maximum temperature is above the extreme heat threshold of 90.0 °F. Data is shown for the City under the RCP 4.5 scenario in which emissions peak around 2040, then decline.

Figure 4-25 City of Placentia– Future Temperature Estimates in High and Low Emission Scenarios



Source: Cal-Adapt – Temperature: Decadal Averages Map. Retrieved on 3/6/2023.

Vulnerability Assessment

Vulnerability—Medium

The City lies in an urban heat island. Large, urbanized areas can experience higher temperatures, greater pollution and more negative health impacts during hot summer months when compared to more rural communities. This phenomenon is known as an urban heat island. Heat islands are created by a combination of heat-absorptive surfaces (such as dark pavement and roofing), heat-generating activities (such as engines and generators) and the absence of vegetation (which provides evaporative cooling). According to the U.S. Environmental Protection Agency, daytime temperatures in urban areas are on average 1-6° F higher than in rural areas, while nighttime temperatures can be as much as 22° F higher as the heat is gradually released from buildings and pavement. The Urban Heat Island Index, developed by the California Environmental Protection Agency, quantifies the extent and severity of urban heat islands for individual cities, including urban heat island interactive maps that show the urban heat island effect for each census tract in and around most urban areas throughout the State. This is shown on Figure 4-26. Though there is no legend to the map, any area covered by green indicates the urban heat island effect. The darker colors indicate areas with greater effect.

Figure 4-26 City of Placentia – Urban Heat Island

Source: Cal EPA. Map retrieved 3/27/2023.

Vulnerability of the community is discussed in multiple sections that detail how this hazard can affect the City. These sections include assets at risk, impacts, and how future development can be affected by this hazard.

Assets at Risk from Extreme Heat

Assets at risk from extreme heat include: people and populations; structures; critical facilities and infrastructure, and community lifelines; natural, historic, and cultural resources; and economic assets and community activities of value. These are discussed in the following sections.

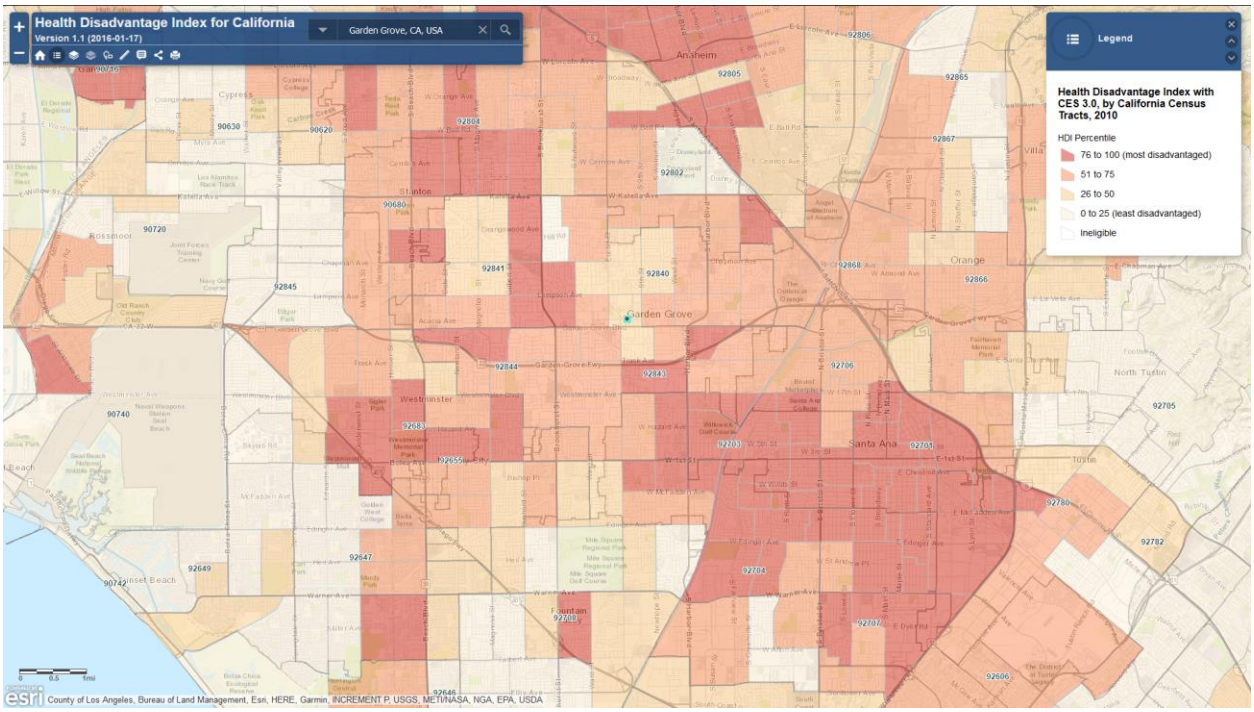
People and Populations

All populations are at some vulnerability to heat. Certain vulnerable populations are at the greatest risk to the effects of extreme heat. Vulnerable populations to extreme heat include:

- Unsheltered and those unable to afford cooling systems during extreme heat events
- Infants and children under age five and their caregivers
- Non-English speakers
- Elderly (65 and older)
- Individuals with disabilities
- Individuals dependent on medical equipment
- Individuals who exercise, physically train, or compete outdoors
- Individuals who work outdoors
- Individuals with impaired mobility

The Public Health Alliance has developed a composite index to identify cumulative health disadvantage in California. Factors such as those bulleted above were combined to show what areas are at greater risk to hazards like extreme heat. This is shown on Figure 4-27. This was also shown, using a different data set, on Figure 4-1.

Figure 4-27 Health Disadvantage Index by California Census Tract



Source: Public Health Alliance of Southern California

In addition to vulnerable populations, pets are at risk to extreme heat. The HMPC noted that there is a need for animal care areas so more people can utilize the cooling centers. This is also a larger shelter issue. Many people won't go to shelters unless there are accommodations in place for their pets.

Structures

Extreme heat normally does not generally impact structures, but City residents and City staff working in structures may be affected during periods of extended heat, especially in homes and structures that might not be equipped with air conditioning. During extended periods of high temperatures, extreme heat may overload the demands for electricity to run air conditioners and can present health concerns to individuals. The City noted that extreme heat has caused brownout conditions in the past. A brownout is a reduction in or restriction on the availability of electrical power in a particular area. When brownouts happen during extreme heat, the risk of heat related illnesses and deaths increase. Also depending on the structure, sensitive contents such as IT equipment can be impacted, especially if a power outage occurs.

Critical Facilities and Infrastructure, and Community Lifelines

Extreme heat normally does not generally impact structures (like the City's critical facilities), but City staff working in structures may be affected during periods of extended heat, especially in structures that might not be equipped with air conditioning. Schools may close during these times as well. Buildings housing at risk populations may have their residents/users be impacted. The same issues with power that affect structures in the section above, will also likely affect critical facilities and infrastructure.

Community lifelines while likely to be affected by extreme heat events, are not likely to become overwhelmed. Impacts to these lifelines include:

- **Safety and Security** – Police and fire personnel may see additional demand during extreme heat. This causes police and fire personnel to be exposed to the effects of higher heat.
- **Food, Hydration, Shelter** – Water distribution may need to occur during extreme heat events. Additional water supplies may need to be procured. Cooling centers and other public shelters will need to be open and staffed.
- **Health and Medical** – Heat stroke and exhaustion may occur with greater frequency. This can cause EMS and ER personnel to have a large influx of those needing medical attention.
- **Energy** – Power outages can occur in extreme heat situations. Power outages during extreme heat can cause air conditioning systems to go offline, causing injuries or deaths. PSPS events can also occur during times of extreme heat, causing the electric grid to temporarily go offline.
- **Communication**s – Communication infrastructure may be impacted during extreme heat events. Alert warnings and messages may need to be given to the general public. These systems can be temporarily overloaded during emergency events. They also could be affected during related power outages. Communications and IT equipment located inside these facilities may also be at risk to extreme heat.
- **Water Systems** – Water systems can be taxed during extreme heat as residents use additional water to keep cool.

While community lifelines can be affected by extreme heat events, they are not likely to be overwhelmed with the exception of the power grid. As discussed above, extreme heat can contribute to power interruptions and outages that can lead to additional impacts and concerns. Backup power sources should be in place to keep critical facilities and community lifelines online and functioning.

Natural, Historic, and Cultural Resources

City park areas and natural resource assets may be vulnerable during periods of extreme heat. These include turfed areas; landscape, trees that are already compromised from an extended drought, and habitat areas. Recently, trees were lost that were weakened by drought and extreme heat. Extreme heat may also cause drought-like conditions. For example, several weeks of extreme heat increases evapotranspiration and reduces moisture content in vegetation, leading to higher wildfire vulnerability in the region for that time period even if the rest of the season is relatively moist. Historic and cultural resources are not expected to be affected by extreme heat. The HMPC noted, however, that these structures may be less likely to have air conditioning.

Economic Assets and Community Activities of Value

During periods of extreme heat, the economy may slow as people stay home or inside. Tourism revenue and taxable shopping and dining revenue may be lost during periods of extreme heat. Additionally, extreme heat causes power costs borne by individuals and businesses in the City to increase, which reduces the amount of money available to circulate inside the local economy.

As noted in the past occurrences discussion, the Heritage Parade has been affected and impacted by extreme heat. Area tourism may slow during these times as well, such as vacations to nearby Disneyland.

Impacts from Extreme Heat

Extreme heat is becoming more frequent, intense, longer lasting and geographically widespread. Extreme heat occurs on an annual basis in the City. In recent years, compounded by climate change conditions, summer months continue to get a bit hotter, causing possible greater impacts. Extreme heat dries out vegetation in the City and Orange County, contributing to the extreme stress and loss of natural resources and creating greater risks from regional wildfires. Heat, combined with low humidity and high winds, can contribute to wildfire conditions and cause SCE to issue a PSPS event for areas with a high risk of wildfire which includes the very northeast portion of the City. Air conditioning used during extreme heat events increases energy demand and could increase the risk of power outages. An extended power outage event can lead to other impacts associated with power loss. Direct impacts from extreme heat include:

- Poor air quality, which can occur when stagnant atmospheric conditions trap humid air and pollutants near the ground. Ozone, a major component of smog, is created in the presence of sunlight via reactions between chemicals in gasoline vapors and industrial smokestacks. Hot weather can increase ozone levels. High ozone levels often cause or worsen respiratory problems.
- Risk of heat stroke injuries and deaths to humans – especially among vulnerable populations.
- Increased stress, migration, and death in plants and animals.

Impacts to identified assets at risk to this hazard and the overall vulnerability of the City may be affected in the future by climate change, changes in population patterns (migration, density, or the makeup of socially vulnerable populations), and changes in land use and development.

As discussed in the hazard profile section, climate change is anticipated to exacerbate this hazard over time. The City is approaching built out conditions. Population projections for the City show very limited growth over the next 25 years. Populations are anticipated to grow by only 7.3% between 2025 and 2050, which equates to an annual growth of 0.29%, thus future population growth should not increase the potential impacts from this hazard on City assets. With respect to population patterns such as those associated with migration, density, or makeup of socially vulnerable populations the data shows that most socially vulnerable populations and disadvantaged communities are concentrated in the western portion of the City. Also, FEMA's National Risk Index for Orange County is rated as Very High. Since extreme heat can occur anywhere in the City, if these population patterns continue to show an increase in vulnerable populations, the vulnerability and potential impacts to these City assets to extreme heat will continue to increase in the future.

As described in the land use discussion at the end of Section 4.2.2, a new land use map was developed as part of the General Plan efforts in 2023, which establishes the basic pattern of development in the City for the next 20-25 years, including land uses and densities. While future development within hazard areas generally contributes to some increase of impacts on City assets, given the limited potential for significant future growth in Placentia, and that extreme heat affects the whole of the City, future changes in land use and development are unlikely to contribute to any notable change in the vulnerability of the City to this hazard.

Indirect impacts from heat include droughts, wildfires, and power failures. Drought impacts are discussed further in Section 4.3.7 and wildfire in Section 4.3.14. Power failure impacts are discussed in the beginning of Section 4.3.

Future Development

Future development in the City will take extreme heat into account. Backup generators are currently in use at many City facilities, and additional generators and backup power sources are being sought for other locations. The City will continue to consider extreme heat when designing new facilities, including incorporating techniques for climate or heat proofing structures. The City is looking to incorporate heat island reduction strategies—such as green or cool roofs, cool pavements, or increased vegetation and trees—into long-term planning efforts to help lower urban temperatures. One way to reduce the negative impacts of an extreme heat event is to develop a comprehensive heat response plan that combines individual strategies into an integrated approach. Components of such a plan might include forecasting and monitoring, education and awareness, and heat wave preparedness and response.

In addition to a comprehensive heat response plan, local officials can help urban areas adapt to extreme heat in the short-term by improving the resilience of infrastructure. Transportation planners can protect or modify roads, bridges, and other structures—for example, by using materials that are more resilient and heat tolerant—to help these systems withstand higher temperatures and reduce service disruptions. They can also implement energy efficiency and conservation efforts to reduce stress on electricity systems during heat waves and help avoid power outages.

4.3.3. Severe Weather: Heavy Rains and Storms

Hazard Profile

This hazard profile contains multiple sections that detail how this hazard can affect the City. These sections include a hazard/problem description; description of location and extent; past occurrences of this hazard; and how climate change can affect this hazard.

Hazard/Problem Description

Storms in the City are generally characterized by heavy rain often accompanied by strong winds and infrequent lightning and hail. Approximately 10 percent of the thunderstorms that occur each year in the United States are classified as severe. A thunderstorm is classified as severe when it contains one or more of the following phenomena: hail that is three-quarters of an inch or greater, winds in excess of 50 knots (57.5 mph), or a tornado. Heavy precipitation in the City falls mainly in the fall, winter, and spring months.

Heavy Rain and Storms

The NWS reports that storms and thunderstorms result from the rapid upward movement of warm, moist air. They can occur inside warm, moist air masses. As the warm, moist air moves upward, it cools, condenses, and forms cumulonimbus clouds that can reach heights of greater than 35,000 ft. As the rising air reaches its dew point, water droplets and ice form and begin falling the long distance through the clouds towards earth's surface. As the droplets fall, they collide with other droplets and become larger. The falling droplets create a downdraft of air that spreads out at Earth's surface and causes strong winds associated with thunderstorms.

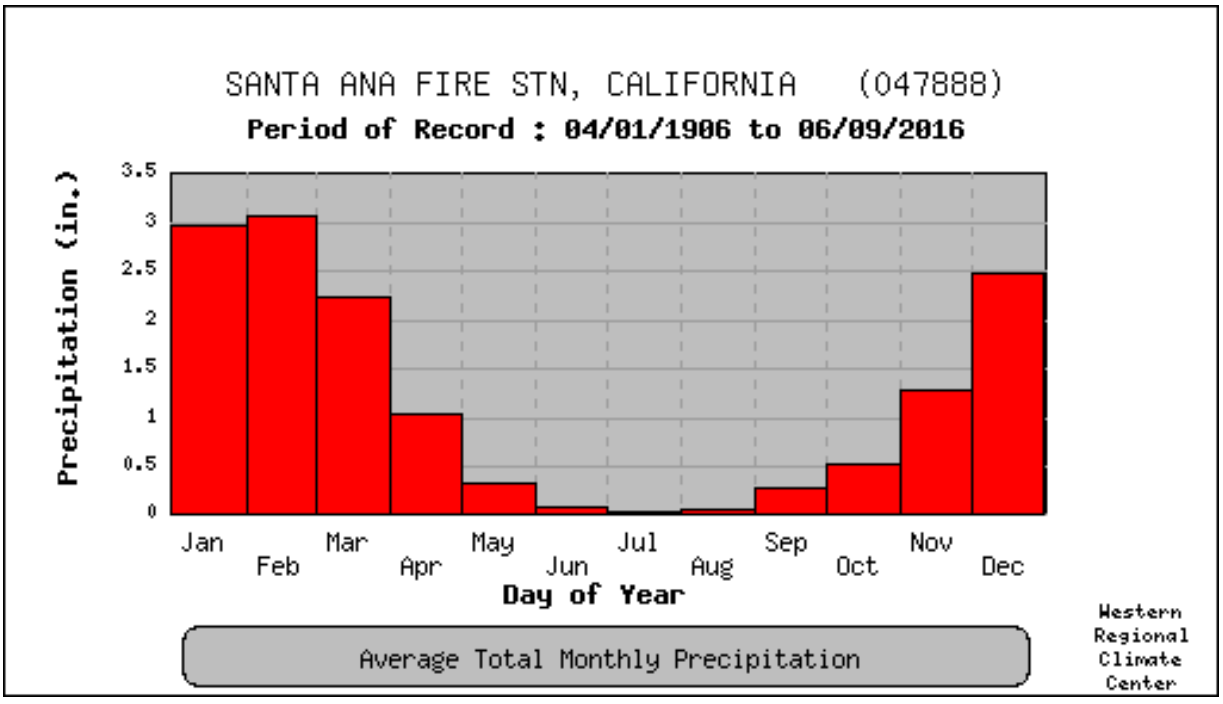
Location and Extent of Heavy Rains and Storms

Heavy rain events occur on a regional basis. Rain and storms can occur in any location of the City; as such, all portions of the City are at risk to heavy rains. Most of these rains occur during the late fall, winter, and early spring months, as discussed below (with problem flooding areas associated with heavy rains and storms shown in Table 4-80 in Section 4.3.10 Flood: Localized Stormwater. There is no scale by which heavy rain and storms are measured. Thunderstorms are rare in the City. Magnitude of storms is measured often in rainfall and damages. The speed of onset of heavy rains can be short, but accurate weather prediction mechanisms often let the public know of upcoming events. Duration of heavy rain and storms in California is often short, ranging from minutes to hours. The WRCC and NWS maintain data on weather normal and extremes in the western United States. WRCC data goes further back in time (with a period of record from 1906 to 2016), while the NWS data is more recent (with a period of record from 1991 to 2022). The use of both datasets gives a more comprehensive look at weather normal and extremes. WRCC and NWS data for the City is summarized below.

Santa Ana Fire Station, Period of Record 1906 to 2016

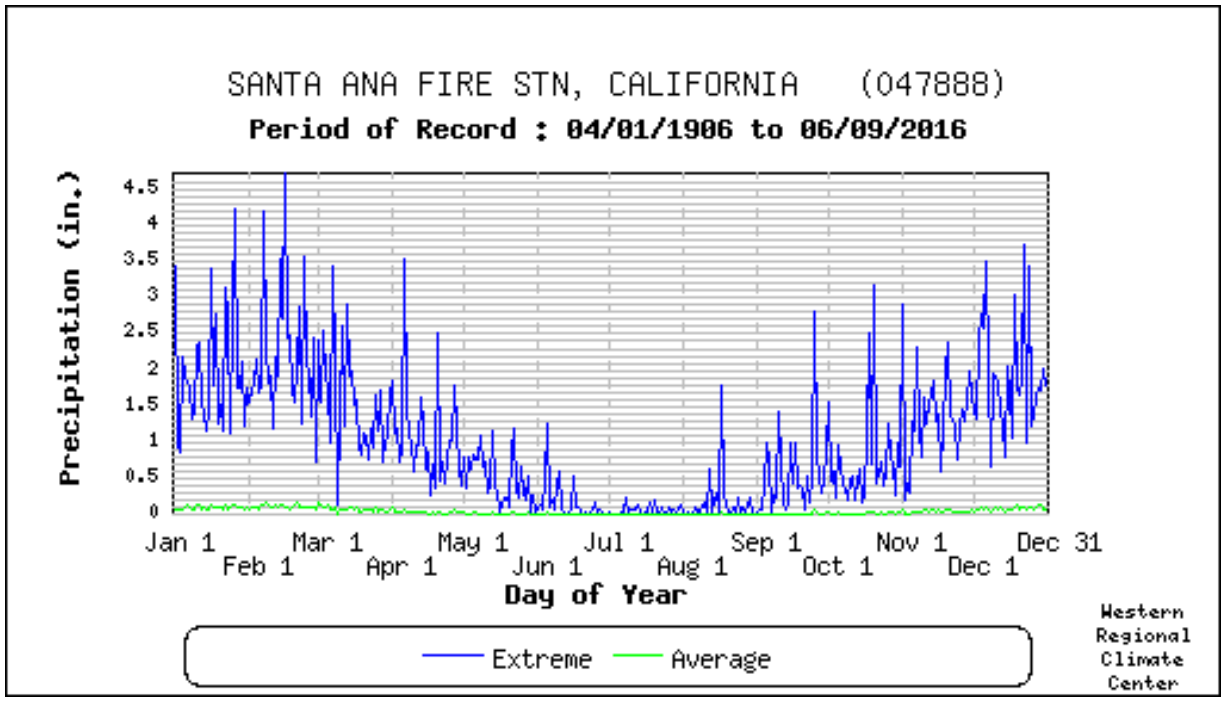
According to the WRCC, average annual precipitation in the City is 13.69 inches per year. The highest recorded annual precipitation is 32.36 inches in 1941; the highest recorded precipitation for a 24-hour period is 4.69 inches on February 16, 1972. The lowest recorded annual precipitation was 3.55 inches in 1961. Average monthly precipitation for the City is shown in Figure 4-28. Daily average and extreme precipitations are shown in Figure 4-29.

Figure 4-28 City of Placentia – Monthly Average Total Precipitation



Source: Western Regional Climate Center, www.wrcc.dri.edu/. Retrieved 3/6/2023.

Figure 4-29 City of Placentia – Daily Average and Extreme Precipitation

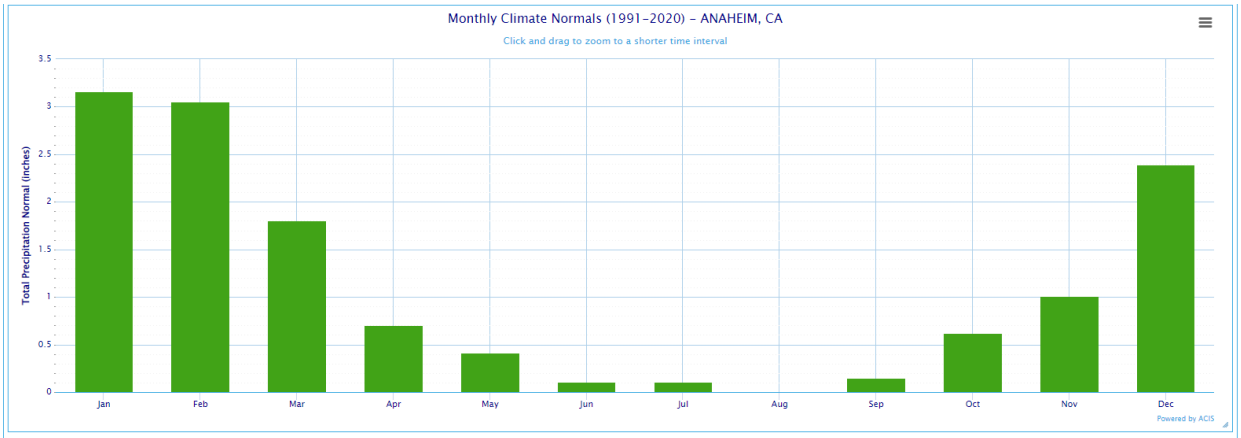


Source: Western Regional Climate Center, www.wrcc.dri.edu/. Retrieved 3/6/2023.

Anaheim, CA NWS Station

According to the NWS, average annual precipitation in and around Placentia since 1991 averages 13.52 inches. Figure 4-30 shows the average precipitation by month for the City.

Figure 4-30 Precipitation Averages – 1991-2022

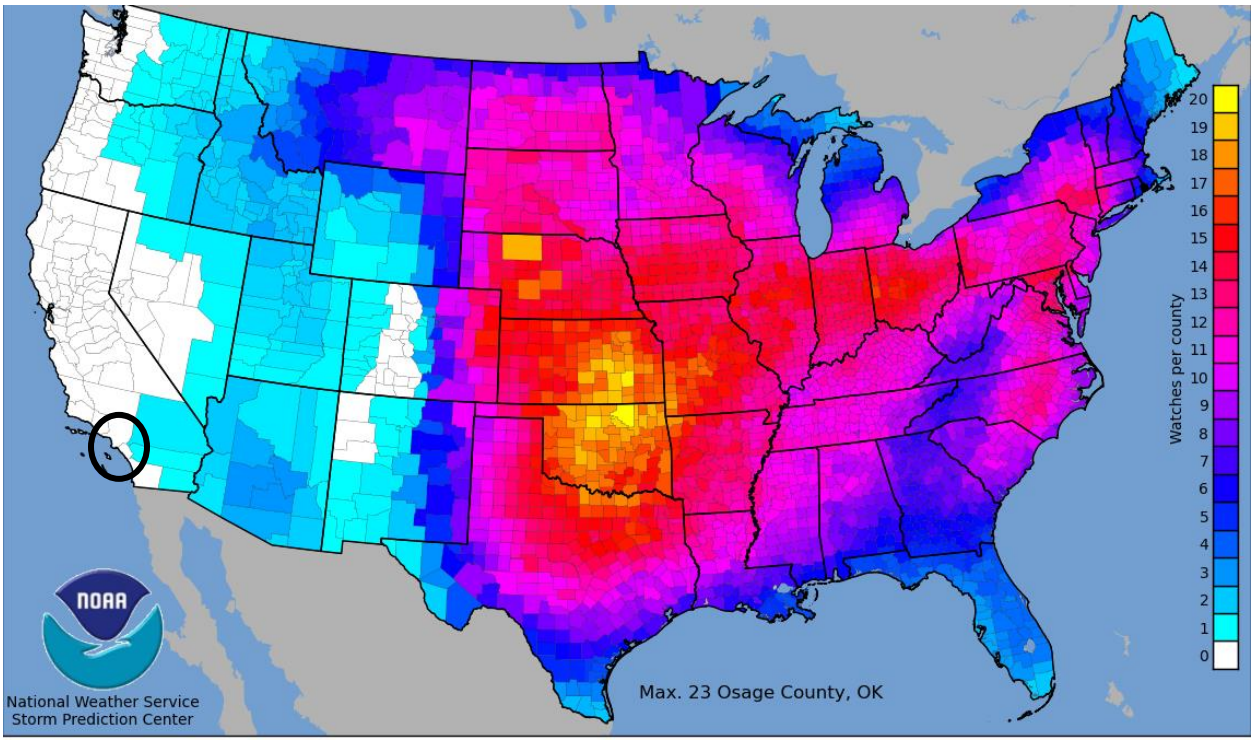


Month	Total Precipitation Normal (inches)
January	3.16
February	3.05
March	1.80
April	0.70
May	0.41
June	0.11
July	0.11
August	0.01
September	0.15
October	0.62
November	1.01
December	2.39
Annual	13.52

Source: National Weather Service XMAC site. Retrieved 5/9/2023.

The NOAA Storm Prediction Center tracks thunderstorm watches in the United States on a county basis. Figure 4-31 shows thunderstorm watches in and around the City and the United States for a 20-year period between 1993 and 2012. Though dated 2012, this is the most recent version of this map.

Figure 4-31 City of Placentia – Average Thunderstorm Watches per Year (1993 to 2012)



Source: NOAA Storm Prediction Center. Retrieved on 3/6/2023.

Hail

Hail events in the City are rare; however, hail can occur throughout the City during storm events. Hail is formed when water droplets freeze and thaw as they are thrown high into the upper atmosphere by the violent internal forces of thunderstorms. Hailstones are usually less than two inches in diameter and can fall at speeds of 120 miles per hour (mph). Severe hailstorms can be quite destructive, causing damage to roofs, buildings, automobiles, vegetation, and crops.

Location and Extent of Hail

While rare, hail events can occur in any location of the City. All portions of the City are at risk to hail. There is no scale in which to measure hail, other than hail stone size. The National Weather Service classifies hail by diameter size, and corresponding everyday objects to help relay scope and severity to the population. Table 4-22 indicates the hailstone measurements utilized by the National Weather Service.

Table 4-22 Hailstone Measurements

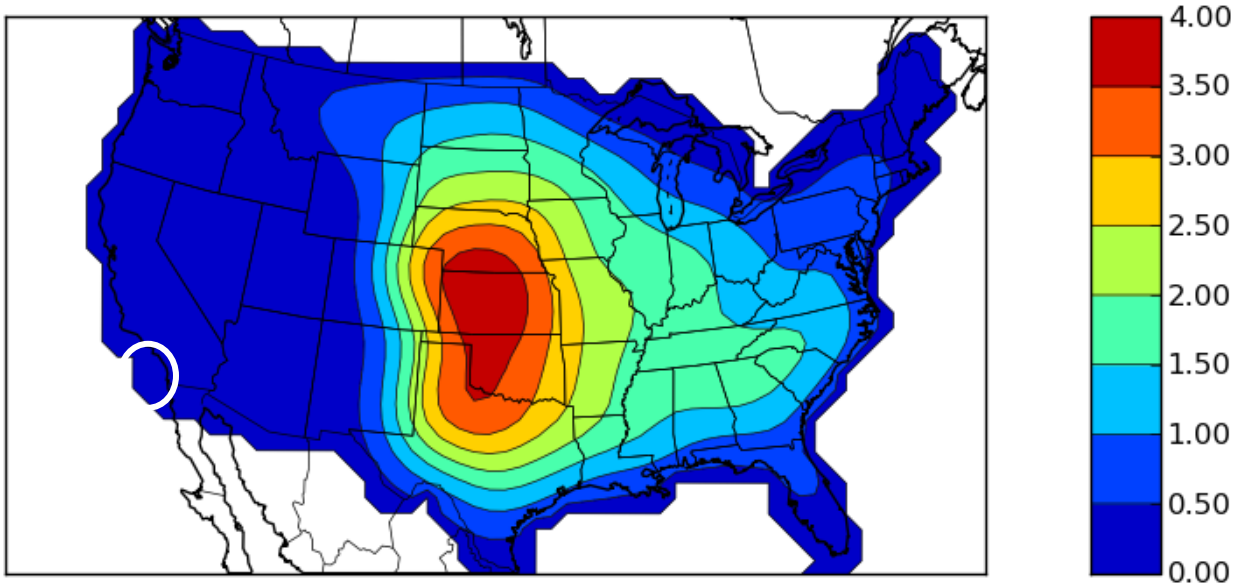
Average Diameter	Corresponding Household Object
.25 inch	Pea
.5 inch	Marble/Mothball
.75 inch	Dime/Penny
.875 inch	Nickel

Average Diameter	Corresponding Household Object
1.0 inch	Quarter
1.5 inch	Ping-pong ball
1.75 inch	Golf-Ball
2.0 inch	Hen Egg
2.5 inch	Tennis Ball
2.75 inch	Baseball
3.00 inch	Teacup
4.00 inch	Grapefruit
4.5 inch	Softball

Source: National Weather Service

The speed of onset of hail can be short, but accurate weather prediction mechanisms often let the public know of upcoming events. Duration of thunderstorms that can cause hail in California is often short, ranging from minutes to hours. Hail events last shorter than the duration of the total thunderstorm. The National Weather Service tracks hail events. Figure 4-32 shows the average days each year where hail of greater than 1" in diameter occurred during a 20-year period from 1990 to 2009. Though dated 2009, this is the most recent version of this map. As shown in the figure, hail is rare in the City.

Figure 4-32 City of Placentia – Average Hail Days per Year (1990 to 2009)



Source: National Weather Service. Map retrieved 3/6/2023.

Lightning

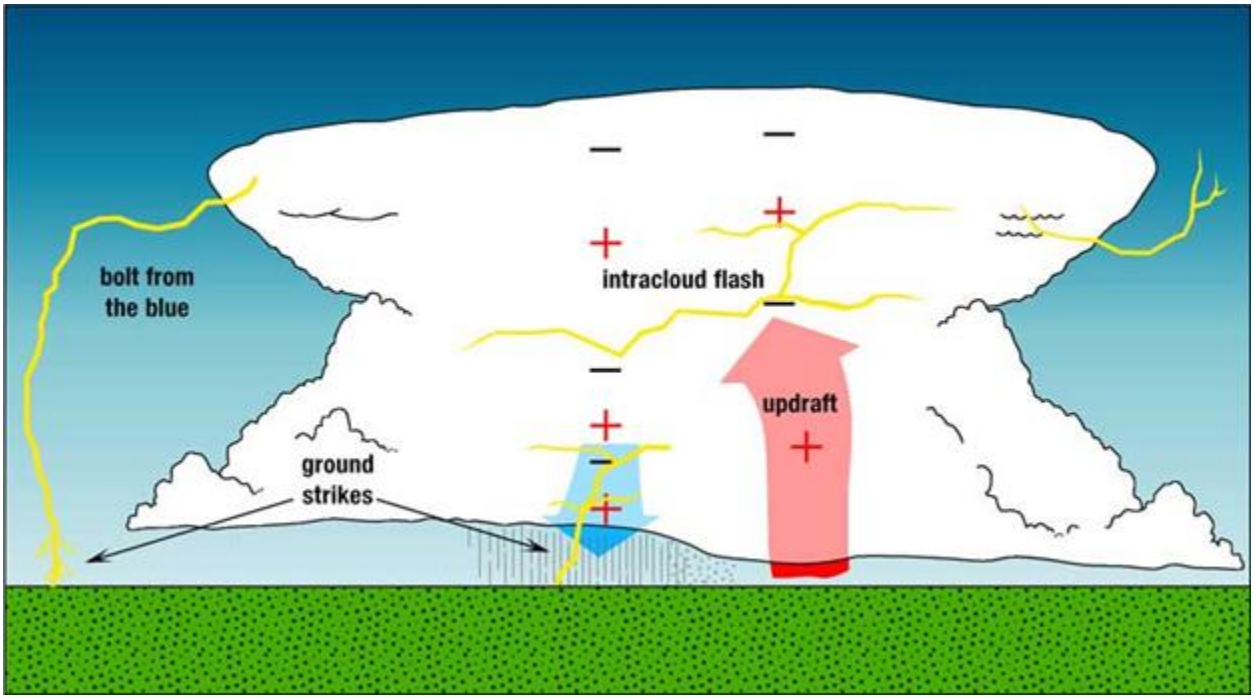
Lightning, while somewhat rare in the City, can occur throughout the City both during and outside of storm events. Lightning is defined by the NWS as any and all of the various forms of visible electrical discharge caused by thunderstorms. Cloud-to-ground lightning can kill or injure people by direct or indirect means. Objects can be struck directly, which may result in an explosion, burn, or total destruction. Additionally,

damage may be indirect, when the current passes through or near an object, which generally results in less damage.

Intra-cloud lightning is the most common type of discharge. This occurs between oppositely charged centers within the same cloud. Usually it takes place inside the cloud and looks from the outside of the cloud like a diffuse brightening that flickers. However, the flash may exit the boundary of the cloud, and a bright channel, similar to a cloud-to-ground flash, can be visible for many miles.

Cloud-to-ground lightning is the most damaging and dangerous type of lightning, though it is also less common. Most flashes originate near the lower-negative charge center and deliver negative charge to earth. However, a large minority of flashes carry positive charge to earth. These positive flashes often occur during the dissipating stage of a thunderstorm's life. Positive flashes are also more common as a percentage of total ground strikes during the winter months. This type of lightning is particularly dangerous for several reasons. It frequently strikes away from the rain core, either ahead or behind the thunderstorm. It can strike as far as 5 or 10 miles from the storm in areas that most people do not consider to be a threat (see Figure 4-33). Positive lightning also has a longer duration, so fires are more easily ignited. And, when positive lightning strikes, it usually carries a high peak electrical current, potentially resulting in greater damage.

Figure 4-33 Cloud to Ground Lightning



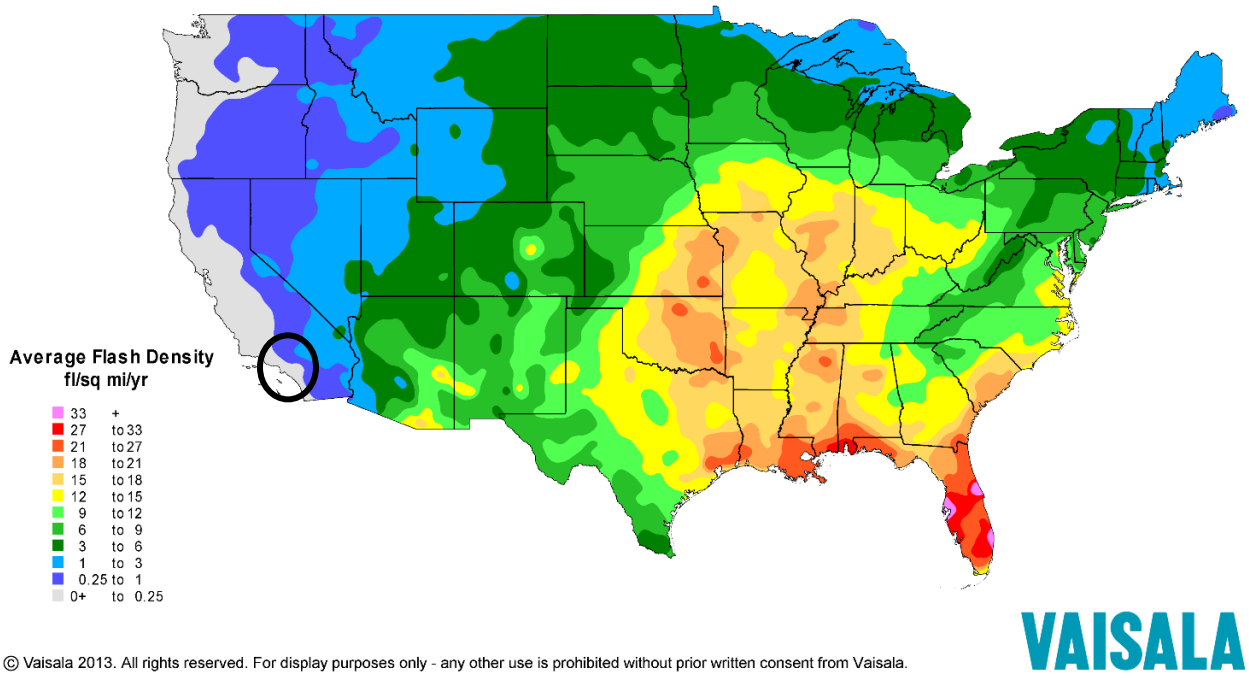
Source: National Weather Service

Location and Extent of Lightning

Lightning events can occur in any location of the City and are often associated with thunderstorms, but also may occur outside of rain, often referred to as dry lightning events. Though rare, all portions of Placentia are at risk to lightning. The speed of onset of thunderstorms (that cause lightning) can be short, and the duration is often short as well, generally ranging from minutes to hours. Vaisala maintains the National

Lightning Detection Network. It tracks cloud to ground lightning incidences in the United States. Figure 4-34 shows lightning incidences in the City and the rest of the United States from 1997 to 2012. Though dated 2012, this is the most recent version of this map.

Figure 4-34 City of Placentia – Lightning Incidence Map 1997 to 2012



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Source: Vaisala National Lightning Detection Network. Retrieved 3/6/2023.

Past Occurrences

Disaster Declaration History

A search of FEMA and Cal OES disaster declarations turned up multiple events. Heavy rains and storms have caused flooding in Orange County. Events where heavy rain and storms (including the resultant flooding) resulted in a state or federal disaster declaration are shown in Table 4-23. Specific disaster numbers for these state and federal disasters are shown in Table 4-4 above.

Table 4-23 Orange County – Disaster Declarations from Heavy Rain and Storms 1950-2023

Disaster Type	State Declarations		Federal Declarations	
	Count	Years	Count	Years
Flood (with heavy rain and storms)	21	1950, 1955, 1958 (twice), 1969, 1978, 1980, 1982, 1988, 1992, 1993, 1995 (twice), 1997, 1998, 2005 (twice), 2011, 2017, 2021, 2022	19	1955, 1958, 1969, 1978, 1980, 1982, 1983, 1988, 1992, 1993, 1995 (twice), 1998, 2005 (twice), 2011, 2017, 2023 (twice)

Source: FEMA, Cal OES

NCDC Events

The NCDC data recorded 154 flash flood, flood, hail, heavy rain, and lightning incidents for Orange County since 1955. Many of these events also affected the City. A summary of these events is shown in Table 4-24.

*Table 4-24 Orange County NCDC Storm Events 1/1/1955-10/31/2022**

Event Type	Number of Events	Deaths	Deaths (indirect)	Injuries	Injuries (indirect)	Property Damage	Crop Damage
Flash Flood	51	2	2	0	0	$64,730,000	$480,000
Flood	49	0	0	0	3	$40,735,000	$242,000
Hail	13	1	0	0	0	$80,600	$0
Heavy Rain	37	1	0	19	0	$36,820,000	$0
Lightning	4	0	0	0	0	$62,000	$0
Total	**154**	**4**	**2**	**19**	**3**	**$142,427,600**	**$722,000**

Source: NCDC

*Note: Losses reflect totals for all impacted areas, some of which fell outside of the City and outside of Orange County.

Hazard Mitigation Planning Committee Events

The HMPC noted that there are annual events of heavy rains and storms causing issues in the City, including flooding. These are discussed in the Flood (Section 4.3.9) and Localized Flood (Section 4.3.10) past occurrences.

Probability of Future Occurrences

Highly Likely – Based on NCDC data and HMPC input, 154 coastal flood, flash flood, flood, hail, heavy rain, high surf, and lightning incidents over a 72-year period (1955-2022) equates to a severe storm event every year. As noted, this database likely doesn't capture all heavy rain, hail, and lightning events. Severe weather, including heavy rains and storms, is a well-documented seasonal occurrence that will continue to occur often in the City.

Climate Change and Heavy Rains and Storms

According to the 2021 CAS, while average annual rainfall may increase or decrease slightly, the intensity of individual rainfall events is likely to increase during the 21st century. However, it is unlikely that hail will become more common in the City. The amount of lightning is not projected to change. The HMPC noted that there has been a seeming increase in wet weather and a greater intensity of storms.

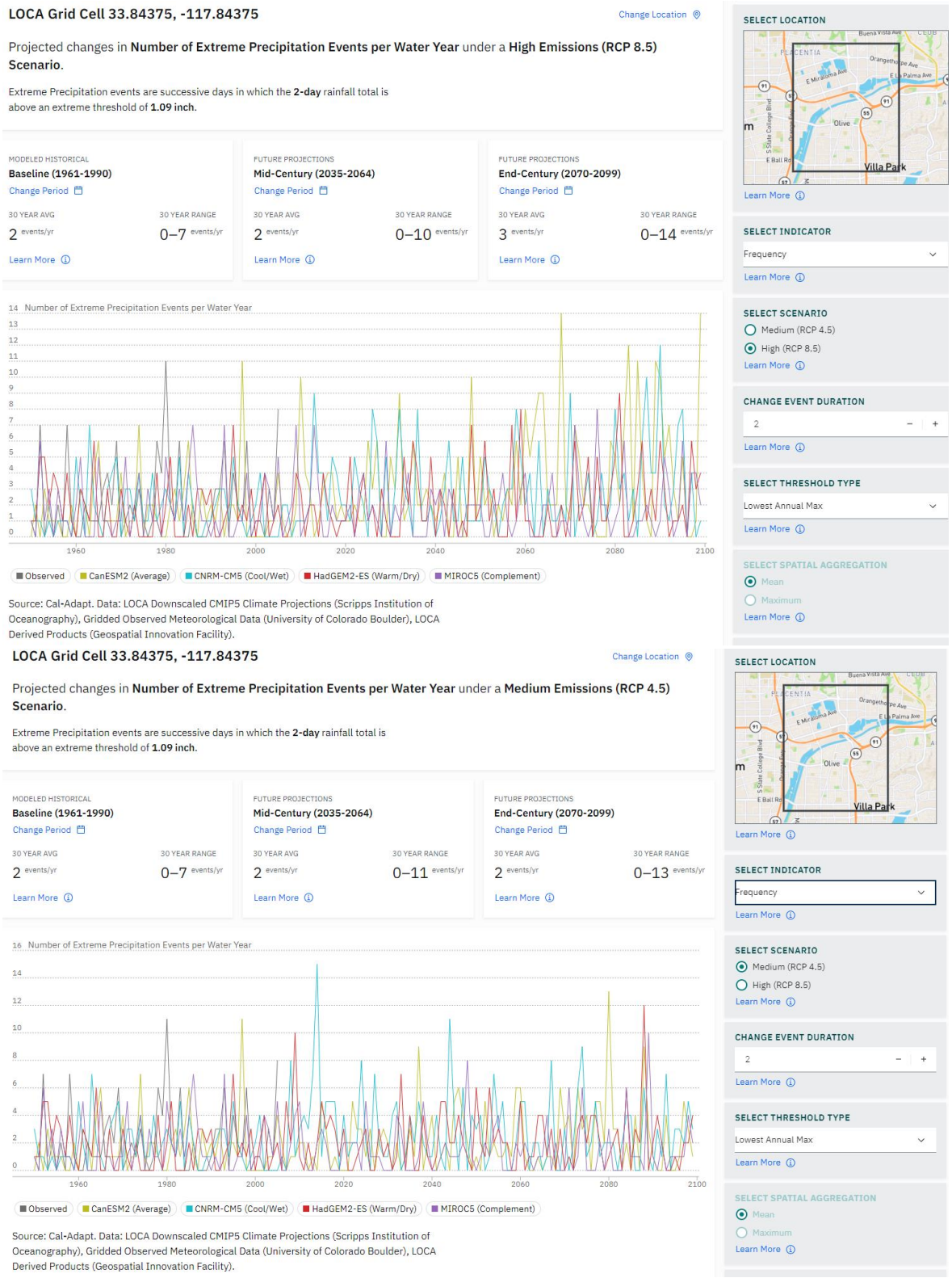
Cal-Adapt noted that, on average, the projections show little change in total annual precipitation in California. Furthermore, among several models, precipitation projections do not show a consistent trend during the next century. The Mediterranean seasonal precipitation pattern is expected to continue, with most precipitation falling during winter from North Pacific storms. One of the four climate models projects slightly wetter winters, and another projects slightly drier winters with a 10 to 20 percent decrease in total annual precipitation. However, even modest changes would have a significant impact because California

ecosystems are conditioned to historical precipitation levels and water resources are nearly fully utilized. Future precipitation estimates for the City are shown in Figure 4-35 for Orange County. This consists of two charts:

- The upper chart shows annual averages of observed and projected precipitation values for the selected area on the map under the RCP 8.5 scenario. The gray line (1950 – 2005) is observed data. The colored lines (2006 – 2100) are projections from 10 LOCA downscaled climate models selected for California. The light gray band in the background shows the least and highest annual average values from all 32 LOCA downscaled climate models.
- The lower chart shows annual averages of observed and projected precipitation values for the selected area on map under the RCP 4.5 scenario. The gray line (1950 – 2005) is observed data. The colored lines (2006 – 2100) are projections from 10 LOCA downscaled climate models selected for California. The light gray band in the background shows the least and highest annual average values from all 32 LOCA downscaled climate models.

These models have been selected by California state agencies as priority models for research contributing to California's Fourth Climate Change Assessment.

Figure 4-35 City of Placentia – Future Precipitation Estimates in High and Low Emission Scenarios



Source: Cal-Adapt. Retrieved 3/6/2023.

Vulnerability Assessment

Vulnerability—Medium

According to historical hazard data, heavy rains and storms, including lightning, are an annual occurrence in the City. Heavy rains can cause both localized flooding and flooding in the floodplains. Atmospheric river storms are of great concern as they can dump large amounts of water in single storms. Impacts can be felt by both the population of the City Planning Area as well as the structures that have been built in the Planning Area.

This vulnerability contains multiple sections that detail how this hazard can affect the City. These sections include assets at risk, impacts, and how future development can affect this hazard.

Assets at Risk from Heavy Rains and Storms

Assets at risk from extreme heat include: people and populations; structures; critical facilities and infrastructure, and community lifelines; natural, historic, and cultural resources; and economic assets and community activities of value. These are discussed in the following sections.

People and Populations

All populations in the City have some measure of risk to heavy rains and storms. Those populations that work or recreate outside and unhoused individuals are more vulnerable to impacts from heavy storm events. Heavy rains and storms occur every year and do not generally cause significant adverse impacts to individuals; it is the secondary hazard, flooding, that poses the biggest impact to people. Populations at risk to heavy rains and storms include those who live in floodplains (discussed in further detail in Section 4.3.9), those who live in and near localized flooding areas floodplains (discussed in further detail in Section 4.3.10), and those who are unsheltered. Also, those who are recreating or working outside may be at risk to high winds and lightning, in addition to being affected by heavy rain events.

Structures

Structures in the City have some risk to heavy rains and storms. Structures built to modern building codes are built to withstand heavy rains and storms (including lightning). Older homes, buildings, and critical facilities may be at increased risk to heavy rains and storms. During a heavy storm, localized flooding may cause water intrusion into buildings from the outside. While it is rare for the power grid to be taken offline due to heavy rains and storms, the risk does still remain.

Critical Facilities and Infrastructure, and Community Lifelines

Heavy rain and storms can affect critical facilities and infrastructure, and community lifelines during large events. Power outages may occur taking facilities offline. High winds can down power lines and trees impacting facilities. Water intrusion into facilities and infrastructure can impact operations. Local roads, streets, and bridges can be impacted resulting in closures restricting traffic flow in the Planning Area. In certain areas, large storms can cause erosion and localized landslides which can impact affected facilities. Many critical facilities are built to modern design standards that take heavy rains and storms into account

when siting and building these structures, and others may need to be retrofitted to better withstand these events.

Community lifelines likely to have some vulnerability to heavy rains and storms include:

- **Safety and Security** – Search and rescue and swiftwater teams may be called on to perform riskier duties during times of heavy rains and flooding. Police, Fire, EMS, and Public Works personnel are often called on to respond during flood emergencies.
- **Food, Hydration and Shelter** – Those displaced by flooding and the unsheltered may have needs for food and water.
- **Health and Medical** – Injuries can occur during storm events. Patient movement from accident scenes by EMS may have to be rerouted around inundated and closed streets. Public health can be at risk from contaminated floodwaters caused by heavy rains.
- **Energy** –Significant storms can cause power outages throughout the Planning Area. Downed trees can fall on electric lines in the Planning Area, causing power outages. High winds and other lightning strikes can cause transformers and other infrastructure to be damaged. Fuel supplies can be temporarily cut off, until flooding subsides.
- **Communications** – Communication systems may be damaged during severe storm events. An influx of service calls to dispatch centers for reporting of flooding, power outages, downed trees, or other issues can occur. Messaging systems need to be deployed during these times to let the public know about road and closures, washouts, and debris or flooding on roads.
- **Transportation** – Highways, local roads, and bridges may be impacted by heavy rains and flooding causing road closures. These closures can affect response personnel (EMS, Fire, Police) as well as cause additional traffic issues for residents.
- **Hazardous Material** – Hazardous material facilities can be affected by heavy rains and flooding. Releases during these times can contaminate the environment, affecting drinking water and natural systems.
- **Water Systems** – water systems in the City, especially drainage systems, can be temporarily overwhelmed during periods of heavy rains and storm.

Short-term, heavy storms can cause both widespread flooding as well as extensive localized drainage issues throughout the City of Placentia. As storms continue to increase in intensity, the limited drainage infrastructure has become an increasingly important issue. Inadequate drainage can contribute to flooding, erosion, and in a few areas, landslides in the City. This is discussed in in further detail in Section 4.3.12. While components of these lifelines may be damaged or otherwise impacted, it is unlikely that this type of event would overwhelm and take out any of these lifelines in the City as a whole.

Natural, Historic, and Cultural Resources

Large storm events and associated flooding can affect natural, historic, and cultural resources. Silt and sediment can damage natural areas. Trees can be uprooted and downed by high winds. Extended periods of rainfall can erode natural banks along waterways and degrade soil stability for terrestrial species. While some natural systems can be adversely impacted during these large storms, heavy rain events can also provide benefits. Groundwater and wetland areas can be recharged and water supplies replenished. Historic and cultural resources may also be affected. Generally, the impacts are associated with damage to structures affected by large storm events, but other cultural resources such as those associated with Native Americans and old tribal areas can also be disturbed, damaged, and lost during extreme storm and flood events.

Economic Assets and Community Activities of Value

Heavy rains and storms can cause damages to major employers or to commercial centers. Smaller employers and economic assets may be affected as well. Impacts and resulting business closures may have an impact on sales tax revenues. Community activities of value may see a reduction in attendance, impacting revenues associated with these events, especially those that occur outdoors. Heavy rains and storms can cause community activities of value to be cancelled or rescheduled. Major parades or other community events that occur outdoors would be affected.

Impacts from Heavy Rains and Storms

Impacts from heavy rains and storms include damage to property, critical facilities and infrastructure, and the natural landscape. This includes: erosion, downed trees, damaged utility structures and infrastructure; power outages; road damage and blockages; and lightning strikes to critical infrastructure and people. Lightning can also cause wildfires and urban fires to occur. Landslides occur when the soil on slopes becomes oversaturated and fails. Climate change may cause these impacts to worsen.

Impacts to identified assets at risk to this hazard and the overall vulnerability of the City may be affected in the future by climate change, changes in population patterns (migration, density, or the makeup of socially vulnerable populations), and changes in land use and development.

As discussed in the hazard profile section regarding population patterns, climate change is anticipated to exacerbate this hazard over time. The City is approaching built out conditions. Population projections for the City show very limited growth over the next 25 years. Populations are anticipated to grow by only 7.3% between 2025 and 2050, which equates to an annual growth of 0.29%, thus future population growth should not increase the potential impacts from this hazard on City assets. With respect to population patterns such as those associated with migration, density, or makeup of socially vulnerable populations the data shows that most socially vulnerable populations and disadvantaged communities are concentrated in the western portion of the City. Also, FEMA's National Risk Index for Orange County is rated as Very High. Since heavy rains and storms occur throughout the City, if these population patterns continue to show an increase in vulnerable populations, the vulnerability and potential impacts to City assets from heavy rains and storms will continue to increase in the future.

As described in the land use discussion at the end of Section 4.2.2, a new land use map was developed as part of the General Plan efforts in 2023, which establishes the basic pattern of development in the City for the next 20-25 years, including land uses and densities. While future development within hazard areas generally contributes to some increase of impacts on City assets, given the limited potential for significant future growth in Placentia and that heavy rains and storms affect the whole of the City, future changes in land use and development are unlikely to contribute to any notable change in the vulnerability of the City to this hazard. In addition, the City has a development review process which includes the consideration of hazard constraints and updated building codes that should further limit the impacts of these hazards on City assets.

Actual damage associated with the primary effects of severe storms and heavy rains has been somewhat limited. It is the secondary hazards caused by these severe weather events, such as floods and erosion that

have had the greatest impact on the City. The risk and vulnerability associated with these secondary hazards are discussed in other sections of this Plan (Section 4.3.9 Flood: 1%/0.2% Annual Chance, Section 4.3.9 Flood: Localized Stormwater (specifically in Table 4-80), Section 4.3.6 Dam Failure, and Section 4.3.13 Levee Failure).

Future Development

Future development in the City will take heavy rains and storms (and the localized flooding they can cause) into account. Climate change may cause these impacts to worsen. Changes in population could increase the number of people impacted by heavy rains and storms, especially if those moving to the City are socially vulnerable populations. Changes in land use may also amplify the impacts of heavy rains and storms, as additional impervious surfaces can cause additional runoff and localized flooding. The City will build any new facilities to current building codes. Building codes (like the California Building Code) addresses hazards like rainstorms and winds during the construction process.

4.3.4. Severe Weather: High Winds and Tornadoes

Hazard Profile

This hazard profile contains multiple sections that detail how this hazard can affect the City. These sections include a hazard/problem description; description of location and extent; past occurrences of this hazard; and how climate change can affect this hazard.

Hazard/Problem Description

High Winds

High winds can cause significant property and resource damage, threaten public safety, and have adverse economic impacts from facility closures and power loss. High winds, as defined by the NWS glossary, are sustained wind speeds of 40 mph or greater lasting for 1 hour or longer, or winds of 58 mph or greater for any duration. These winds may occur as part of a seasonal climate pattern or in relation to other severe weather events such as thunderstorms.

Straight-line (i.e., non-tornadic) winds may also exacerbate existing weather conditions by increasing the effect on temperature and decreasing visibility due to the movement of particulate matters through the air, as in dust and snowstorms. The winds may also exacerbate fire conditions by drying out the ground cover, propelling fuel around the region, and increasing the ferocity of exiting fires, as well as contributing to fire weather conditions resulting in red flag days.

Location and Extent

The entire City is subject to significant, non-tornadic (straight-line) winds. Each area of the City is at risk to high winds. Magnitude of winds is measured often in speed and damages. The speed of onset of both thunderstorm winds and high winds outside of thunderstorm events can be short or prolonged, but accurate weather prediction mechanisms often let the public know of upcoming events. Duration of thunderstorm winds in California is often short, ranging from minutes to hours, but can occur for longer periods. The

Beaufort scale is an empirical measure that relates wind speed to observed conditions at sea or on land. Its full name is the Beaufort wind force scale. Figure 4-36 shows the Beaufort wind scale.

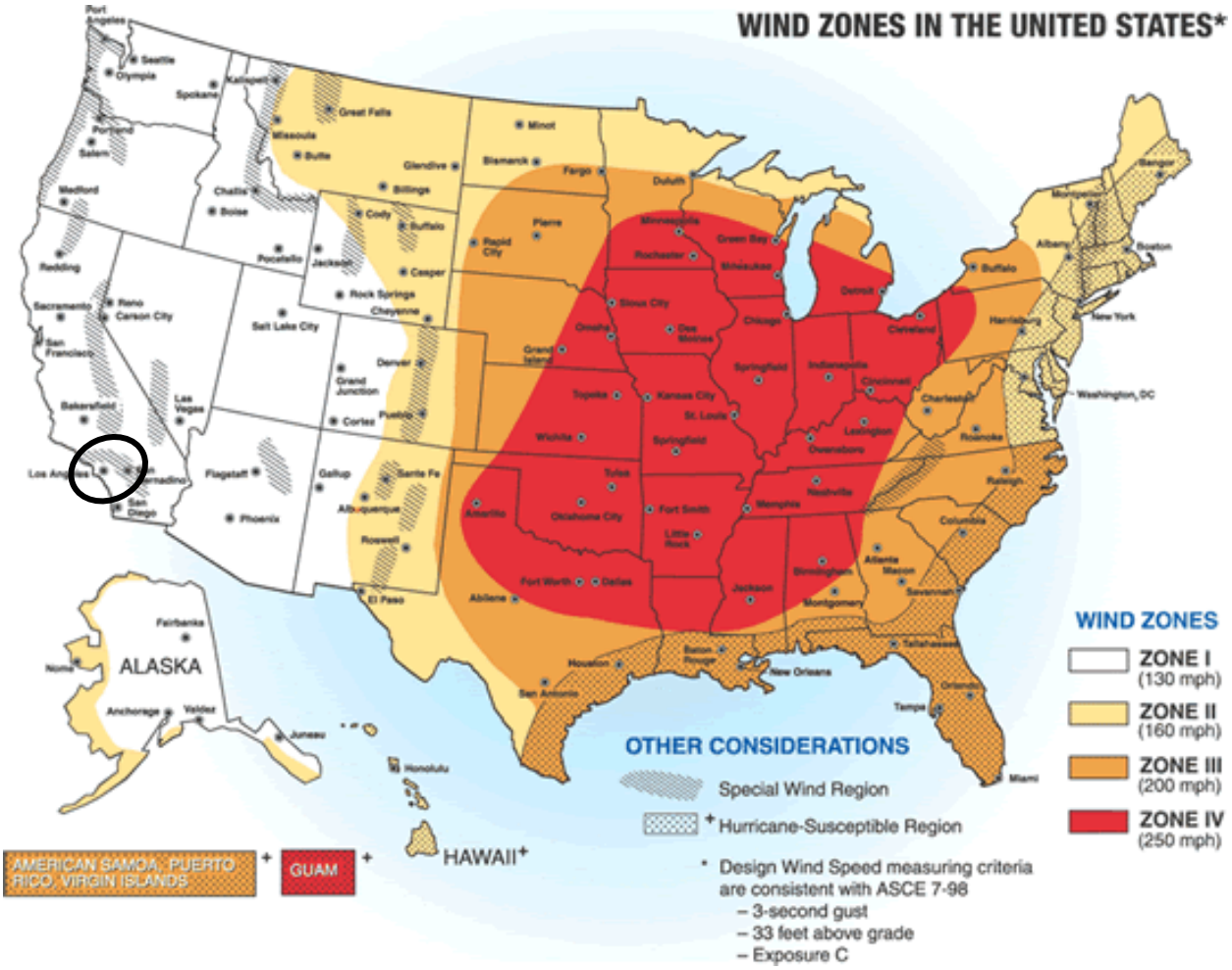
Figure 4-36 Beaufort Wind Scale

Beaufort Number	Wind Speed (miles/hour)	Wind Speed (km/hour)	Wind Speed (knots)	Description	Wind Effects on Land
0	< 1	< 1	< 1	Calm	Calm. Smoke rises vertically.
1	1-3	1-5	1-3	Light Air	Wind motion visible in smoke.
2	4-7	6-11	4-6	Light Breeze	Wind felt on exposed skin. Leaves rustle.
3	8-12	12-19	7-12	Gentle Breeze	Leaves and smaller twigs in constant motion.
4	13-18	20-28	11-16	Moderate Breeze	Dust and loose paper are raised. Small branches begin to move.
5	19-24	29-38	17-21	Fresh Breeze	Small trees begin to sway.
6	25-31	39-49	22-27	Strong Breeze	Large branches are in motion. Whistling is heard in overhead wires. Umbrella use is difficult.
7	32-38	50-61	28-33	Near Gale	Whole trees in motion. Some difficulty experienced walking into the wind.
8	39-46	62-74	34-40	Gale	Twigs and small branches break from trees. Cars veer on road.
9	47-54	75-88	41-47	Strong Gale	Larger branches break from trees. Light structural damage.
10	55-63	89-102	48-55	Storm	Trees broken and uprooted. Considerable structural damage.
11	64-72	103-117	56-63	Violent Storm	Widespread damage to structures and vegetation.
12	> 73	> 117	> 64	Hurricane	Considerable and widespread damage to structures and vegetation. Violence.

Source: National Weather Service

Figure 4-37 depicts wind zones for the United States. The map denotes that the City falls into Zone I, which is characterized by high winds of up to 130 mph (above Beaufort Number 12).

Figure 4-37 Wind Zones in the United States



Source: FEMA

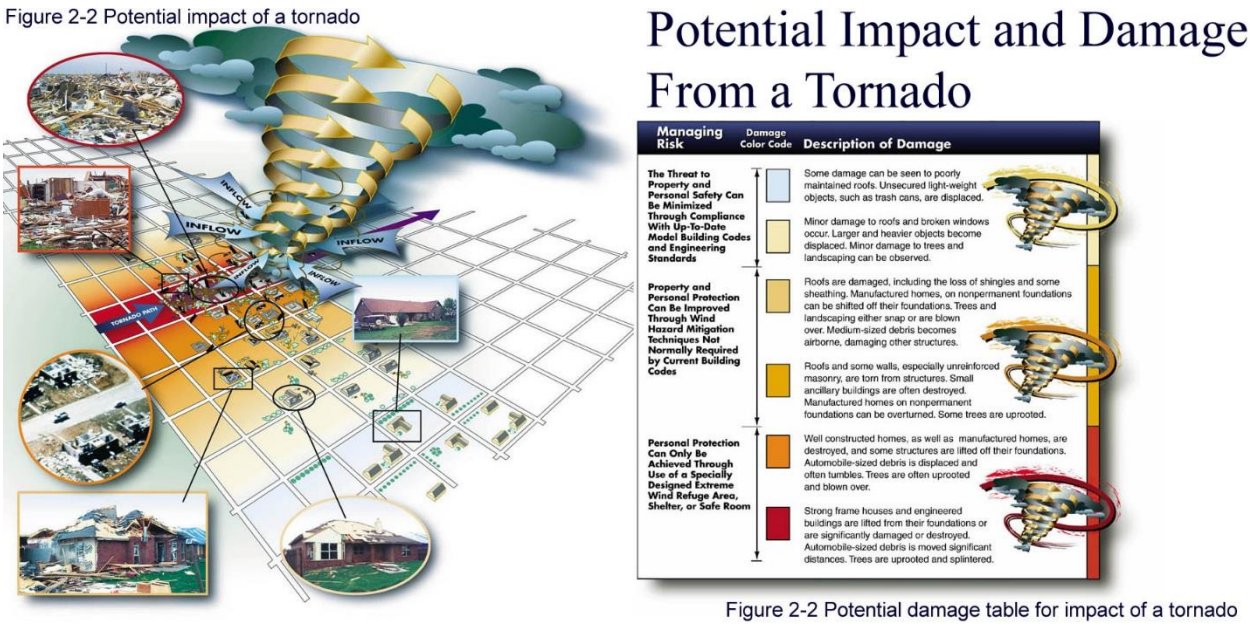
Though not included on the map above as a special wind region, the City did note that they are subject to Santa Ana winds on a seasonal basis. Santa Ana winds are a seasonal phenomenon in Southern California occurring between October and March. These winds are warm, dry, gusty offshore winds that blow from the east or northeast and occur below the passes and canyons of the coastal ranges of Southern California and in Los Angeles Basin. According to San Diego's National Weather Service forecasters, winds must blow at speeds greater than 25 knots (28.8 mph) to be called Santa Ana Winds. They accelerate to speeds of 35 knots (approximately 40 mph) as they move through canyons and passes, with gusts to 50 or 60 knots (between 55 and 70 mph).

Several meteorological conditions contribute to the phenomenon. The Bernoulli Effect accounts for increased speeds when the desert wind is pushed through narrow canyons. Bernoulli's law mathematically describes the relationship between pressure and velocity in the flow of fluids. Although different scenarios may contribute to a Santa Ana Wind, the most common pattern involves a high-pressure region sitting over the great Basin (the high plateau that is west of the Rockies and east of the Sierras). According to most accounts, they are named for either the Santa Ana River Valley where they originate or for the Santa Ana Canyon, southeast of Los Angeles, where they pick up speed.

Tornadoes

Tornadoes and funnel clouds can also occur during severe storms. Tornadoes are another severe weather hazard that, though rare, can affect areas in the City, primarily during the rainy season in the late fall and early spring. Tornadoes form when cool, dry air sits on top of warm, moist air. Tornadoes are rotating columns of air marked by a funnel-shaped downward extension of a cumulonimbus cloud whirling at destructive speeds of up to 300 mph, usually accompanying a thunderstorm. Tornadoes are the most powerful storms that exist. They can have the same pressure differential across a path only 300 yards wide or less as 300-mile-wide hurricanes. Figure 4-38 illustrates the potential impact and damage from a tornado.

Figure 4-38 Potential Impact and Damage from a Tornado



Source: FEMA: Building Performance Assessment: Oklahoma and Kansas Tornadoes

Location and Extent

Tornadoes, while rare, can occur at any location in the City. Prior to February 1, 2007, tornado intensity was measured by the Fujita (F) scale. This scale was revised and is now the Enhanced Fujita scale. Both scales are sets of wind estimates (not measurements) based on damage. The new scale provides more damage indicators (28) and associated degrees of damage, allowing for more detailed analysis and better correlation between damage and wind speed. It is also more precise because it considers the materials affected and the construction of structures damaged by a tornado. Table 4-25 shows the wind speeds associated with the original Fujita scale ratings and the damage that could result at different levels of intensity. Table 4-26 shows the wind speeds associated with the Enhanced Fujita Scale ratings.

Table 4-25 Original Fujita Scale

Fujita (F) Scale	Fujita Scale Wind Estimate (mph)	Typical Damage
F0	< 73	Light damage. Some damage to chimneys; branches broken off trees; shallow-rooted trees pushed over; sign boards damaged.
F1	73-112	Moderate damage. Peels surface off roofs; mobile homes pushed off foundations or overturned; moving autos blown off roads.
F2	113-157	Considerable damage. Roofs torn off frame houses; mobile homes demolished; boxcars overturned; large trees snapped or uprooted; light-object missiles generated; cars lifted off ground.
F3	158-206	Severe damage. Roofs and some walls torn off well-constructed houses; trains overturned; most trees in forest uprooted; heavy cars lifted off the ground and thrown.
F4	207-260	Devastating damage. Well-constructed houses leveled; structures with weak foundations blown away some distance; cars thrown, and large missiles generated.
F5	261-318	Incredible damage. Strong frame houses leveled off foundations and swept away; automobile-sized missiles fly through the air in excess of 100 meters (109 yards); trees debarked; incredible phenomena will occur.

Source: National Oceanic and Atmospheric Administration Storm Prediction Center, www.spc.noaa.gov/faq/tornado/f-scale.html

Table 4-26 Enhanced Fujita Scale

Enhanced Fujita (EF) Scale	Enhanced Fujita Scale Wind Estimate (mph)
EF0	65-85
EF1	86-110
EF2	111-135
EF3	136-165
EF4	166-200
EF5	Over 200

Source: National Oceanic and Atmospheric Administration Storm Prediction Center, www.spc.noaa.gov/faq/tornado/ef-scale.html

It is difficult to predict a tornado or the conditions that preclude a tornado far in advance. Tornadoes can strike quickly with very little warning. In California it is rare for tornadoes to exceed EF3 magnitude. Most tornadoes that touch down are not long lived.

Past Occurrences

Disaster Declaration History

There have been no past federal or state disaster declarations due to high winds or tornadoes in Orange County, as detailed in Table 4-4.

NCDC Events

The NCDC data recorded 338 high wind and tornado incidents for Orange County since 1955. A summary of these events is shown in Table 4-27.

*Table 4-27 Orange County NCDC Wind and Tornado Events 1/1/1950-10/31/2022**

Event Type	Number of Events	Deaths	Deaths (indirect)	Injuries	Injuries (indirect)	Property Damage	Crop Damage
Dust Devil	1	0	0	0	0	$0	$0
Funnel Cloud	37	0	0	0	0	$0	$0
High Wind	199	1	0	0	0	$633,000	$5,500
Strong Wind	23	0	0	0	0	$560,000	$15,000
Thunderstorm Wind	34	0	0	0	0	$1,246,000	$20,000
Tornado	31	0	0	13	0	$13,994,500	$0
Waterspout	13	0	0	0	0	$0	$0
Total	**338**	**1**	**0**	**13**	**0**	**$16,433,500**	**$40,500**

Source: NCDC

*Note: Losses reflect totals for all impacted areas, some of which fell outside of the City and outside of Orange County.

Hazard Mitigation Planning Committee Events

As a result of drought conditions in **2018**, it was noted that winds caused damages to numerous City owned trees that had been previously weakened by drought. Over 50 large trees died, along with multiple smaller trees. Arroyo Verde Park was particularly hard hit.

Additionally, the HMPC noted that regionally more tornadoes are occurring, but not in the City itself.

Probability of Future Occurrences

Highly Likely – Based on NCDC data and HMPC input, 338 wind and tornado incidents over a 67-year period (1955-2022) equates to a severe wind event every year. High winds are a well-documented seasonal occurrence that will continue to occur annually in the City.

Climate Change and High Winds and Tornadoes

According to the 2021 CAS, while average annual rainfall may increase or decrease slightly, the intensity of individual thunderstorm events is likely to increase during the 21st century. This may bring stronger thunderstorm winds. The CAS does not discuss non-thunderstorm winds or tornadoes. The HMPC noted that regionally more tornadoes are occurring, but not in the City itself.

Vulnerability Assessment

Vulnerability—Medium

The City is subject to potentially destructive high winds and tornadoes. Regional Santa Ana winds are a significant concern in the City. High winds are common throughout the area and can happen during most times of the entire year and outside of a severe storm event. High winds and tornadoes can be a significant public safety and economic concern.

Vulnerability of the community is discussed in multiple sections that detail how this hazard can affect the City. These sections include assets at risk, impacts, and how future development can be affected by this hazard.

Assets at Risk from Wind and Tornado

Assets at risk from wind and tornado include: people and populations; structures; critical facilities and infrastructure, and community lifelines; natural, historic, and cultural resources; and economic assets and community activities of value. These are discussed in the following sections.

People and Populations

All populations are at some vulnerability to high winds and tornadoes. Certain vulnerable populations are at the greatest risk to the effects of high winds and tornadoes. This includes:

- The unsheltered.
- Citizens who reside in mobile homes.
- Citizens in buildings with no tornado shelter or below ground floors.
- Those with access and functional needs.
- Those working or caught outdoors during a wind or tornado event.

Structures

All structures in the City have some measure of risk from high wind and tornadoes. Though most structures are built to withstand winds, Santa Ana wind speeds can still cause damage in the City. Though rare, a tornado could cause damage to virtually all facilities in the tornado touchdown path. This would affect homes, businesses, commercial property, as well as government and critical facilities. During a wind or tornado event, power lines in the Planning Area can be damaged by falling trees caused by wind. A tornado could also damage power lines. High winds are a cause for PSPS events to be declared, causing power outages to occur. High winds and tornadoes could cause sparks from electric wires and other sources, which could lead to fire ignitions. Once ignited, high winds can also cause fires to rapidly spread and become out of control. High wind conditions can cause fires to move into more urban areas destroying structures and whole subdivisions, as seen in recent events in the West.

Critical Facilities and Infrastructure, and Community Lifelines

Though most critical facilities are built to withstand winds, Santa Ana wind speeds can still cause damage in the City. Though rare, a tornado could cause damage to virtually all facilities in the tornado touchdown

path. Winds can cause power outages and PSPS events, which can affect critical facilities abilities to perform their critical roles in the community. High winds and tornadoes could cause sparks from electric wires and other sources, which could lead to wildfire ignition. Downed trees from winds and tornadoes can fall on critical facilities and can block roads and other infrastructure.

Community lifelines likely to have some vulnerability from wind and tornado include:

- **Safety and Security** – Winds and tornadoes can increase fire spread and lead to blocked roads, which causes issues for firefighters, police, dispatch, and EMS in the City.
- **Food, Hydration, Shelter** – Significant damage caused by tornadoes can increase the need for those who need shelter. This is true for the unsheltered populations as well as for those whose homes may be damaged or rendered unusable.
- **Health and Medical** – Winds and tornadoes can cause injuries or deaths to residents. Trees may be downed during these times, causing EMS to need to reroute ambulance or emergency services around areas where roads may be closed while tree materials are removed.
- **Energy** – Downed trees may cause power grid issues. If a tornado were to strike a power station or large transmission lines, power outages may occur in the City.
- **Communications** – 911, dispatch, and emergency responder communications see marked increase during times of high winds and tornadoes.
- **Transportation** – Transportation routes may be blocked by downed trees, downed power wires, or downed poles and signs.
- **Hazardous Materials** – Hazardous materials facilities may be compromised during periods of high winds and tornadoes. Trucks carrying hazardous materials may be overturned on roads in the City during high wind and tornado events.
- **Water Systems** – Above ground water infrastructure may be damaged by high winds and tornadoes.

Backup power sources to these critical facilities that comprise the community lifelines should be in place to reduce possible impacts from these lifelines going offline. During periods of high wind and tornadoes the electric system could be overwhelmed, causing brownouts and power outages to occur. Power outages and PSPS events can also occur during times of extreme heat, causing the electric grid to temporarily go offline. It is unlikely that whole lifelines would be overwhelmed by this hazard.

Natural, Historic, and Cultural Resources

Natural resources, such as trees, are vulnerable to winds. Most all natural, historic, or cultural resources are at risk to tornadoes. Soil erosion can also occur during high winds. Most all natural, historic, or cultural resources are at risk to tornadoes. Tornadoes can tear apart habitats, causing fragmentation across ecosystems and can damage and destroy historic structures and cultural resources.

Economic Assets and Community Activities of Value

During periods of high winds and tornadoes, the economy may slow as people stay home or inside. Should high winds or tornadoes damage commercial centers, long term economic issues may occur with the loss of sales tax. All community activities of value have some measure of vulnerability to high wind and tornado. High winds and tornadoes can cause life safety issues. Activities may be cancelled, postponed, or rescheduled due to high wind and tornado events.

Impacts from Wind and Tornado

Wind and tornadoes can cause damage to property and loss of life. While most tornado damage is caused by violent winds, the majority of injuries and deaths generally result from flying debris. Property damage can include damage to buildings, fallen trees, and power lines. Local industries may also be damaged or destroyed. Access roads and streets may be blocked by debris, delaying necessary emergency response. Winds can push automobiles off roads, damage roofs and structures, cause power outages, and cause secondary damage due to flying debris and hazardous trees. High winds can also contribute to the spread and intensity of wildfires. Climate change may affect this hazard and cause winds to increase in velocity and more tornadoes to affect the City.

All of these impacts may be exacerbated by the effects of climate change, changes in population patterns (migration, density, or the makeup of socially vulnerable populations), and changes in land use and development.

As discussed in the hazard profile section, climate change is anticipated to exacerbate this hazard over time. However, the City is approaching built out conditions. Population projections for the City show very limited growth over the next 25 years. Populations are anticipated to grow by only 7.3% between 2025 and 2050, which equates to an annual growth of 0.29%, thus future population growth should not increase the potential impacts from this hazard on City assets. With respect to population patterns such as those associated with migration, density, or makeup of socially vulnerable populations the data shows that most socially vulnerable populations and disadvantaged communities are concentrated in the western portion of the City. Also, FEMA's National Risk Index for Orange County is rated as Very High. Since high winds can occur anywhere in the City, if these population patterns continue to show an increase in vulnerable populations, the vulnerability and potential impacts to City assets from high winds and tornadoes will continue to increase (though minimally) in the future.

As described in the land use discussion at the end of Section 4.2.2, a new land use map was developed as part of the General Plan efforts in 2023, which establishes the basic pattern of development in the City for the next 20-25 years, including land uses and densities. While future development within hazard areas generally contributes to some increase of impacts on City assets, given the limited potential for significant future growth in Placentia and that high winds and tornadoes affect the whole of the City, future changes in land use and development are unlikely to contribute to any notable change in the vulnerability of the City to this hazard. In addition, the City has a development review process which includes the consideration of hazard constraints and updated building codes that should further limit the impacts of these hazards on City assets.

Future Development

Future development in the City will take windstorms into account. As the population of the City increases, there are more and more residents who may be affected by winds and tornadoes. The City will build any new facilities to current City building codes. California Building codes take winds into account during the design and construction process.

4.3.5. Climate Change

Hazard Profile

This hazard profile contains multiple sections that detail how this hazard can affect the City. These sections include a hazard/problem description; description of location and extent; past occurrences of this hazard; and how climate change can affect this hazard.

Hazard/Problem Description

Climate change is the distinct change in measures of weather patterns over a long period of time, ranging from decades to millions of years. More specifically, it may be a change in average weather conditions such as temperature, rainfall, snow, ocean and atmospheric circulation, or in the distribution of weather around the average. While the Earth's climate has cycled over its 4.5-billion-year age, these natural cycles have taken place gradually over millennia, and the Holocene, the most recent epoch in which human civilization developed, has been characterized by a highly stable climate – until recently.

This LHMP is concerned with human-induced climate change that has been rapidly warming the Earth at rates unprecedented in the last 1,000 years. Since industrialization began in the 19th century, the burning of fossil fuels (coal, oil, and natural gas) at escalating quantities has released vast amounts of carbon dioxide and other greenhouse gases responsible for trapping heat in the atmosphere, increasing the average temperature of the Earth. Secondary impacts include changes in precipitation patterns, the global water cycle, melting glaciers and ice caps, and rising sea levels. According to the Intergovernmental Panel on Climate Change (IPCC), climate change will "increase the probability of severe, pervasive, and irreversible impacts for people and ecosystems" if unchecked.

Through changes to oceanic and atmospheric circulation cycles and increasing heat, climate change affects weather systems around the world. Climate change increases the likelihood and exacerbates the severity of extreme weather – more frequent or intense storms, floods, droughts, and heat waves. Consequences for human society include loss of life and injury, damaged infrastructure, long-term health effects, loss of agricultural crops, disrupted transport and freight, and more. Climate change is not a discrete event but a long-term hazard, the effects of which communities are already experiencing.

Climate change adaptation is a key priority of the State of California. The 2023 (Draft) State Hazard Mitigation Plan noted that climate change is already affecting California. Sea levels have risen by as much as seven inches along the California coast over the last century, increasing erosion and pressure on the state's infrastructure, water supplies, and natural resources. The State has also seen increased average temperatures, more extreme hot days, fewer cold nights, a lengthening of the growing season, shifts in the water cycle with less winter precipitation falling as snow, and earlier runoff of both snowmelt and rainwater in the year. In addition to changes in average temperatures, sea level, and precipitation patterns, the intensity of extreme weather events is also changing.

The 2020 California's Adaptation Planning Guide: Understanding Regional Characteristics has divided California into 11 different regions based on political boundaries, projected climate impacts, existing environmental setting, socioeconomic factors and regional designations. Orange County falls within the

South Coast Region. Table 4-28 provides a summary of Cal-Adapt Climate Projections for the South Coast Region.

Table 4-28 South Coast Region – Cal Adapt Climate Projections

Effect	Ranges
Temperature Change, 1990-2100	January increase in average temperatures: 1°F to 2.5°F by 2050 and 5°F to 6°F by 2100 Temperature Change, July increase in average temperatures: 3°F to 4°F by 2050 and 5°F to 10°F by 2100 with larger 1990-2100 increases projected inland. (Modeled high temperatures; high carbon emissions scenario)
Precipitation	Annual precipitation will vary by area but will decline overall throughout the century. Low-lying coastal areas will lose up to 2 inches by 2050 and 3 to 5 inches by 2090, while high elevations will see a drop of 4 to 5 inches by 2050 and 8 to 10 inches by 2090. (Community Climate System Model 3 (CCSM3) climate model; high emissions scenario)
Sea Level Rise	By 2100, sea levels may rise up to 66 inches, posing considerable threats to coastal areas in the region including Venice Beach, the Port of Long Beach, the South Coast naval stations, and San Diego Harbor. As a result of sea level rise, 45 percent more land in Los Angeles County, 40 percent more land in San Diego County, 35 percent more land in Ventura County, and 28 percent more land in Orange County will be vulnerable to 100-year floods.
Heat wave	Along the coast, a heat wave is five days over temperature in the 80s. Inland, the temperature must hit the 90s and 100s for five days. All areas can expect 3 to 5 more heat waves by 2050 and 12 to 14 by 2100 in most areas of the region.
Wildfire	Little change is projected in the already high-fire risk in this region, save for slight increases expected in a few coastal mountainous areas such as near Ojai and in Castaic, Fallbrook, and Mission Viejo.

Source: 2020 California's Adaptation Planning Guide: Understanding Regional Characteristics

Location and Extent

Climate change is a global phenomenon. It is expected to affect the whole of the City, surrounding jurisdictions, and State of California. There is no scale to measure the extent of climate change. Climate change exacerbates other hazards, such as drought, extreme heat, flooding, wildfire, and others. The speed of onset of climate change is very slow. The duration of climate change is not yet known but is feared to be tens to hundreds of years.

Past Occurrences

Disaster Declaration History

Climate change has never been directly linked to any declared disasters, as shown in Table 4-4.

NCDC Events

The NCDC does not track climate change events.

Hazard Mitigation Planning Committee Events

In the City of Placentia, the HMPC noted that each year it seems to get a bit warmer. It appears that the temperatures have been increasing more in the early fall (September/October). It was also noted that the winters of 2017 and 2022/2023 were some of the wettest years ever.

Probability of Future Occurrence

Highly Likely – Climate change is virtually certain to continue without immediate and effective global action. According to NASA, 2021 was one of the hottest years on record. Without significant global action to reduce greenhouse gas emissions, the IPCC concludes in its Sixth Assessment Synthesis Report (2022) that average global temperatures are likely to exceed 1.5°C by the end of the 21st century, with consequences for people, assets, economies and ecosystems, including risks from heat stress, storms and extreme precipitation, inland and coastal flooding, landslides, air pollution, drought, water scarcity, sea level rise and storm surge.

Climate Scenarios

The United Nations IPCC developed several greenhouse gas (GHG) emissions scenarios based on differing sets of assumptions about future economic growth, population growth, fossil fuel use, and other factors. The emissions scenarios range from "business-as-usual" (i.e., minimal change in the current emissions trends) to more progressive (i.e., international leaders implement aggressive emissions reductions policies). Each of these scenarios leads to a corresponding GHG concentration, which is then used in climate models to examine how the climate may react to varying levels of GHGs. Climate researchers use many global climate models to assess the potential changes in climate due to increased GHGs.

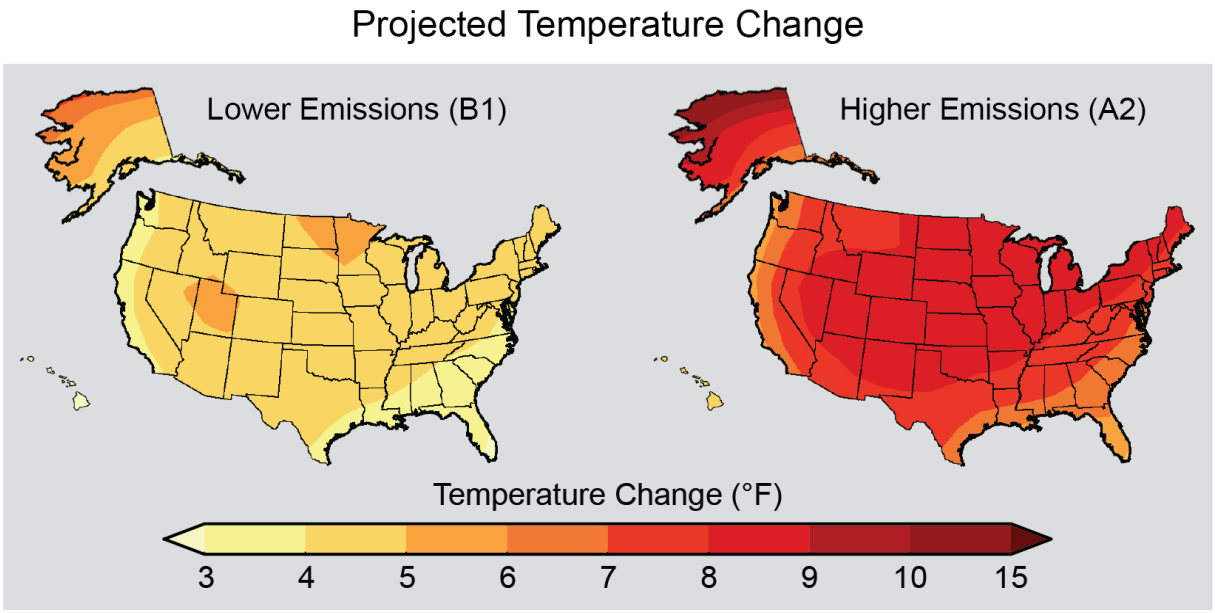
Key Uncertainties Associated with Climate Projections

- Climate projections and impacts, like other types of research about future conditions, are characterized by uncertainty. Climate projection uncertainties include but are not limited to:
  - ✓ Levels of future greenhouse gas concentrations and other radiatively important gases and aerosols,
  - ✓ Sensitivity of the climate system to greenhouse gas concentrations and other radiatively important gases and aerosols,
  - ✓ Inherent climate variability, and
  - ✓ Changes in local physical processes (such as afternoon sea breezes) that are not captured by global climate models.

Even though precise quantitative climate projections at the local scale are characterized by uncertainties, the information provided can help identify the potential risks associated with climate variability/climate change and support long term mitigation and adaptation planning.

Maps show projected change in average surface air temperature in the later part of this century (2071-2099) relative to the later part of the last century (1970-1999) under a scenario that assumes substantial reductions in heat trapping gases and a higher emissions scenario that assumes continued increases in global emissions. These are shown in Figure 4-39.

Figure 4-39 Projected Temperature Change – Lower and Higher Emissions Scenario



Source: National Climate Assessment

According to the California Natural Resource Agency (CNRA), climate change is already affecting California and is projected to continue to do so well into the foreseeable future. Current and projected changes include increased temperatures, sea level rise, a reduced winter snowpack altered precipitation patterns, and more frequent storm events. Over the long term, reducing greenhouse gases can help make these changes less severe, but the changes cannot be avoided entirely. Unavoidable climate impacts can result in a variety of secondary consequences including detrimental impacts on human health and safety, economic continuity, ecosystem integrity and provision of basic services.

The CNRA's 2021 CAS delineated how climate change may impact and exacerbate natural hazards in the future, including extreme heat, floods, drought, and wildfires.

- Climate change is expected to lead to increases in the frequency, intensity, and duration of extreme heat events and heat waves in the City and the rest of California, which are likely to increase the risk of mortality and morbidity due to heat-related illness and exacerbation of existing chronic health conditions. Those most at risk and vulnerable to climate-related illness are the elderly, individuals with chronic conditions such as heart and lung disease, diabetes, and mental illnesses, infants, the socially or economically disadvantaged, and those who work outdoors.
- Higher temperatures will melt the Sierra snowpack earlier and drive the snowline higher, resulting in less snowpack to supply water to California users.
- Droughts are likely to become more frequent and persistent in the 21st century.
- Intense rainfall events, periodically ones with larger than historical runoff, will continue to affect California with more frequent and/or more extensive flooding.
- Storms and snowmelt may coincide and produce higher winter runoff from the landward side, while accelerating sea-level rise will produce higher storm surges during coastal storms. Together, these

changes may increase the probability of floods and levee and dam failures, along with creating issues related to saltwater intrusion.

- Warmer weather, reduced snowpack, and earlier snowmelt can be expected to increase wildfire through fuel hazards and ignition risks. These changes can also increase plant moisture stress and insect populations, both of which affect forest health and reduce forest resilience to wildfires. An increase in wildfire intensity and extent will increase public safety risks, property damage, fire suppression and emergency response costs to government, watershed and water quality impacts, vegetation conversions and habitat fragmentation.

Vulnerability Assessment

Vulnerability—Medium

Climate change is the distinct change in measures of weather patterns over a long period of time, ranging from decades to millions of years. More specifically, it may be a change in average weather conditions such as temperature, rainfall, snow, ocean and atmospheric circulation, or in the distribution of weather around the average. While climate change on its own is a hazard, its effect on exacerbating other hazards is a primary concern.

Assets at Risk and Impacts of Climate Change

The discussion on assets at risk and impacts to the City and Orange County come from three sources:

- 2017 Orange County Climate Change and Health Profile Report (CCHPR)
- California Adaptation Planning Guide (2017 updated in 2021)
- Proceedings of the National Academy of Sciences

Note: All other vulnerability sections of this Plan discuss:

- People and Populations
- Structures
- Critical Facilities and Infrastructure, and Community Lifelines
- Natural, Historic, and Cultural Resources
- Economic Assets
- Community Activities of Value

Climate change will continue to influence natural hazards and play a role in the nature and extent of natural hazards and their impacts on City assets. In general, changes in population patterns and land use and development will also be a factor in the extent by which climate change is an issue over time. Thus, any changes in population patterns and land use and development would likely increase the impacts associated with climate change on City assets. Due to the complexity of climate change and the way the data sources handle some or all of these listed issues, rather than grouping the data in the bulleted list above, the source material is presented in the same way it is presented in their original documents. Each document addresses part or all of the bulleted list above.

Orange County Climate Change and Health Profile Report Impacts

According to the Orange County CCHPR, all Californians are vulnerable to the health impacts of climate change. Even if one is fortunate to live, work, study, or play in a place without direct contact with wildfires, flooding, or sea level rise, no one can entirely avoid excessive heat or the indirect effects of extreme weather events. Based on medical reviews of individuals who died during heat waves and other extreme weather events, those who are particularly vulnerable to the direct effects of climate change include the very old and very young, individuals who have chronic medical conditions and psychiatric illness, people taking multiple medications, people without means for evacuation (no access to public transit or private cars), people who are socially isolated, medically fragile people, and people living in institutions. Acclimatization to heat may help reduce risks from heat waves in the healthy general population, but may not be sufficient to protect those with underlying medical conditions.

Researchers have examined the pathways in which increased temperatures and hydrologic extremes can impact health and generally recognize three main pathways: direct exposures, indirect exposures, and socioeconomic disruption. Based on the review of weather-related natural disasters and historical patterns and scientific judgment, public health researchers have suggested the nature and direction of health harms or benefits.

- **Extreme Weather-Related Injury, Mental Health, and Displacement extreme weather events (storms, flooding)** – These events can cause fatal and nonfatal injuries from drowning, being struck by objects, fire, explosions, electrocution, or exposure to toxic materials. A widespread weather-related natural disaster may destroy or ruin housing, schools and businesses and cause temporary or permanent displacement. Individuals and families may experience post-traumatic stress, depression, and increased risk of suicide.
- **Vector-borne Illnesses** – Climatic changes alter the range, biogeography, and growth of microbes and the vectors of food, water, and vector-borne illnesses. This includes the changes in aquatic environments that could increase harmful algal blooms and lead to increases in foodborne and waterborne illnesses.
- **Food Insecurity** – Climate change is expected to have global impacts on food production and distribution systems. This can cause food prices to increase, which makes food less affordable and increases food insecurity, obesity, and malnutrition in economically constrained households.
- **Sea Level Rise, Mold, and Indoor Air Quality** – Through sea level rise, saltwater may intrude into coastal aquifers thus reducing quality and quantity of water supply. Water intrusion into buildings can result in mold contamination leading to indoor air quality problems.
- **Socioeconomic Disruption** – Widespread social and economic disruption includes damage to the infrastructure for the delivery of health services and for general economic well-being. Health care facilities, water treatment plants, and roads for emergency responders and transportation for health care personnel can be damaged in climate-related extreme weather events. Increased burden of disease and injury will test the surge capacity of health care facilities. Economic disruption can lead to income loss, income insecurity, food insecurity, housing insecurity, and mental health problems, which in turn may increase substance abuse, suicide and other health problems. Energy production and distribution is also threatened by heat and wildfires through loss of efficiency, generating capacity, and fires disrupting transmission lines. California's ports that provide the gateway to goods for California, national, and international markets are at risk from sea level rise and coastal storms.

In addition to the bulleted points above, drought, extreme heat, and wildfire, and other natural hazards are also exacerbated by climate change. This will be discussed further in Section 4.3.7 (Drought), Section 4.3.2 (Extreme Heat), and Section 4.3.14 (Wildfire). All Californians are vulnerable to the health impacts of climate change. Even if one is fortunate to live, work, study, or play in a place without direct contact with wildfires, flooding, or sea level rise, no one can entirely avoid excessive heat or the indirect effects of extreme weather events.

California Adaptation Planning Guide Impacts

The California Adaptation Planning Guide (APG) prepared by California OES and CNRA was developed to provide guidance and support for local governments and regional collaboratives to address the unavoidable consequences of climate change. The APG: Defining Local and Regional Impacts focuses on understanding the ways in which climate change can affect a community. According to this APG, climate change impacts (temperature, precipitation, sea level rise, ocean acidification, and wind) affect a wide range of community structures, functions and populations in the City. These impacts further defined by regional and local characteristics are discussed by secondary impacts and seven sectors found in local communities: Public Health, Socioeconomic, and equity impacts; Ocean and Coastal Resources; Water Management; Forest and Rangeland; Biodiversity and Habitat; Agriculture; and Infrastructure.

The APG: Understanding Regional Characteristics identified the following impacts specific to the South Coast region in which Orange County and the City of Placentia part of:

- Increased temperatures
- Reduced precipitation
- Sea level rise
- Reduced tourism
- Reduced water supply
- Wildfire risk
- Public health - heat and air quality
- Coastal erosion

The South Coast is a highly urbanized region. High population density also creates greater vulnerability to climate-related hazards simply because more people are in harm's way. The concentration of population on the coast has the potential to affect public safety, infrastructure, and the integrity of coastal ecosystems. In addition, the urban setting can also amplify public health risks because increased temperatures are even higher due to the urban heat island.

California's Adaptation Guide: Understanding Regional Characteristics provides input on adaptation considerations for the South Coast region. As detailed in this guide, climate change has the potential to disrupt many features that characterize the region, including ecosystems health, sea levels, and the tourist economy. Specific regional impacts include the following:

Public Health, Socioeconomic, and Equity Impact. In the highly populated areas within this region, "urban heat islands" (discussed in Section 4.3.2 above) will exacerbate the public health impacts that poor air quality and heat waves have upon the more vulnerable populations of this area. The highest percentages of impervious surfaces are in the urban areas of Los Angeles and San Diego counties, increasing the

potential impacts of heat islands. Southern California's urban centers are warming more rapidly than other parts of the State. Los Angeles, San Diego, and Orange counties rank first, second, and third in the State in absolute numbers of the elderly and children less than five years of age. These two populations are most likely to suffer from heat-related illnesses and heat events. Because of the significant and varied population in this region, there is also likely to be a significant population that fits into a number of the socially vulnerable categories lacking adaptive capacity. This increases the vulnerability of these populations. The higher cost of living in some areas of this region means low-income families pay a high percentage of their income on housing and transportation. Increases in food and energy costs may impact low-income residents.

Sea Level Rise. While not a direct impact to Placentia, sea level rise has the potential to result in far-reaching impacts on the South Coast region. Sea level rise may affect the region's tourism–the largest value tourist industry in the state–as well as other considerable assets, including international airports and seaports. Sea level rise and severe storm surges are a concern for nuclear power plants near the Pacific Ocean, including the San Onofre Nuclear Power Plant in Orange County. Risks associated with this facility include flooding of containment buildings where highly radioactive spent nuclear fuel is stored, loss of generating capacity owing to severe corrosion from the intrusion of seawater, and other damages to the facility due to sea level rise. The plant's cooling practices might be impacted due to rising ocean temperatures. These impacts could affect populations that live near the facility or rely on the power produced by the facility.

Water Supply. Two primary sources of water used by the South Coast region are the State Water Project and the Colorado River. In both cases, these water supplies originate in mountain snowpack. Climate change will result in reduced snowpack, which will translate into reduced water supply. Further threatening the regional water supply is the vulnerability of the levees protecting the California Delta, which feeds the State Water Project. Jurisdictions in the South Coast must carefully consider the vulnerability of their water supply. Climate change will reduce water supply and subsequently increase costs. Industries reliant on water may be affected, resulting in reduced revenue and employment base.

Wildfire. The South Coast already experiences wildfire. The extent to which climate change is projected to alter existing wildfire risk is variable. Wildfire frequency and severity will depend on shifts in vegetation and Santa Ana wind behavior. Management of fire risk such as prescribed burns may be subject to regulations beyond normal California forest practice. For example, the "High Use" subdistricts of CAL FIRE's Southern District (including Orange County) may have additional stipulations with regard to management practice. Increased temperature and decreased moisture, such as longer drought periods, will increase fire vulnerability in a number of areas. Along with impacts associated with temporary and/or permanent displacement, long-term impacts on the elderly and children under the age of five are of concern. Eye and respiratory illnesses due to air pollution resulting from wildfires, and exacerbation of asthma, allergies, chronic obstructive pulmonary disease (COPD), and other cardiovascular diseases are likely to increase.

Proceedings of National Academy of Sciences Impacts

In addition to the APG, a report from the Proceedings of the National Academy of Sciences (PNAS) stated that some of the recent fire impacts may have been attributed to climate change. The PNAS report posits

that climate influences wildfire potential primarily by modulating fuel abundance in fuel-limited environments, and by modulating fuel aridity in flammability-limited environments. Increased forest fire activity across the western United States in recent decades has contributed to widespread forest mortality, carbon emissions, periods of degraded air quality, and substantial fire suppression expenditures. Those most vulnerable to high levels of ozone and particulate matter include people who work or spend a lot of time outdoors, such as residents of this region who spend a lot of time working or recreating outdoors.

Future Development

The City could see population fluctuations as a result of climate impacts relative to those experienced in other regions, and these fluctuations are expected to affect Placentia. While there are currently no formal studies of specific migration patterns expected to impact the City, climate-induced migration was recognized within the UNFCCC Conference of Parties Paris Agreement of 2022. Future development issues in the City are expected to be as follows:

- **Climate change will stress water resources**. Water is an issue in every region, but the nature of the potential impacts varies. Drought, related to reduced precipitation, increased evaporation, and increased water loss from plants, is an important issue in many U.S. regions, especially in the West. Floods, water quality problems, and impacts on aquatic ecosystems and species are likely to be amplified by climate change. The ability to secure and provide water for new development requires on-going monitoring and assurances. It is recommended that the ability to provide a reliable water supply from the appropriate water purveyor, continue to be in the conditions for project approval, and such assurances shall be verified and in place prior to issuing building permits.
- **Similarly, protecting and enhancing water supply will also need to be addressed**. California's Sustainable Groundwater Management Act (SGMA) will contribute to addressing groundwater and aquifer recharge needs. Good groundwater management by the City and the surrounding cities and Orange County will provide a buffer against drought and climate change and contribute to reliable water supplies regardless of weather patterns. California depends on groundwater for a major portion of its annual water supply, and sustainable groundwater management is essential to a reliable and resilient water system. Protection of critical recharge areas should be addressed across the City. Further, these plans should include provisions that guide development or curtail development in areas that would harm or compromise recharge areas.
- **Climate change will affect land uses and planning**. Climate change coupled with shifting demographics and market conditions, could impact both the location of desired developments and the nature of development. The value of open space, urban greening, green infrastructure, tree canopy expansion and pressure to preserve it will likely increase, due in part to its restorative, recreational, environmental, and habitat, and physical and mental health benefits but also for its ability to sequester carbon and cool the surrounding environment.

4.3.6. Dam Failure

Hazard Profile

This hazard profile contains multiple sections that detail how this hazard can affect the City. These sections include a hazard/problem description; description of location and extent; past occurrences of this hazard; and how climate change can affect this hazard.

Hazard/Problem Description

Dams are manmade structures built for a variety of uses including flood protection, power generation, agriculture, water supply, and recreation. When dams are constructed for flood protection, they are usually engineered to withstand a flood with a computed risk of occurrence. For example, a dam may be designed to contain a flood at a location on a stream that has a certain probability of occurring in any one year. If prolonged periods of rainfall and flooding occur that exceed the design requirements, that structure may be overtopped or fail. Overtopping is the primary cause of earthen dam failure in the United States. Dam failures can also result from any one or a combination of the following causes:

- Earthquake
- Inadequate spillway capacity resulting in excess overtopping flows
- Internal erosion caused by embankment or foundation leakage, or piping or rodent activity
- Improper design
- Improper maintenance
- Negligent operation
- Failure of upstream dams on the same waterway

The California Department of Water Resources (Cal DWR) Division of Safety of Dams (DSOD) has jurisdiction over impoundments that meet certain capacity and height criteria. Embankments that are less than six feet high and impoundments that can store less than 15 acre-feet are non-jurisdictional. Additionally, dams that are less than 25 feet high can impound up to 50 acre-feet without being jurisdictional. Cal DWR, DSOD assigns hazard ratings to large "jurisdictional sized" dams within the State. The following two factors are considered when assigning hazard ratings: existing land use and land use controls (zoning) downstream of the dam. Dams are classified in four categories that identify the potential hazard to life and property:

- **Extremely High Hazard** – Expected to cause considerable loss of human life or would result in an inundation area with a population of 1,000 or more.
- **High Hazard** – Expected to cause loss of at least one human life.
- **Significant Hazard** – No probable loss of human life but can cause economic loss, environmental damage, impacts to critical facilities, or other significant impacts.
- **Low Hazard** – No probable loss of human life and low economic and environmental losses. Losses are expected to be principally limited to the owner's property.

Location and Extent

In general, there are three types of dams: concrete arch or hydraulic fill, earth and rockfill, and concrete gravity. Each type of dam has different failure characteristics. A concrete arch or hydraulic fill dam can fail almost instantaneously; the flood wave builds up rapidly to a peak then gradually declines. An earth-rockfill dam fails gradually due to erosion of the breach; a flood wave will build gradually to a peak and then decline until the reservoir is empty. A concrete gravity dam can fail instantaneously or gradually with a corresponding buildup and decline of the flood wave.

According to data provided by Orange County, Cal DWR, and Cal OES, there are 43 dams in Orange County constructed for flood control, storage, electrical generation, and recreational purposes. Of these

dams, 16 are rated as extremely high, 22 are rated as high hazard, 3 are rated as significant hazard, and 2 are rated as low hazard dams. Figure 4-40 focuses not on the entirety of Orange County, but zooms in to the Placentia Area. Table 4-29 identifies the 43 dams in Orange County, which includes dams not shown on Figure 4-40. The column titled "In Map Extent of Figure Above" of Table 4-29 indicates if the dam is shown on Figure 4-40. Table 4-30 shows the dam outside of Orange County that has inundation areas in the City of Placentia. It should be noted that none of the dams from these tables are physically located in Placentia. All of the dams are given a Condition Assessment grade of Satisfactory by the DSOD, with the exception of the dams owned by USACE, which do not fall under DSOD purview.

Figure 4-40 City of Placentia – Area Dam Inventory

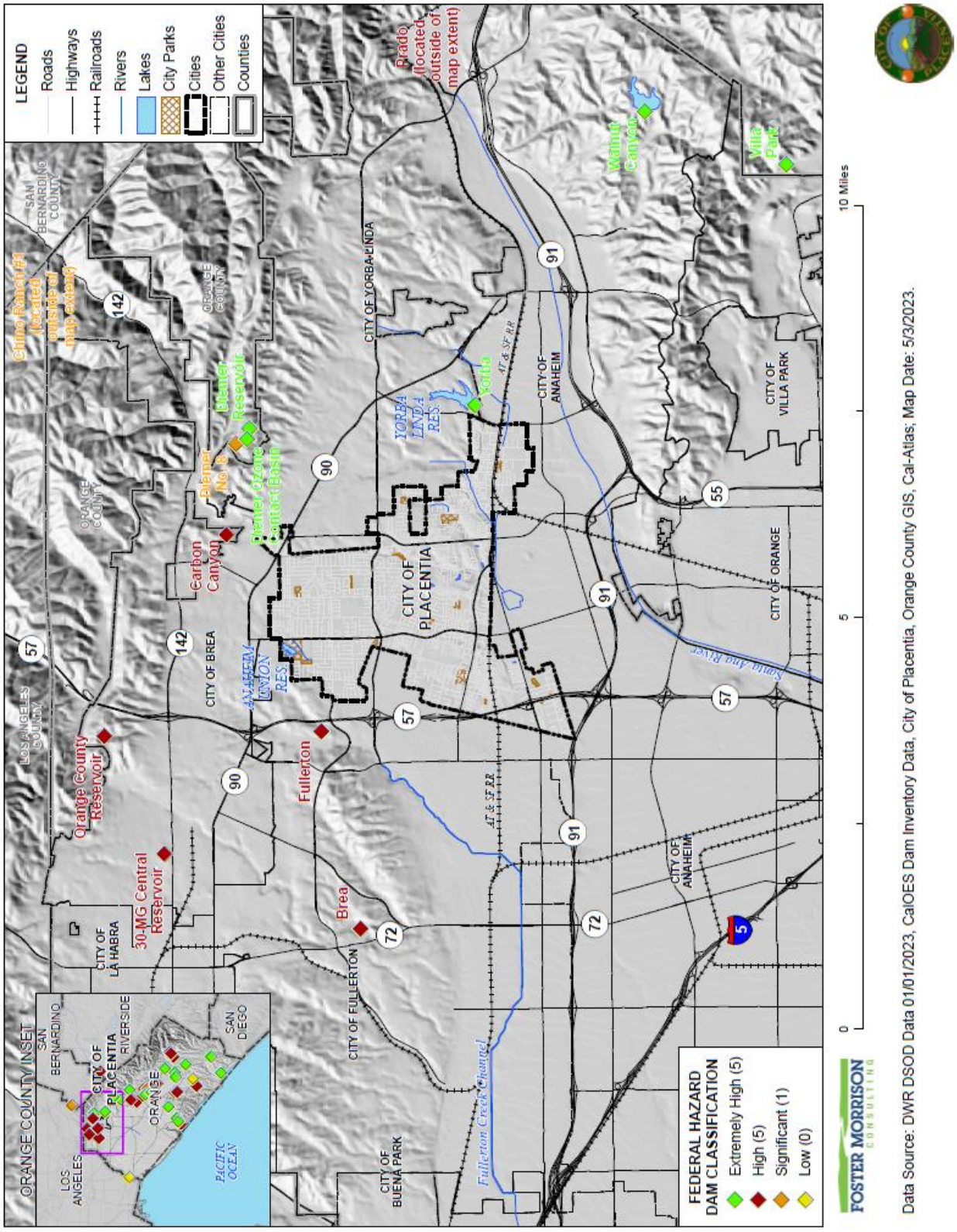


Table 4-29 Orange County Dam Inventory

Dam Name	Owner Name	Dam Type	Year Built	Dam Height feet	Dam Length feet	Capacity acre feet*	Hazard Classification	In Map Extent of Figure Above	Inundation Data Source
30 MG Central Reservoir	City of Brea	Earth	1924	30	1,596	92	High	Y	Yes - DSOD
Agua Chinon	County of Orange	Earth	1998	41	480	256	High	N	Yes - DSOD
Bee Canyon Retention Basin	County of Orange	Earth	1994	62	570	243	High	N	No - DSOD/Cal OES
Big Canyon	City of Newport Beach	Earth	1959	65	3,824	600	Extremely High	N	Yes - DSOD
Brea	USACE	Earth	1942	88	1,792	7,420	High	Y	Yes - CalOES
Carbon Canyon	USACE	Earth	1961	100	2,650	12,000	High	Y	Yes - DSOD
Diemer No. 8	Metropolitan Water District of Southern California	Earth	1968	172	1,004	18	Significant	Y	Yes - DSOD
Diemer Ozone Contact Basin	Metropolitan Water District of Southern California	Earth	2011	32	1,012	23	Extremely High	Y	Yes - DSOD
Diemer Reservoir	Metropolitan Water District of Southern California	Earth	1963	22	1,880	80	Extremely High	Y	Yes - DSOD
Dove Canyon	Dove Canyon Master Association	Earth	1989	88	700	415	High	N	Yes - DSOD
East Hicks Canyon Retarding Basin	County of Orange	Earth	1997	49	1,168	75	Significant	N	No - DSOD/ Cal OES
Eastfoot Retarding Basin	City of Irvine	Earth	2007	38.5	1,000	213	High	N	Yes - DSOD
El Toro Reservoir	El Toro Water District	Earth	1967	113.3	900	877	Extremely High	N	Yes - DSOD

Dam Name	Owner Name	Dam Type	Year Built	Dam Height feet	Dam Length feet	Capacity acre feet*	Hazard Classification	In Map Extent of Figure Above	Inundation Data Source
Fullerton Dam	USACE	Earth	1941	47	584	134	High	Y	Yes – Cal OES
Galivan Retarding Basin	County of Orange	Earth	2000	14	600	169	Low	N	Yes - DSOD
Harbor View	County of Orange	Earth	1964	65	330	28	High	N	Yes - DSOD
Hicks Canyon Retention Basin	County of Orange	Earth	1997	60	806	110	Significant	N	No - DSOD/ Cal OES
Lower Peters Canyon Retarding Basin	County of Orange	Earth	1990	52	1,166	206	High	N	Yes - DSOD
Marshburn Retarding Basin	County of Orange	Earth	1998	27	2,456	424	High	N	Yes - DSOD
Mission Viejo, Lake	Lake Mission Viejo Association, Inc.	Earth	1976	123	1,750	4,300	Extremely High	N	Yes - DSOD
Orange County Reservoir	Metropolitan Water District of Southern California	Earth	1941	103	655	217	High	Y	Yes - DSOD
Orchard Estates Retarding Basin	County of Orange	Earth	1999	21	810	138	High	N	Yes - DSOD
Palisades Reservoir	South Coast Water District	Earth	1963	146	620	147	Extremely High	N	Yes - DSOD
Peters Canyon	County of Orange	Earth	1932	54	580	1090	High	N	Yes - DSOD
Portola	Santa Margarita Water District	Earth	1980	53	1,200	586	High	N	Yes - DSOD
Rattlesnake Canyon	Irvine Ranch Water District	Earth	1959	79	980	1480	Extremely High	N	Yes – Cal OES

Dam Name	Owner Name	Dam Type	Year Built	Dam Height feet	Dam Length feet	Capacity acre feet*	Hazard Classification	In Map Extent of Figure Above	Inundation Data Source
Rossmoor No 1	El Toro Water District	Earth	1964	36	305	43	High	N	Yes - DSOD
Rossmoor Retarding Basin	County of Orange	Earth	2002	14	95	175	Low	N	Yes - DSOD
Round Canyon Retarding Basin	County of Orange	Earth	1994	98	750	286	High	N	Yes - DSOD
San Joaquin Reservoir	Irvine Ranch Water District	Earth	1966	224	873	3,036	Extremely High	N	No - DSOD/ Cal OES
Sand Canyon	Irvine Ranch Water District	Earth	1912	58	861	960	Extremely High	N	Yes - DSOD
Santiago Creek	Serrano Water District and Irvine Ranch Water District	Earth	1933	136	1,425	25,000	Extremely High	Y	Yes - DSOD
Sulphur Creek	County of Orange	Earth	1966	42	485	520	High	N	Yes - DSOD
Syphon Canyon	Irvine Ranch Water District	Earth	1949	59	843	578	Extremely High	N	Yes - DSOD
Trabuco	Trabuco Canyon Water District	Earth	1984	108	620	138	High	N	Yes - DSOD
Trabuco Retarding Basin	County of Orange	Earth	1996	18	2,250	390	High	N	Yes - DSOD
Trampas Canyon	Santa Margarita Water District	Earth	1975	183	1,300	5,700	Extremely High	N	Yes - DSOD
Upper Chiquita	Santa Margarita Water District	Earth	2012	177.2	965	754	Extremely High	N	Yes - DSOD
Upper Oso	Santa Margarita Water District	Earth	1979	142	800	3700	Extremely High	N	Yes - DSOD

Dam Name	Owner Name	Dam Type	Year Built	Dam Height feet	Dam Length feet	Capacity acre feet*	Hazard Classification	In Map Extent of Figure Above	Inundation Data Source
Veeh	Lake Hills Community Church	Earth	1936	37	417	185	High	N	Yes - DSOD
Villa Park	County of Orange	Earth	1963	118	1,475	15,600	Extremely High	Y	Yes - DSOD
Walnut Canyon	City of Anaheim	Earth	1968	187	930	2,570	Extremely High	Y	Yes - DSOD
Yorba	County of Orange	Hydraulic Fill	1907	45	920	1,200	High	Y	Yes - DSOD

Source: Cal OES, National Performance of Dams Program, Cal DWR

*One acre foot equals 325,000 gallons

Table 4-30 Dams Outside Orange County with Inundations in Placentia

Dam Name	Owner Name	Dam Type	Year Built	Dam Height feet	Dam Length feet	Capacity acre feet*	Hazard Classification	In Map Extent of Figure Above	Inundation Data Source
Prado Dam	USACE	Earth	1941	107	2,314	295,600	High	N	Yes - DSOD

Source: Cal OES, National Performance of Dams Program, Cal DWR

*One acre foot equals 325,000 gallons

Dams of Concern

Dams of concern from the City come from two sources: 2019 City of Placentia General Plan Safety Element; and DSOD Mapped Dam Inundation Areas. These are combined in the following discussion.

The 2019 City of Placentia General Plan Safety Element noted that floods resulting from dam failure of Prado Dam or Carbon Canyon Dam is a potential hazard for the City. Both of these are considered high hazard dams. While the Carbon Canyon Dam is located in Orange County and included in the above inventory table, the Prado Dam is located in nearby San Bernadino County. In addition to these two dams above, a review of the DSOD dam inundation areas that could affect the City was performed. It was found that the following dams had inundations in the City: Deimer Reservoir Dam, Deimer Ozone Contact Basin Dam, and Yorba Dam. These three dams are also considered dams of concern and are rated as extremely high hazard dams by the DSOD. These five dams of concern are delineated in Table 4-31.

Also in determining dams of concern to the City, it should be noted that the following dams did not have inundation data available, and it is unknown whether or the extent to which these dams may affect Placentia:

- Bee Canyon Retention Basin – High Hazard Dam
- East Hicks Canyon Retarding Basin – Significant
- Hicks Canyon Retention Basin – Significant Hazard Dam
- Round Canyon Retarding Basin – High Hazard Dam

Table 4-31 City of Placentia– Dams of Concern

Dam Name	Why a Source of Concern	Comments
Carbon Canyon Dam	City inside Cal OES inundation area. Noted in 2019 City of Placentia General Plan Safety Element	Inundation from Carbon Canyon would affect the majority of the City generally west of Rose Drive/Tustin Avenue. Dam analysis was performed on this dam in this LHMP.
Prado Dam (in San Bernardino County)	City inside Cal OES inundation area. Noted in 2019 City of Placentia General Plan Safety Element	Inundation from Prado Dam would affect the very southern portions of the City. Dam analysis was performed on this dam in this LHMP.
Deimer Reservoir Dam	Mapped inundation area intersects City of Placentia	Inundation areas would affect the City. Dam analysis was performed on this dam in this LHMP.
Deimer Ozone Contact Basin Dam	Mapped inundation area intersects City of Placentia	Inundation areas would affect the City. Dam analysis was performed on this dam in this LHMP.
Yorba Dam	Mapped inundation area intersects City of Placentia	Inundation areas would affect the City. Dam analysis was performed on this dam in this LHMP.

Source: City of Placentia

The following information is sourced from the 2019 Safety Element:

- Carbon Canyon Dam – The Carbon Canyon Dam, an earth-filled structure with a capacity of 12,000 acre-feet, is located approximately one (1) mile north of Placentia and was completed in 1961. It is 2,600 feet in length and 99 feet in height. The drainage area above the dam is 19.3 square miles. The structure provides flood protection to the cities of Placentia, Brea, Yorba Linda, Anaheim, Fullerton, Buena Park and unincorporated areas of the County of Orange. The Carbon Canyon Dam rarely contains threatening quantities of water. However, when the dam is filled to its capacity, the reservoir could create some potential upstream flooding problems. The dam is owned and operated by the US Army Corps of Engineers. If an inundation event should occur as a result of dam failure, floodwaters are expected to generally follow the path of the Carbon Canyon Creek Channel. Floodwaters could potentially reach the SR-91 Freeway in the southern portion of the City.
- Prado Dam – Prado Dam, designed in the 1930s and completed in 1941, is located approximately 18 miles east of Placentia in Riverside County. The Prado Dam was intended to provide flood protection to the Lower Santa Ana River Basin. The existing 9,000 cubic feet per second (cfs) limit on controlled releases from the Prado Dam is based upon the original non-damaging capacity of the downstream channel. Recently downstream channel improvements were completed as part of the United States Army Corps of Engineers' Santa Ana River project.

Dam failure is a natural disaster from two perspectives. First, the inundation from released waters resulting from dam failure is related to naturally occurring floodwaters. Second, dam failure would most probably happen in consequence of the natural disaster triggering the event. There is no scale with which to measure dam failure, only a scale to measure dam failure vulnerability based on size of dam and proximity to development. Dam failure may range from a small breach to a total failure. While a dam may fill slowly with runoff from winter storms, a dam break can have a very quick speed of onset. The duration of dam failure is not long – only as long as it takes to empty the reservoir of water the dam held back.

Aerial extent of dam inundation in the City can be seen on Figure 4-41 in Table 4-32 for extremely high hazard dams and on Figure 4-42 and in Table 4-33 for high hazard dams.

Figure 4-41 City of Placentia – Extremely High Hazard Dam Inundation Areas

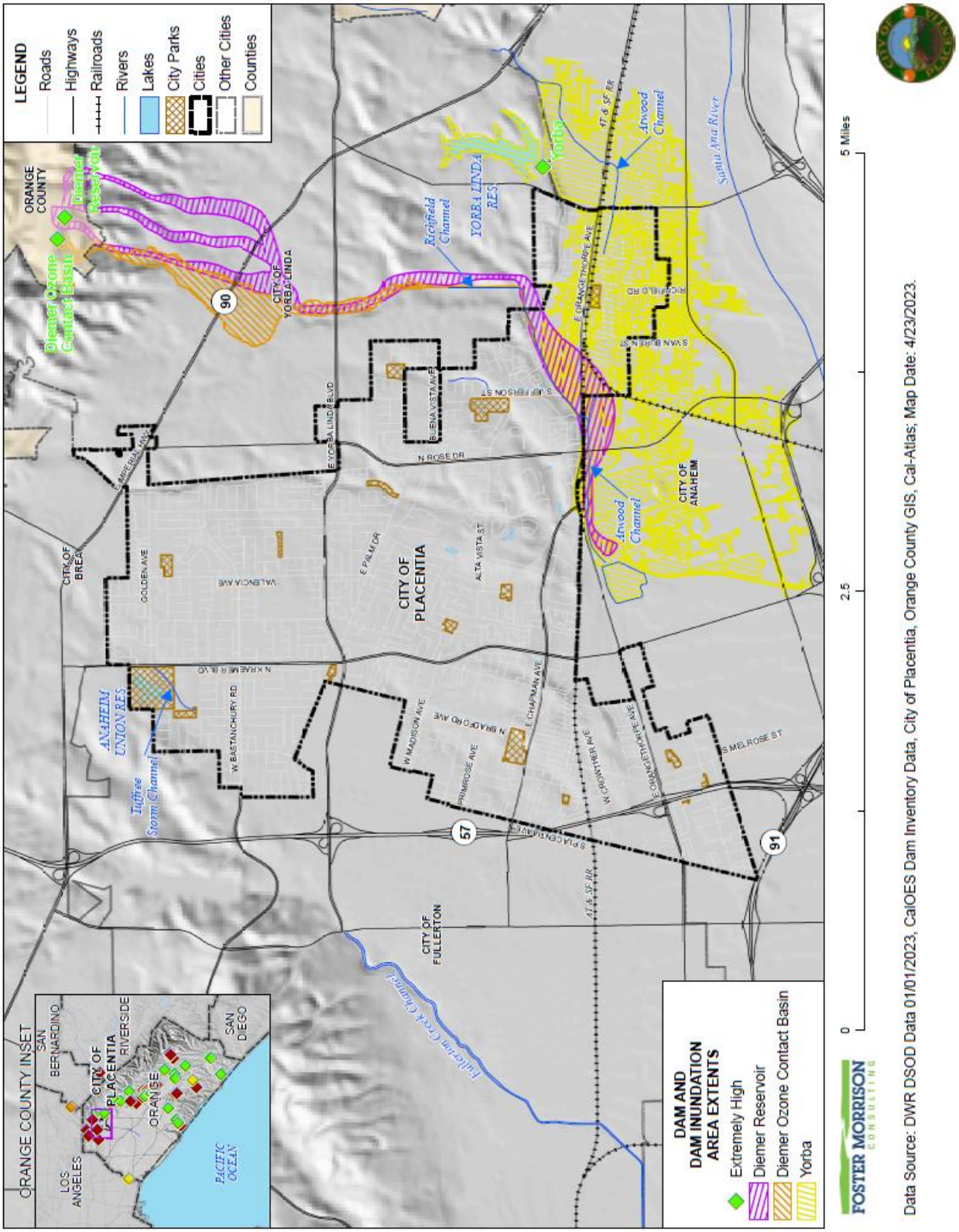


Table 4-32 City of Placentia – Geographical (Extremely High Hazard) Dam Inundation Extents by Land Use

Dam/Land Use	Total Acres	% of Total Acres	Improved Acres	% of Total Improved Acres	Unimproved Acres	% of Total Unimproved Acres
Diemer						
Agricultural	0.0	0.0%	0.0	0.0%	0.0	0.0%
Commercial	0.0	0.0%	0.0	0.0%	0.0	0.0%
Industrial	8.42	0.2%	1.03	0.0%	7.39	1.0%
Miscellaneous	0.0	0.0%	0.0	0.0%	0.0	0.0%
Residential	36.74	1.1%	34.36	1.3%	2.38	0.3%
Tax Exempt	7.98	0.2%	0.06	0.0%	7.93	1.1%
Unknown	9.88	0.3%	0.0	0.0%	9.88	1.4%
Diemer Total	**63.03**	**1.8%**	**35.44**	**1.3%**	**27.59**	**3.9%**
Diemer Ozone Basin						
Agricultural	0.0	0.0%	0.0	0.0%	0.0	0.0%
Commercial	0.0	0.0%	0.0	0.0%	0.0	0.0%
Industrial	0.0	0.0%	0.0	0.0%	0.0	0.0%
Miscellaneous	0.0	0.0%	0.0	0.0%	0.0	0.0%
Residential	0.02	0.0%	0.0	0.0%	0.02	0.0%
Tax Exempt	0.82	0.0%	0.0	0.0%	0.82	0.1%
Unknown	0.0	0.0%	0.0	0.0%	0.0	0.0%
Diemer Ozone Basin Total	**0.84**	**0.0%**	**0.0**	**0.0%**	**0.84**	**0.1%**
Yorba						
Agricultural	0.78	0.0%	0.0	0.0%	0.78	0.1%
Commercial	5.04	0.1%	4.56	0.2%	0.48	0.1%
Industrial	95.59	2.8%	81.38	3.0%	14.21	2.0%
Miscellaneous	0.0	0.0%	0.0	0.0%	0.0	0.0%
Residential	37.62	1.1%	30.68	1.1%	6.94	1.0%
Tax Exempt	24.31	0.7%	3.07	0.1%	21.24	3.0%
Unknown	18.25	0.5%			18.25	2.6%
Yorba Total	**181.59**	**5.3%**	**119.69**	**4.4%**	**61.90**	**8.7%**

Source: DSOD, Cal OES

Figure 4-42 City of Placentia – High Hazard Dam Inundation Areas

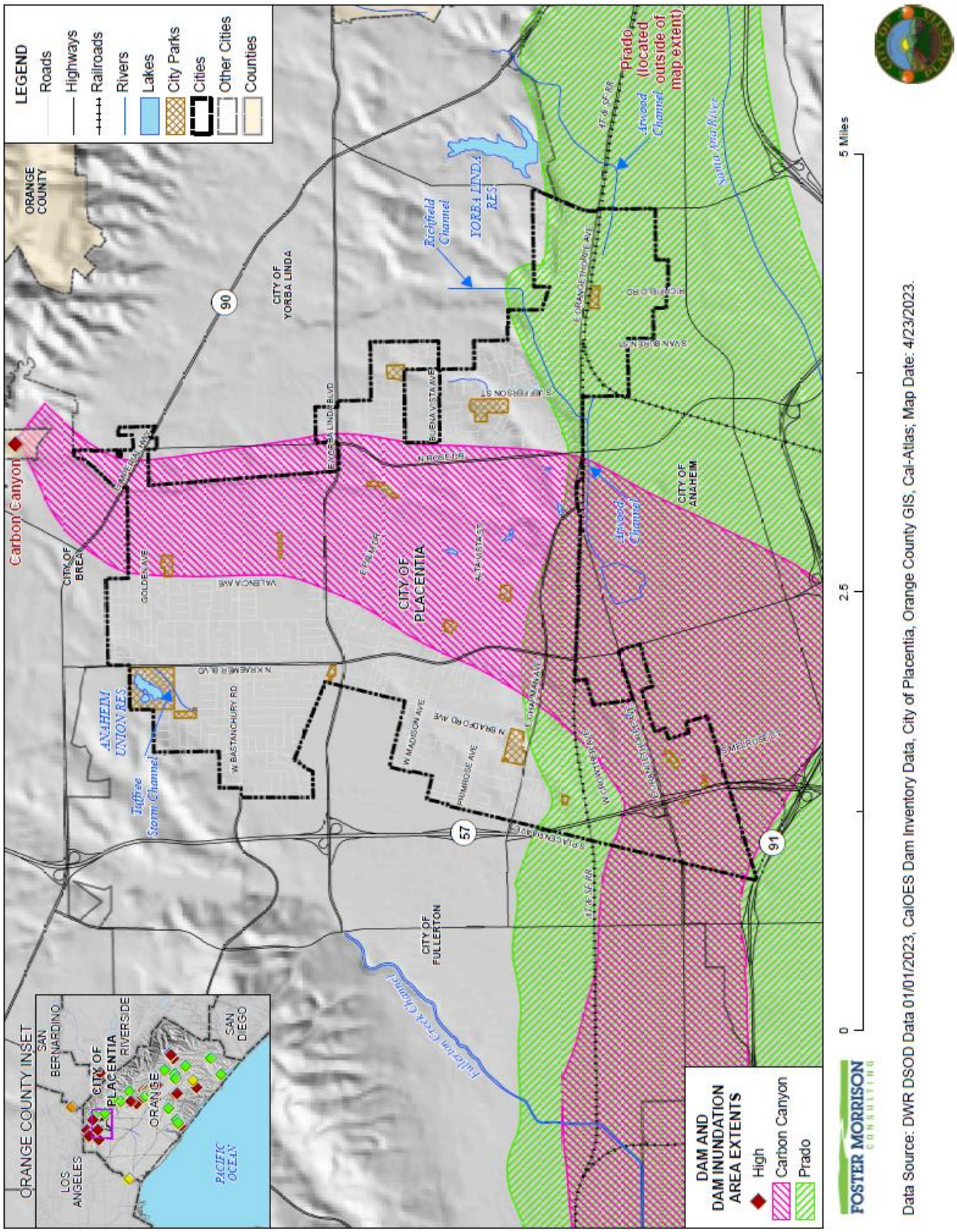


Table 4-33 City of Placentia – Geographical (High Hazard) Dam Inundation Extents by Land Use

Dam/Land Use	Total Acres	% of Total Acres	Improved Acres	% of Total Improved Acres	Unimproved Acres	% of Total Unimproved Acres
Carbon Canyon						
Agricultural	21.29	0.6%	0	0.0%	21.29	3.0%
Commercial	256.35	7.5%	204.31	7.6%	52.04	7.3%
Industrial	126.20	3.7%	119.92	4.4%	6.28	0.9%
Miscellaneous	0.05	0.0%	0	0.0%	0.05	0.0%
Residential	984.74	28.8%	862.70	31.9%	122.04	17.1%
Tax Exempt	117.48	3.4%	80.62	3.0%	36.86	5.2%
Unknown	69.27	2.0%	**0**	0.0%	69.27	9.7%
Carbon Canyon Total	**1,575.39**	**46.1%**	**1,267.56**	**46.9%**	**307.83**	**43.0%**
Prado						
Agricultural	1.60	0.0%	**0**	0.0%	1.60	0.2%
Commercial	105.00	3.1%	103.42	3.8%	1.59	0.2%
Industrial	292.57	8.6%	271.29	10.0%	21.27	3.0%
Miscellaneous	0	0	0	0.0%	0.0	0.0%
Residential	378.38	11.1%	309.97	11.5%	68.41	9.6%
Tax Exempt	97.73	2.9%	41.54	1.5%	56.19	7.9%
Unknown	118.72	3.5%	**0**	0.0%	118.72	16.6%
Prado Total	**993.99**	**29.1%**	**726.22**	**26.9%**	**267.77**	**37.4%**

Source: DSOD, Cal OES

Past Occurrences

Disaster Declaration History

There have been no disasters declarations related to dam failure in Orange County, as shown in Table 4-4.

NCDC Events

There have been no NCDC dam failure events in Orange County.

National Performance of Dams Program Events

The National Performance of Dams Program at Stanford University tracks dam failures. A search of the National Performance of Dams Program database showed no past dam failure events on dams that could affect the City.

Hazard Mitigation Planning Committee Events

On **January 14, 2005**, after days of heavy rain, water began seeping through an earthen extension at Prado Dam. Authorities released water in order to relieve pressure and sent a flood warning to areas downriver of the dam. Over 3,000 residents were evacuated from their homes for nearly twenty-four hours for fear of flooding. The gymnasium at Corona High School in Corona, CA was converted by the American Red Cross into a temporary shelter. No damage was reported in the City of Placentia. The Prado Dam has been going through a series of improvements since then.

The HMPC noted no other events where the City was under threat of dam failure.

Probability of Future Occurrences

Unlikely– There have been no recorded events of direct damage from dam failure or other issues of concern. Based on past occurrences and the rigorous monitoring and inspection requirements for dams, it is unlikely that a dam failure will occur in the future that would impact the City. The HMPC noted that it could be considered to be occasional based on aging dam systems and variety of dam owners, some with limited resources to properly maintain dams.

Climate Change and Dam Failure

Increases in precipitation in areas upstream of dams could increase the potential for dam failure and uncontrolled releases on the dam that could affect the City.

Vulnerability Assessment

Vulnerability—High

Dam failure flooding can occur as the result of a partial or complete collapse of an impoundment. Dam failures often result from prolonged rainfall and flooding. An earthquake event can also contribute to a dam failure. The primary danger associated with dam failure is the high velocity flooding of those properties downstream of the dam. A dam failure can range from a small, uncontrolled release to a catastrophic failure. Vulnerability to dam failures is generally confined to the areas subject to inundation downstream of the facility. Secondary losses would include loss of the multi-use functions of the facility and associated revenues that accompany those functions. Dam failure flooding would vary by community depending on which dam fails and the nature and extent of the dam failure and associated flooding.

Vulnerability of the community is discussed in multiple sections that detail how this hazard can affect the City. These sections include assets at risk, impacts, and how future development can be affected by this hazard.

Assets at Risk from Dam Failure

Dam inundation areas were available for the dams of concern (as shown in Table 4-31) and were used as the basis of this dam inundation analysis. This includes:

- Extremely High Hazard Dams:
  - ✓ Diemer
  - ✓ Diemer Ozone Basin
  - ✓ Yorba Dam
- High Hazard Dams
  - ✓ Carbon Canyon
  - ✓ Prado Dam

The depth of flooding due to the failure of these dams is unknown. Assets at risk from dam failure include: people and populations; structures; critical facilities and infrastructure, and community lifelines; natural, historic, and cultural resources; and economic assets and community activities of value. These are discussed in the following sections. These are discussed in the following sections (after the Methodology and Results).

The methodology used to analyze dam failure for the people and populations, structures, and critical facilities is discussed in the section below.

Methodology and Results

In order to analyze people and populations, structures, and critical facilities at risk in dam inundation areas, GIS was used to quantify those values. The Orange County 2022 Parcel/Assessor Data was used as the basis for the inventory of assessed values for both improved and unimproved parcels within the City. The dam inundation areas, obtained from DSOD and Cal OES, were then overlaid on the parcel layer. For the purposes of this analysis, if the dam inundation layer intersected any portion of a parcel polygon, the entire parcel was considered to be in the dam inundation area. The parcels were segregated and analyzed in this fashion for Placentia.

People and Populations

All people and populations located in dam inundation areas are vulnerable to dam failure. Certain vulnerable populations may be at increased risk to dam failure, especially during a large event with minimal advance notice. These vulnerable populations may include: the unhoused, those with limited mobility, and those that lack the resources to leave the area.

Planning Area residents that live in these dam inundation areas are often the most vulnerable. Not only are the residents at risk, but their homes and contents are all at risk, compounding the impacts associated with significant hazard events. To future evaluate, the impact to the residential population within the City, a separate analysis was performed to determine residential populations in the dam inundation areas (as shown on Figure 4-41 and Figure 4-42 below). Using GIS, the dam inundation area dataset was overlayed on the improved residential parcel data. Those parcel polygons that intersect an inundation area were counted and multiplied by the Census Bureau average household size for the City of Placentia (3.14). Results were tabulated and are shown in Table 4-34. As shown, Carbon Canyon, Prado, Yorba and Diemer dams all affect population in the City.

Table 4-34 City of Placentia – Improved Residential Parcels and Populations by Dam Inundation Area

Hazard Classification / Dam	Improved Residential Parcels	Population
Extremely High Hazard Dams		
Diemer	16	50
Diemer Ozone Basin	0	0
Yorba Dam	323	1,014
High Hazard Dams		
Carbon Canyon	5,728	17,986
Prado Dam	1,912	6,004

Source: Cal OES Dam Inundation Data, DSOD, US Census Bureau Average Household Sizes (3.14)

Structures

Structures in the City have some measure of risk to dam failure. Dam failure flooding can affect the built environment of the City. Structures in dam inundation areas are at risk and depending on flood depths, can range from slight damage to totally inundated. Analysis by extremely high hazard dam and high hazard dam follows.

Extremely High Hazard Dams

Three DSOD Extremely High Hazard Dam inundation areas intersect the City: Diemer Dam, Diemer Ozone Basin Dam, and Yorba Dam. The inundation areas for these Extremely High Hazard Dams can be seen on Figure 4-41. Table 4-35 contains summary analysis for the three Extremely High Hazard Dams. Table 4-36, Table 4-37, and Table 4-38 break down Table 4-35 by dam and land use type, and show total and improved number of parcels (structures) and values at risk to each Extremely High Hazard Dam. The estimated contents replacement values are based on the CRV factors detailed in Table 4-7. Also, it is important to keep in mind that these assessed values may be well below the actual market value of improved parcels located within the landslide incidence and susceptibility areas due primarily to Proposition 13.

Table 4-35 City of Placentia – Count and Value of Parcels (and Structures) by Extremely High Hazard Dam Inundation Area

Dam Inundation Areas	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Deimer Reservoir	66	22	$106,642,846	$75,637,452	$50,963,559	$233,243,857
Deimer Ozone Contact Basin	5		$107,783	$0	$0	$107,783
Yorba	574	441	$340,345,797	$239,330,349	$233,149,720	$826,047,028

Source: Cal OES, DSOD, Orange County 2022 Parcel/Assessor Data
Summary tables and inundations cannot be summed as the inundations intersect in similar area coverage. By summing, duplication would occur.

Table 4-36 City of Placentia – Count and Value of Parcels (and Structures) in Diemer Dam Inundation Area by Land Use

Land Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Agricultural	0	0	$0	$0	$0	$0
Commercial	0	0	$0	$0	$0	$0
Industrial	12	5	$29,005,662	$13,052,487	$19,578,730	$61,636,879
Miscellaneous	0	0	$0	$0	$0	$0
Residential	30	16	$76,036,110	$62,492,617	$31,246,307	$169,775,034
Tax Exempt	15	1	$1,601,074	$92,348	$138,522	$1,831,944
Unknown	9	0	$0	$0	$0	$0
Grand Total	**66**	**22**	**$106,642,846**	**$75,637,452**	**$50,963,559**	**$233,243,857**

Source: Cal OES, DSOD, Orange County 2022 Parcel/Assessor Data

Table 4-37 City of Placentia – Count and Value of Parcels (and Structures) in Diemer Ozone Basin Dam Inundation Area by Land Use

Land Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Agricultural	0	0	$0	$0	$0	$0
Commercial	0	0	$0	$0	$0	$0
Industrial	0	0	$0	$0	$0	$0
Miscellaneous	0	0	$0	$0	$0	$0
Residential	2	0	$13,886	$0	$0	$13,886
Tax Exempt	3	0	$93,897	$0	$0	$93,897
Unknown	0	0	$0	$0	$0	$0
Grand Total	**5**	**0**	**$107,783**	**$0**	**$0**	**$107,783**

Source: Cal OES, DSOD, Orange County 2022 Parcel/Assessor Data

Table 4-38 City of Placentia – Count and Value of Parcels (and Structures) in Yorba Dam Inundation Area by Land Use

Land Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Agricultural	4	0	$0	$0	$0	$0
Commercial	14	13	$13,046,287	$8,688,385	$8,688,385	$30,423,057
Industrial	117	104	$162,720,546	$108,566,021	$162,849,026	$447,356,755
Miscellaneous	0	0	$0	$0	$0	$0
Residential	390	323	$159,699,512	$121,501,613	$60,750,814	$341,951,939
Tax Exempt	30	1	$4,879,452	$574,330	$861,495	$6,315,277

Land Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Unknown	19	0	$0	$0	$0	$0
Grand Total	**574**	**441**	**$340,345,797**	**$239,330,349**	**$233,149,720**	**$826,047,028**

Source: Cal OES, DSOD, Orange County 2022 Parcel/Assessor Data

High Hazard Dams

Two High Hazard Dam inundation areas intersect the City: Carbon Canyon Dam and Prado Dam. The inundation areas for these High Hazard Dams can be seen on Figure 4-42. Table 4-39 contains summary analysis for the two High Hazard Dams. Table 4-40 and Table 4-41 break down Table 4-39 by dam and land use type and show total and improved number of parcels and values at risk to each High Hazard Dam.

Table 4-39 City of Placentia – Count and Value of Parcels (and Structures) in High Hazard Dam Inundation Areas

Dam Inundation Area	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Carbon Canyon	6,328	5,912	$2,207,881,590	$1,407,551,122	$903,029,855	$4,526,364,939
Prado	2,635	2,254	$1,135,294,892	$784,023,369	$682,005,051	$2,614,575,827

Source: Cal OES, DSOD, Orange County 2022 Parcel/Assessor Data

Summary tables and inundations cannot be summed as the inundations intersect in similar area coverage. By summing, duplication would occur.

Table 4-40 City of Placentia – Count and Value of Parcels (and Structures) in Carbon Canyon Dam Inundation Area by Land Use

Land Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Agricultural	8	0	$1,086,274	$0	$0	$1,086,274
Commercial	86	68	$116,265,448	$110,190,771	$110,190,771	$344,518,009
Industrial	104	98	$151,881,961	$92,718,676	$139,078,019	$383,678,656
Miscellaneous	1	0	$0	$0	$0	$0
Residential	6,002	5,728	$1,908,461,486	$1,153,201,509	$576,600,816	$3,638,295,164
Tax Exempt	91	18	$30,186,421	$51,440,166	$77,160,249	$158,786,836
Unknown	36	0	$0	$0	$0	$0
Grand Total	**6,328**	**5,912**	**$2,207,881,590**	**$1,407,551,122**	**$903,029,855**	**$4,526,364,939**

Source: Cal OES, DSOD, Orange County 2022 Parcel/Assessor Data

Table 4-41 City of Placentia – Count and Value of Parcels (and Structures) in Prado Dam Inundation Area by Land Use

Land Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Agricultural	4	0	$0	$0	$0	$0
Commercial	114	103	$100,056,767	$79,503,663	$79,503,663	$259,064,093
Industrial	234	215	$333,264,696	$218,101,721	$327,152,582	$891,740,161
Miscellaneous	0	0	$0	$0	$0	$0
Residential	2,108	1,912	$665,164,964	$454,278,195	$227,139,122	$1,346,613,634
Tax Exempt	104	24	$36,808,465	$32,139,790	$48,209,684	$117,157,939
Unknown	71	0	$0	$0	$0	$0
Grand Total	**2,635**	**2,254**	**$1,135,294,892**	**$784,023,369**	**$682,005,051**	**$2,614,575,827**

Source: Cal OES, DSOD, Orange County 2022 Parcel/Assessor Data

Critical Facilities and Infrastructure, and Community Lifelines

Dam failure flooding presents a threat to critical facilities, infrastructure, and community lifelines. The following GIS analysis identifies critical facilities and infrastructure at risk to dam inundation flooding, followed by a discussion on vulnerability of community lifelines.

Critical Facilities and Infrastructure

Dam failure flooding presents a risk to the critical facilities and infrastructure in the City. A separate analysis was performed on the critical facility inventory in the City of Placentia to determine critical facilities in the dam inundation areas. Using GIS, the dam inundation areas were overlayed on the critical facility GIS layer. Separate analysis was done for extremely high hazard and high hazard dam inundation areas:

- Figure 4-44 shows critical facilities, as well as the extremely high hazard dam inundation areas. Table 4-42 provides summary information by category and type of critical facilities in the extremely high hazard dam inundation areas.
- Figure 4-43 shows critical facilities, as well as the high hazard dam inundation areas. Table 4-43 provides summary information by category and type of critical facilities in the high hazard dam inundation areas.

Details of critical facility categories, type, name, and address by fire hazard severity zone are listed in Appendix F.

Figure 4-43 City of Placentia - Critical Facilities in Extremely High Hazard Dam Inundation Areas

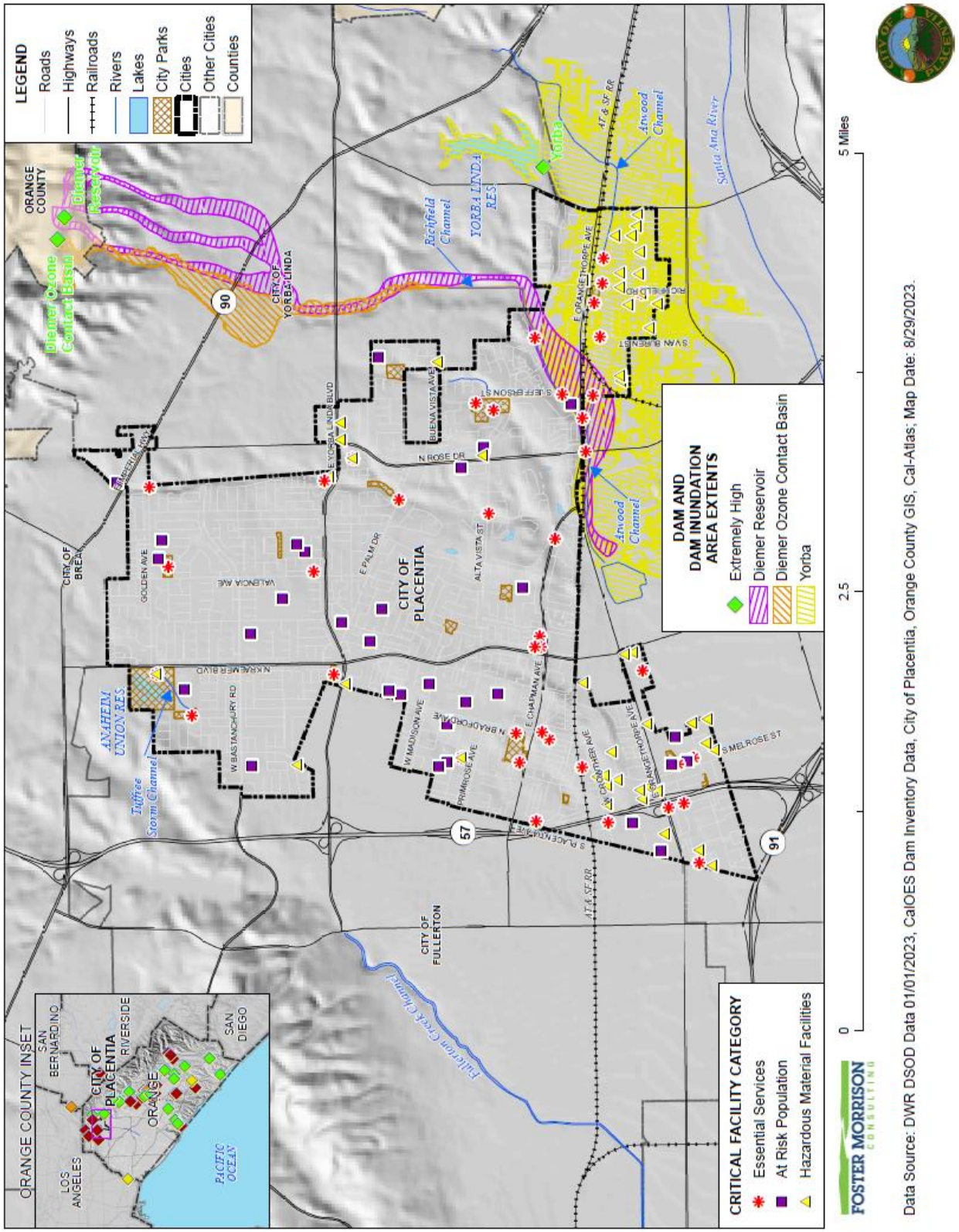


Table 4-42 City of Placentia – Critical Facility Counts by Extremely High Hazard Dam Inundation Areas and Critical Facility Type

Critical Facility Category	Critical Facility Type	Facility Count
Essential Services Facilities	Bridge	8
	Water Treatment Facilities	1
	Essential Services Facilities Total	**9**
At Risk Population Facilities	Primary/Secondary School	1
	At Risk Population Facilities Total	**1**
Hazardous Material Facilities	Gas Station	1
	Hazardous Material Business	1
	Water Utilities	1
	Hazardous Material Facilities Total	**3**
Grand Total		**13**

Source: Cal OES, DSOD, City of Placentia GIS

Figure 4-44 City of Placentia – High Hazard Dam Inundations and Critical Facilities

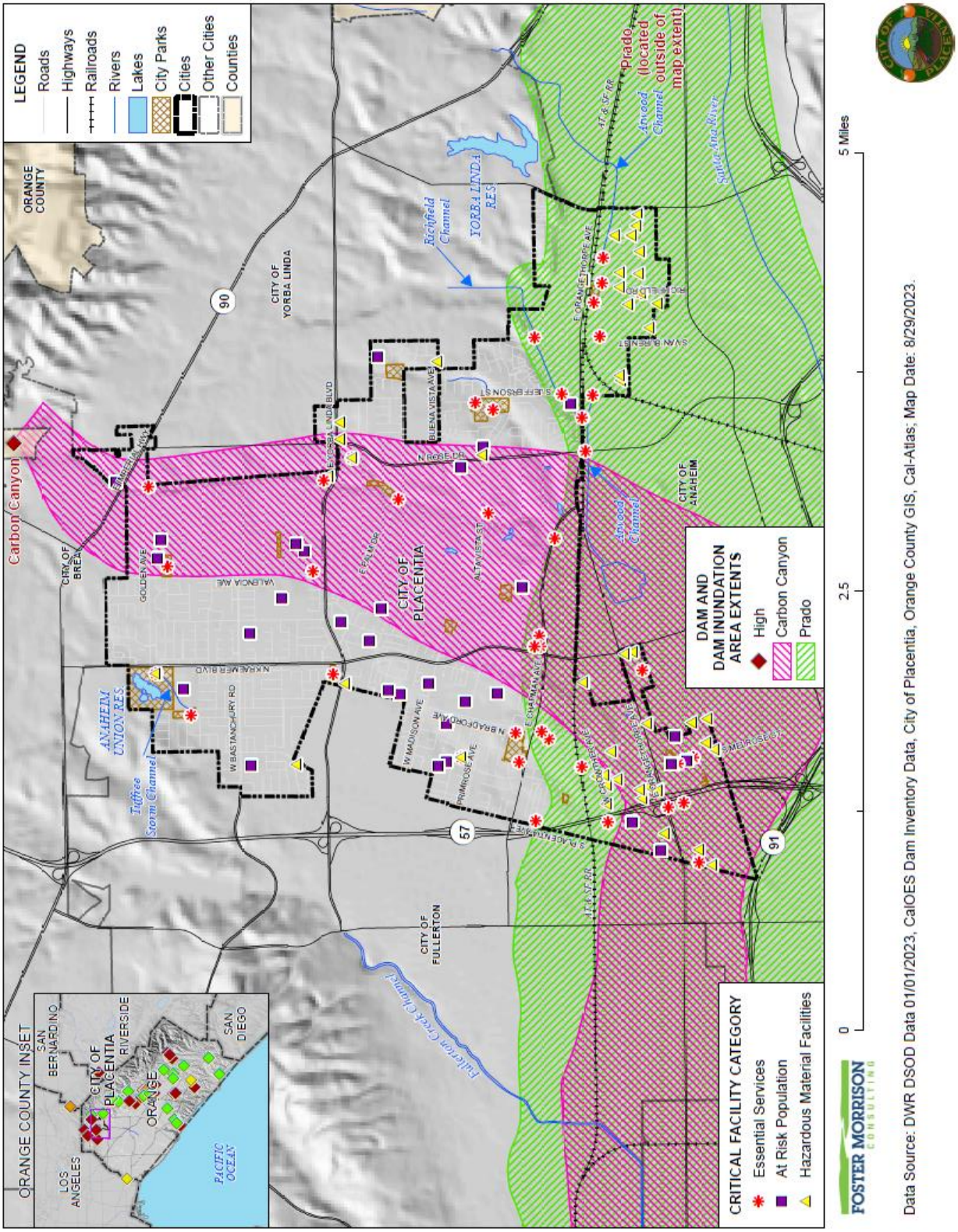


Table 4-43 City of Placentia – Critical Facility Counts by High Hazard Dam Inundation Areas and Critical Facility Type

Critical Facility Category	Critical Facility Type	Facility Count
Essential Services Facilities	Bridge	18
	City Facility	8
	Fire Station	2
	Hospital	1
	Police Station	1
	Water Treatment Facilities	1
	Essential Services Facilities Total	**31**
At Risk Population Facilities	Daycare Center	5
	Primary/Secondary School	8
	Rehabilitation Center	1
	Senior Apartment	1
	Senior Hospice	1
	At Risk Population Facilities Total	**16**
Hazardous Material Facilities	Gas Station	4
	Hazardous Material Business	33
	Hospital	2
	Propane Tank Facility	1
	Water Utilities	1
	Hazardous Material Facilities Total	**41**
Grand Total		**88**

Source: Cal OES, DSOD, City of Placentia GIS

Community Lifelines

Dam failure flooding presents a threat to life and property, including community lifelines in the City. A catastrophic dam failure could challenge local response capabilities and require evacuations to save lives. Community lifelines that would be at risk to dam failure flooding include:

- **Safety and Security** – Search and rescue and swiftwater teams may be called on to perform riskier duties during times of heavy rains and flooding. Police, Fire, EMS, and Public Works personnel are often called on to respond during flood emergencies. This would be especially true in a dam failure event.
- **Food, Hydration, Shelter** – a dam failure would displace many residents in the City. Some would need shelter, as well as food and water.
- **Health and Medical** – There is the potential for multiple injuries and deaths from a catastrophic dam failure taxing health and medical facilities. Casualty and patient movement from the inundation areas and unrelated incidents by EMS may be significantly impacted and have to be rerouted. Public health facilities can also be at risk from flooding caused by dam failures.

- **Energy** – Dam failure could impact large areas of above ground electric infrastructure, causing widespread power outages. Dam failure could also affect fueling stations, as well as electric car charging stations.
- **Communications** – An influx of service calls to dispatch centers for reporting of flooding, power outages, and rescues or other issues can occur resulting in communication networks going down for extended periods of time. Messaging systems need to be deployed during these events to let the public know about road closures, washouts, debris on roads, or lane closures. Calls to and from family and friends during a hazard event can further overwhelm communication systems such as cell towers and other infrastructure. Demand may exceed the capacity of these systems to remain operational during response efforts.
- **Transportation** – Highways and local roads may see extensive flooding. Bridges can be damaged or destroyed. This can cause lane closures or road closures and limit available routes altogether. These closures can affect response personnel (EMS, Fire, Police) as well as cause additional traffic issues for residents. Evacuation efforts may be difficult and further put people at risk of death or injury.
- **Hazardous Material** – Hazardous material facilities can be affected by flooding. Releases during these events can contribute to the dangers of floodwaters and cause contamination of potable water sources, as well as additional exposure to the environment.
- **Water Systems** – Any water system located in a dam inundation area may be affected by dam failure flooding. This is true of both water provider's systems, as well as the City's stormwater drainage system and facilities.

Depending on the dam and the magnitude and extent of the failure, a large dam failure event could significantly impact the critical facilities and infrastructure in the City and possibly overwhelm many if not all of the community lifelines, if only for a short period of time.

Natural, Historic, and Cultural Resources

A major dam failure and associated flooding could have a devastating impact on the City. Large flood events can affect all natural, historic, and cultural resources that lie in the dam inundation zones shown on Figure 4-41 and Figure 4-42. There are a number of ways floodwaters associated with a dam failure event can impact natural resources and the environment: Wildlife habitats can be destroyed by floodwaters. Contaminated floodwater can pollute rivers and habitats. Silt and sediment can destroy natural areas. River banks and natural levées can be eliminated as rivers reach bankfull capacity. Rivers can be widened, and deposition can increase downstream. Trees can be uprooted by high-velocity water flow. Plants that survive the initial flood may die due to being inundated with water. Historic and Cultural resources may also be affected. Generally, the impacts are associated with damage to these structures within the flooded areas, but other cultural resources such as those associated with Native Americans and old tribal areas can also be disturbed, damaged, and lost during extreme flood events.

Economic Assets and Community Activities of Value

As shown on Figure 4-41 and Figure 4-42, dam failures could affect any economic asset that lies in the dam inundation area. These areas would contain many economic assets, both large and small. Most economic assets of the City Planning Area would be at least temporarily disrupted. Many of these would come back online relatively quickly after a dam failure flood event, but some would take longer to re-engage in business. Some economic assets may be damaged to the point where the business or area would no longer be economically viable to continue to operate. Depending on the dam that failed, most community activities

of value would be affected if they occurred during a dam failure event. If a dam failure were to occur during one of the larger community gatherings like the Heritage Parade or Tamale Festival, additional difficulties would be incurred as there would be a greater number of people to evacuate or get to safety.

Impacts from Dam Failure

Impacts to the City from dam failure flooding could be extensive and widespread and include loss of life and injury, flooding and damage to property and structures, damage to critical facilities and infrastructure, loss of natural resources, and all other flood related impacts. Additionally, mass evacuations and associated economic losses can also be significant.

Other impacts associated with dam failure are landslides, bank erosion, and destruction of habitat. Dam failures can cause downstream flooding and can transport large volumes of sediment and debris and contaminants from the floodwaters. Other environmental impacts can include contamination from septic system failures and releases of contaminants from hazardous materials facilities, contamination of potable water supplies; changes in configurations of streams; loss of wildlife habitats; and degradation of wetlands. A large dam failure event could have significant and catastrophic impacts.

These impacts may be exacerbated by the effects of climate change, changes in population patterns (migration, density, or the makeup of socially vulnerable populations), and changes in land use and development.

As discussed in the hazard profile section, climate change is anticipated to exacerbate this hazard over time. Regarding population projections, the City is approaching built out conditions. Population projections for the City show very limited growth over the next 25 years. Populations are anticipated to grow by only 7.3% between 2025 and 2050, which equates to an annual growth of 0.29%, thus future population growth should not increase the potential impacts from this hazard on City assets. With respect to population patterns such as those associated with migration, density, or makeup of socially vulnerable populations the data shows that most socially vulnerable populations and disadvantaged communities are concentrated in the western portion of the City. Also, FEMA's National Risk Index for Orange County is rated as Very High. Dam failure flooding shows limited hazard risk occurring in the western portion of the City. Thus, even if these population patterns continue, it is unlikely that the vulnerability and potential impacts from this hazard to City assets will significantly change.

As described in the land use discussion at the end of Section 4.2.2, a new land use map was developed as part of the General Plan efforts in 2023, which establishes the basic pattern of development in the City for the next 20-25 years, including land uses and densities. While future development within hazard areas generally contributes to some increase of impacts on City assets, given the limited potential for significant future growth in Placentia, and that most future development areas in the City lie outside of mapped dam inundation areas, future changes in land use and development are unlikely to contribute to any notable change in the vulnerability of City assets to this hazard. Any future development that occurs inside these planning areas could increase the risk of dam failure impacts in the City. In addition, the City has a development review process which includes the consideration of hazard constraints and updated building codes that should further limit the impacts of these hazards on City assets.

Future Development

Although new growth and development corridors would fall in the area flooded by a dam failure, given the limited potential of total dam failure and the large area that a dam failure would affect, development in the dam inundation area will continue to occur. Future development areas and their vulnerability to dam failure are discussed further in the below GIS analysis.

Future Development GIS Analysis

The City provided 19 future development areas which were used as the basis for the inventory of future development areas for the City. Utilizing the future development area spatial layer, the parcel centroid data was intersected to determine the parcel counts and acreage within each area. Figure 4-45 shows the locations of the future development areas overlayed on the extremely high hazard dam inundation areas. Table 4-44 shows the parcels and acreages of each future development area in the City by extremely high hazard dam inundation areas. Figure 4-46 shows the locations of the future development areas overlayed on the high hazard dam inundation areas. Table 4-45 shows the parcels and acreages of each future development area in the City by high hazard dam inundation areas.

Figure 4-45 City of Placentia – Future Development and Extremely High Hazard Dam Inundation Areas

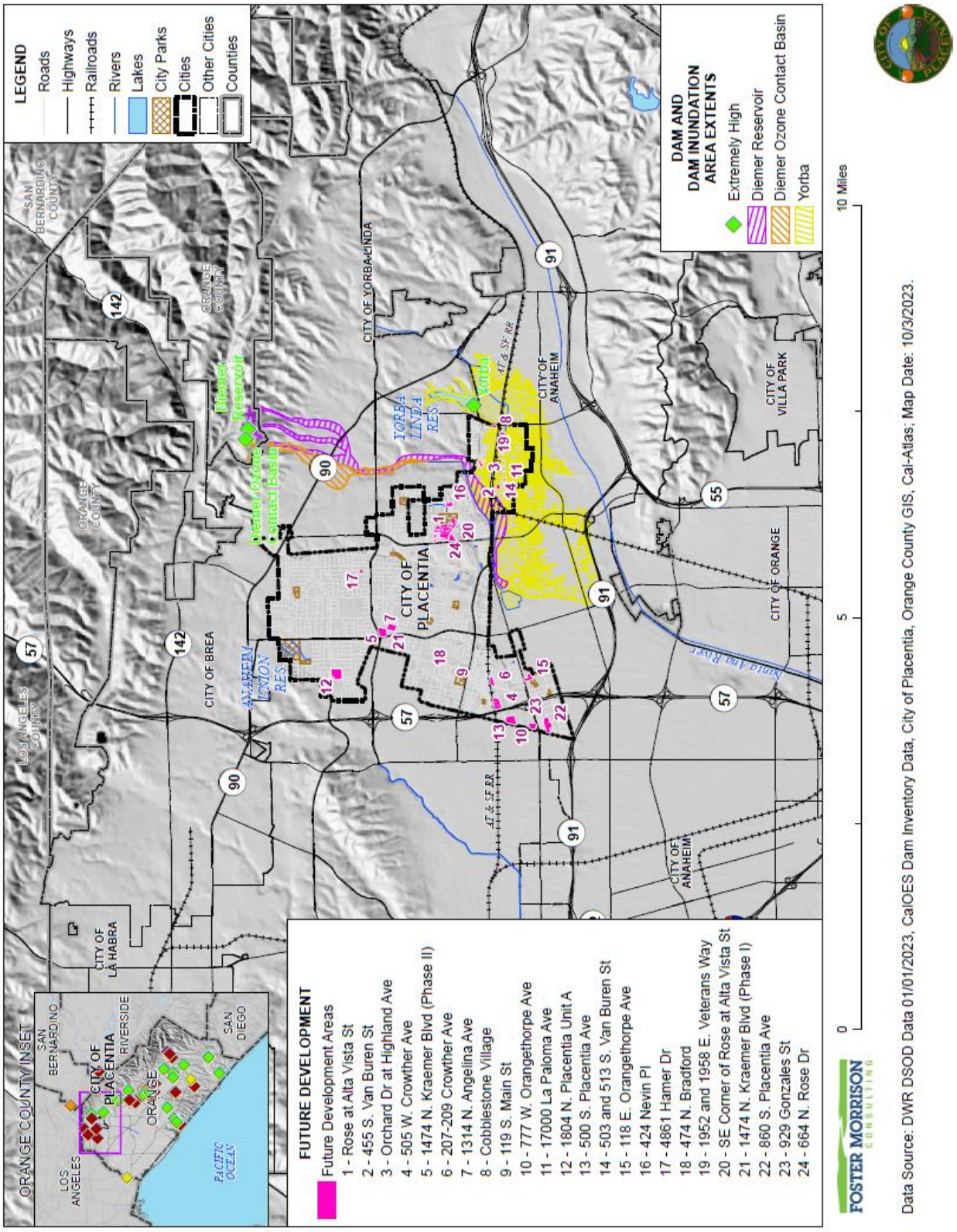


Table 4-44 City of Placentia – Future Development Areas in Extremely High Hazard Potential Dam Inundation Areas

Map #	Future Development Area	Total Parcel Count	Improved Parcel Count	Total Acres
2	455 S. Van Buren St	1	1	0.17
8	Cobblestone Village	1	0	0.59
11	17000 La Paloma Ave	1	0	0.26
14	503 & 513 S. Van Buren St	2	2	0.38
19	1952 & 1958 E. Veterans Way	1	0	0.78
Extremely High Hazard Inundation Total		**6**	**3**	**2.18**

Source: Cal OES, DSOD, City of Placentia GIS

Figure 4-46 City of Placentia – Future Development and High Hazard Dam Inundation Areas

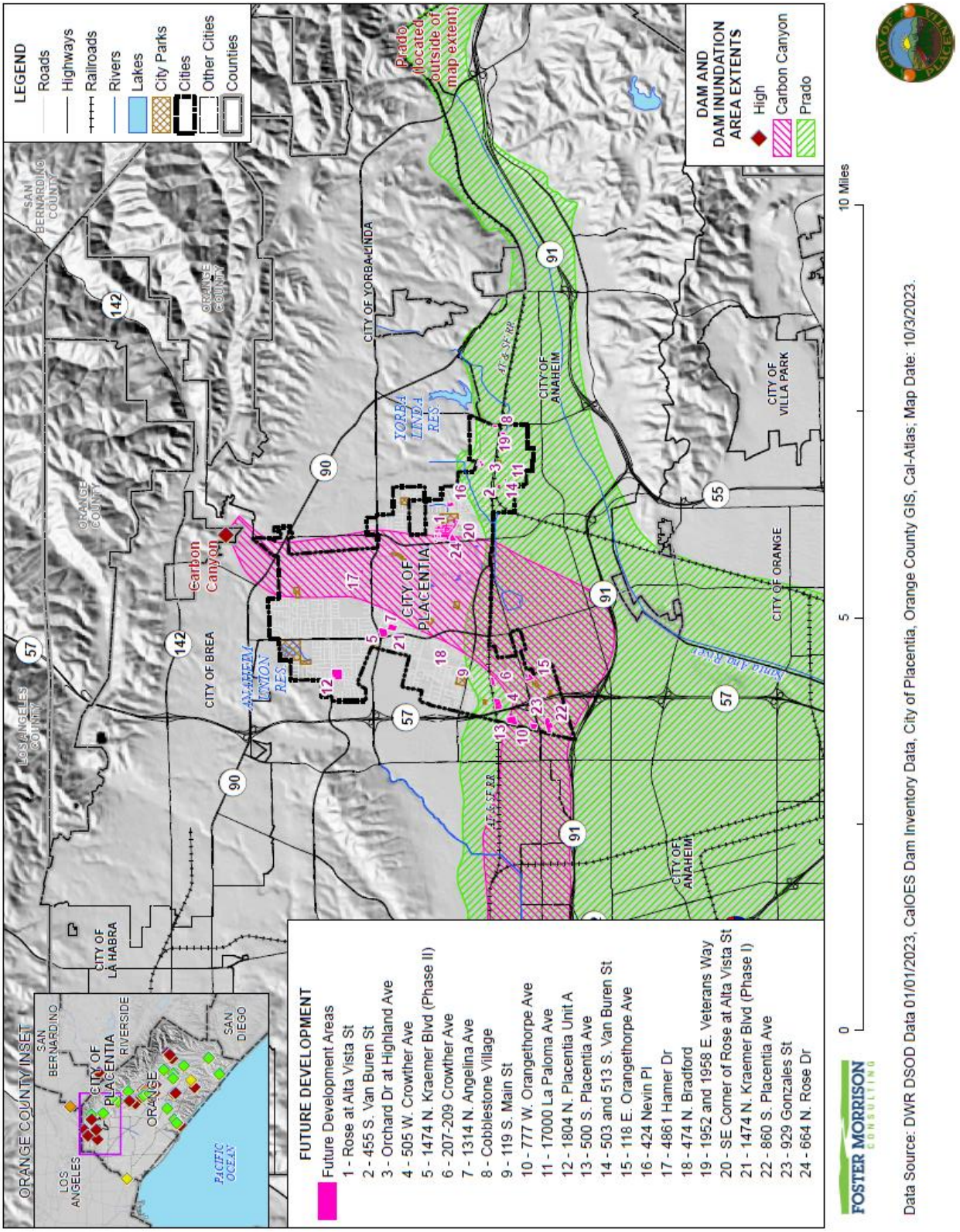


Table 4-45 City of Placentia – Future Development Areas in High Hazard Potential Dam Inundation Areas

Map #	Future Development Areas	Total Parcel Count	Improved Parcel Count	Total Acres
2	455 S. Van Buren St	1	1	0.17
3	Orchard Dr at Highland Ave	1	0	1.15
4	505 W. Crowther Ave	6	1	5.60
6	207-209 Crowther Ave	4	1	2.09
8	Cobblestone Village	1	0	0.59
9	119 S. Main St	1	1	0.15
10	777 W. Orangethorpe Ave	1	1	2.72
11	17000 La Paloma Ave	1	0	0.26
13	500 S. Placentia Ave	1	1	5.82
14	503 & 513 S. Van Buren St	2	2	0.38
15	118 E. Orangethorpe Ave	1	1	2.38
17	4861 Hamer Dr	1	1	0.17
19	1952 & 1958 E. Veterans Way	1	0	0.78
20	SE Corner of Rose at Alta Vista St	1	0	8.25
22	860 S. Placentia Ave	1	1	6.28
23	929 Gonzales St	1	0	0.08
24	664 N. Rose Dr	1	1	3.88
High Hazard Dam Inundation Total		**26**	**12**	**40.75**

Source: Cal OES, DSOD, City of Placentia GIS

4.3.7. Drought and Water Shortage

Hazard Profile

This hazard profile contains multiple sections that detail how this hazard can affect the City. These sections include a hazard/problem description; description of location and extent; past occurrences of this hazard; and how climate change can affect this hazard.

Hazard/Problem Description

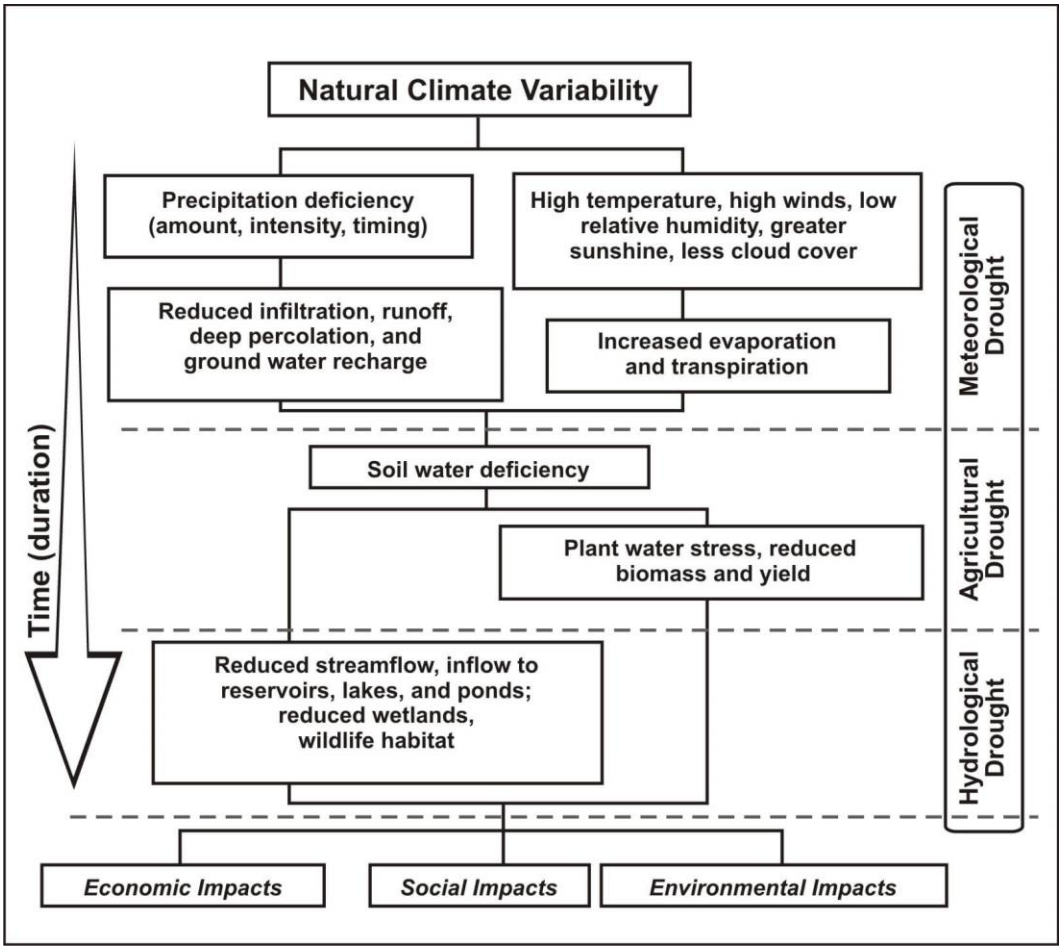
Drought

Drought is a gradual phenomenon. Although droughts are sometimes characterized as emergencies, they differ from typical emergency events. Most natural disasters, such as floods or forest fires, occur relatively rapidly and afford little time for preparing for disaster response. Droughts occur slowly, over a multi-year period, and it is often not obvious or easy to quantify when a drought begins and ends.

Drought is a complex issue involving (see Figure 4-47) many factors—it occurs when a normal amount of precipitation and snow is not available to satisfy an area's usual water-consuming activities. Drought can often be defined regionally based on its effects:

- **Meteorological drought** is usually defined by a period of below average water supply.
- **Agricultural drought** occurs when there is an inadequate water supply to meet the needs of the state's crops and other agricultural operations such as livestock.
- **Hydrological drought** is defined as deficiencies in surface and subsurface water supplies. It is generally measured as streamflow, snowpack, and as lake, reservoir, and groundwater levels.
- **Socioeconomic drought** occurs when a drought impacts health, well-being, and quality of life, or when a drought starts to have an adverse economic impact on a region.

Figure 4-47 Causes and Impact of Drought



Source: National Drought Mitigation Center (NDMC)

Location and Extent of Drought

Drought is a regional phenomenon that affects the entire City and surrounding Orange County. Drought has a slow onset and long duration. Drought is not initially recognized as a problem because it normally originates in what is considered good weather, which typically includes a dry late spring and summer in

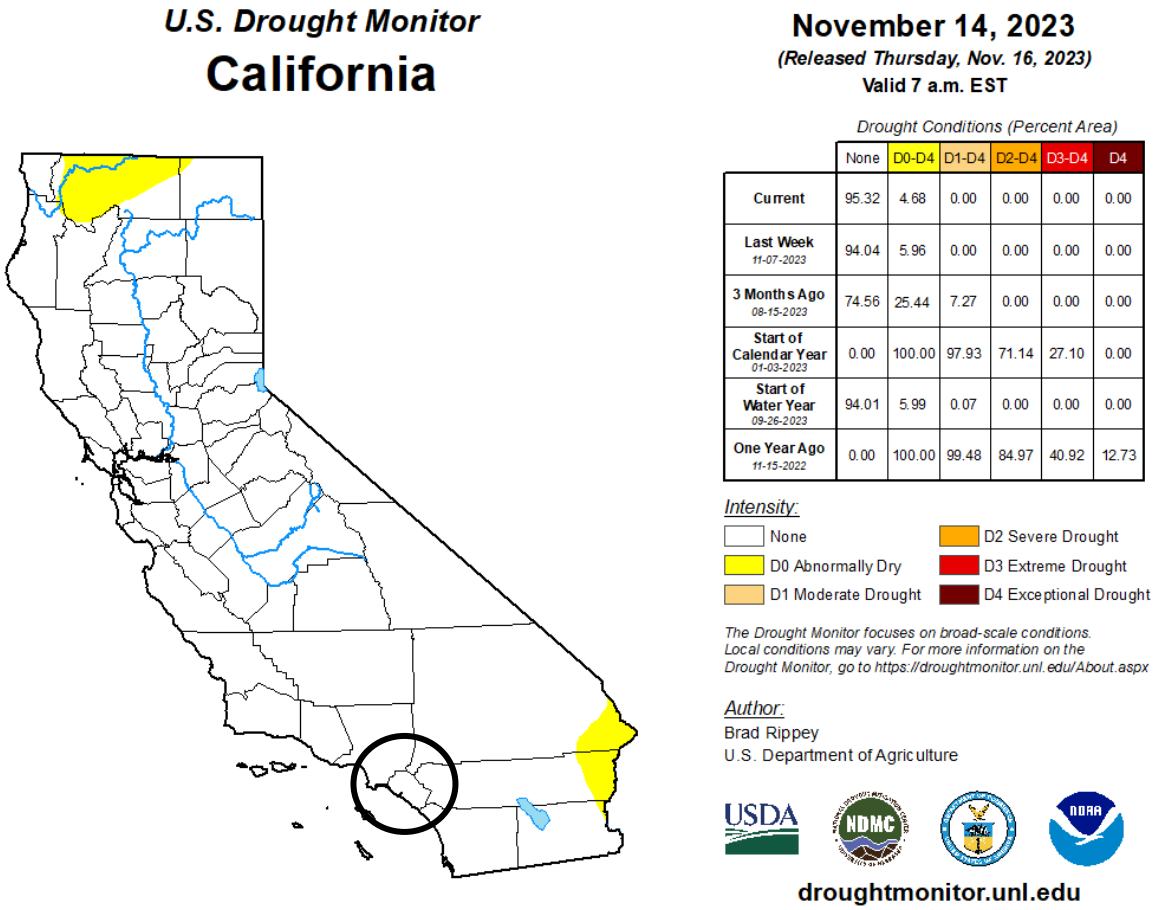
Mediterranean climates, such as in California. Drought complications normally appear more than a year after a drought begins.

Drought in the United States is monitored by the National Integrated Drought Information System (NIDIS). A major component of this portal is the U.S. Drought Monitor. The Drought Monitor concept was developed jointly by the NOAA's Climate Prediction Center, the NDMC, and the USDA's Joint Agricultural Weather Facility in the late 1990s as a process that synthesizes multiple indices, outlooks and local impacts, into an assessment that best represents current drought conditions. The Drought Monitor includes a scale to measure drought intensity:

- None
- D0 (Abnormally Dry)
- D1 (Moderate Drought)
- D2 (Severe Drought)
- D3 (Extreme Drought)
- D4 (Exceptional Drought)

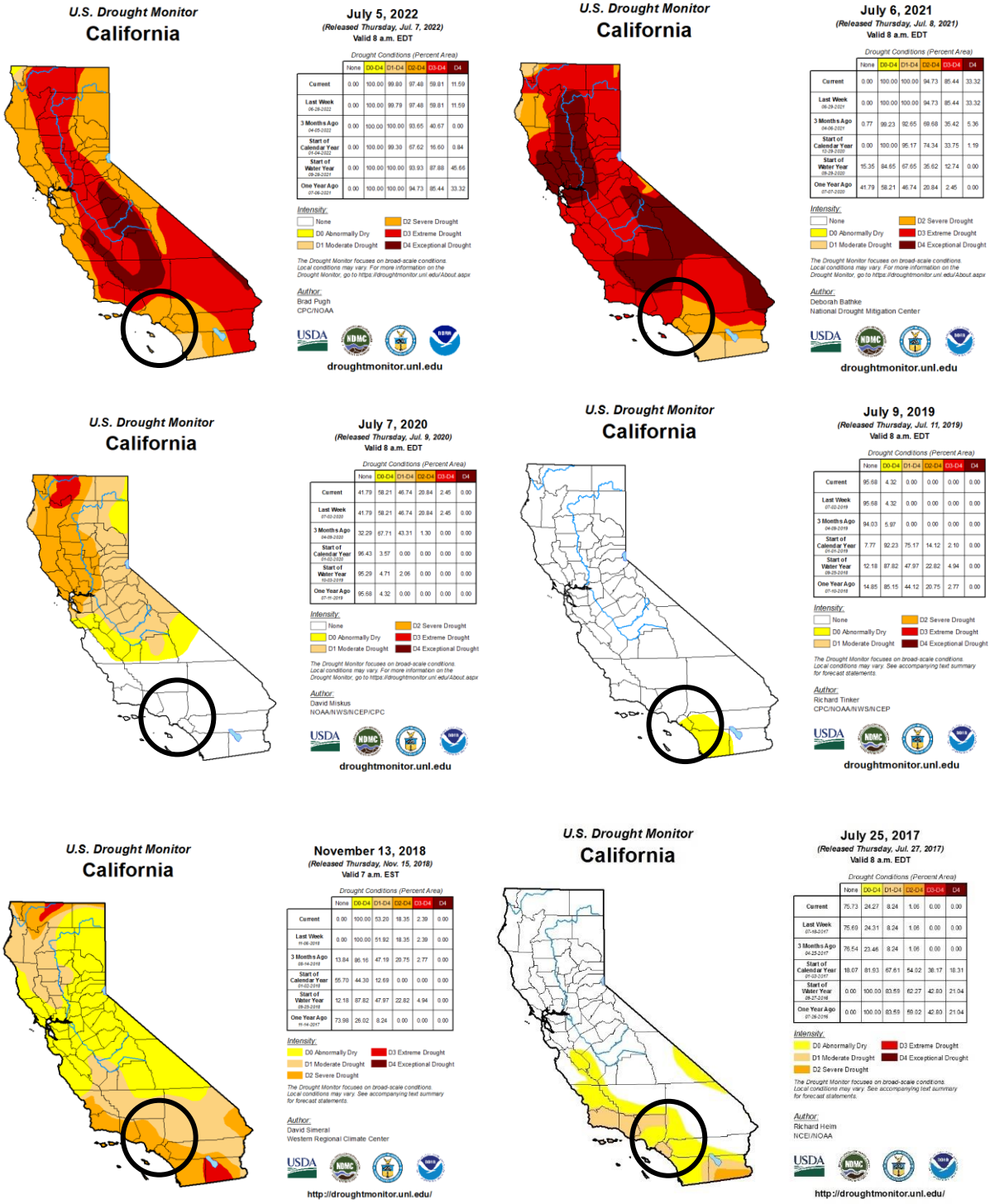
A snapshot of the current 2023 drought conditions in California and the City can be found in Figure 4-48. Snapshots from 2017, 2018, 2019, 2020, 2021, and 2022 are shown in Figure 4-49. As seen in these figures and related data, the City has been in and out of drought over the past eight years since the last drought started in 2014.

Figure 4-48 Current Drought Status in the City



Source: US Drought Monitor

Figure 4-49 Previous Drought Status in Placentia



Source: US Drought Monitor

Cal DWR says the following about drought:

One dry year does not normally constitute a drought in California. California's extensive system of water supply infrastructure—its reservoirs, groundwater basins, and inter-regional conveyance facilities—mitigates the effect of short-term dry periods for most water users. Defining when a drought begins is a function of drought impacts to water users. Hydrologic conditions constituting a drought for water users in one location may not constitute a drought for water users elsewhere, or for water users having a different water supply. Individual water suppliers may use criteria such as rainfall/runoff, amount of water in storage, or expected supply from a water wholesaler to define their water supply conditions.

The drought issue in California is further compounded by water rights. Water is a commodity possessed under a variety of legal doctrines. The prioritization of water rights between domestic uses, farming and federally protected fish habitats in California further contributes to this issue.

Water Shortage

Southern California's water resources have historically been affected by periodic drought cycles. Multi-year droughts in particular can diminish the supply of water available to City of Placentia residents. However, when precipitation levels are up, these water sources can and do rebound. The City of Placentia is serviced by two water districts: Golden State Water and Yorba Linda Water District. Information on water shortage from each of their respective water management plans follows.

Golden State Water Company

The 2020 Placentia-Yorba Linda Service Area Urban Water Management Plan (UWMP) from Golden State Water Company (GSWC) noted that Golden State Water Company serves most of the City of Placentia (as well as Yorba Linda and Anaheim). GSWC Placentia-Yorba Linda's two primary water supplies consist of local groundwater pumped from the Central Plain of Orange County Groundwater Basin, and purchased supplies from the Municipal Water District of Orange County (MWDOC). GSWC Placentia-Yorba Linda also maintains emergency connections with the Yorba Linda Water District, City of Fullerton, City of Anaheim, and the City of Brea in order to access additional water supply sources in emergency conditions. It is important to note that water supply is shared with other GSWC Service Areas in the region.

Specifically, GSWC Placentia-Yorba Linda's water supply portfolio contains the following rights and contracts:

- Pumped groundwater from the Central Plain of Orange County Groundwater Basin, subject to Basin Production Percentage (BPP) allocations managed by Orange County Water District (OCWD)
- Supplemental purchased supplies from the Municipal Water District of Orange County (MWDOC), derived from imported water assets generated by the Metropolitan Water District of Southern California (MET).

GSWC Placentia-Yorba Linda's water allocations have certain variability in different regulatory and hydrological conditions. For example, BPP considerations depend upon groundwater conditions and seawater intrusion concerns. Similarly, OCWD sets production limits, regulates the storage of water, controls the underground storage space, and administers in-lieu contracts. OCWD also administers a

Groundwater Replenishment System (GWRS) that augments native groundwater supplies in the Basin. These sorts of management dynamics embedded in the GSWC Placentia-Yorba Linda's water supplies must be carefully considered in order to improve the utility of all the service area water supplies.

GSWC Placentia-Yorba Linda has reliable supplies to meet its retail customer demands in normal, single dry years, and five consecutive dry year conditions through 2045. Its contract water from the MWDOC coupled with groundwater supplies derived from the Orange County Groundwater Basin are resilient during dry conditions. As such, GSWC Placentia-Yorba Linda is not faced with shortages during normal or dry years through this UWMPs planning horizon. Because GSWC Placentia-Yorba Linda extracts only as much groundwater as is necessary to meet customer demands, and has a reliable water purchase agreement with MWDOC, it is anticipated that supplies and demands are congruent across all the scenarios examined.

Yorba Linda Water District

The remainder of the City is served by the Yorba Linda Water Company. The 2020 UWMP for Yorba Linda Water District noted that the District is located against the foothills in the northern part of Orange County, approximately 13 miles northeast of Disneyland and is an independent special district governed by a five-member board of directors, providing water service to the City of Yorba Linda and portions of the Cities of Brea, Placentia, Anaheim, and unincorporated areas of Orange County. The District operates ten wells, one untreated and three treated imported water connections with MET, 12 booster pumping stations, 14 water storage reservoirs, 43 pressure reducing stations, 10 (soon to be 9) emergency interconnections with neighboring agencies, and 352.0 miles of water mains with 25,385 service connections.

Every urban water supplier is required to assess the reliability of their water service to its customers under a normal year, a single dry year, and a drought period lasting five consecutive years. The water service reliability assessment compares projected supply to projected demand for the three hydrological conditions between 2025 and 2045. Factors affecting reliability, such as climate change and regulatory impacts, are accounted for as part of the assessment. The District depends on a combination of imported and local supplies to meet its water demands and has taken numerous steps to ensure it has adequate supplies. MET's and MWDOC's 2020 UWMPs conclude that they can meet full-service demands of their member agencies through 2045 during normal years, single-dry years, and multiple-dry years. Consequently, the District is projected to meet full-service demands through 2045 for the same scenarios, due to diversified supply and conservation measures.

The Drought Risk Assessment (DRA) evaluates the District's near-term ability to supply water assuming the District is experiencing a drought over the next five years. Even under the assumption of a drought over the next five years, MET's 2020 UWMP concludes a surplus of water supplies would be available to all of its Member Agencies, including MWDOC and in effect, the District, should the need for additional supplies arise to close any local supply gap. Additionally, the District partakes in various efforts to reduce its reliance on imported water supplies such as increasing the use of local groundwater and indirect recycled water.

The District's service area is almost completely built-out and is projected to add minimum land use and small population increase. Water demand is likely to decrease about 1.0% over the next 5 years. In the longer term, water demand is projected to increase 1.0% from 2025 through 2045. The projected potable

water use for 2045 is 19,332 AF. This demand projection considers such factors as current and future demographics, future water use efficiency measures, and long-term weather variability.

Location and Extent of Water Shortage

Since water shortage generally happens on a regional scale, the entirety of the City is at risk. There is no established scientific scale to measure water shortage. The speed of onset of water shortage tends to be lengthy. The duration of water shortage can vary, depending on the severity of the drought that accompanies it and the status of the water sources going into the drought. The extent of the drought considers several factors, including the nature, source, and reliability of water.

Past Occurrences

Disaster Declaration History

There has been one state and no federal disaster declarations for Orange County. This is shown on Table 4-46. Specific disaster numbers for these state and federal disasters were shown in Table 4-4 above.

Table 4-46 Orange County – State and Federal Drought Disaster Declarations 1950-2023

Disaster Type	State Declarations		Federal Declarations	
	Count	Years	Count	Years
Drought	1	2014	0	–

Source: Cal OES, FEMA

NCDC Events

There have been 26 NCDC drought events in Orange County. Table 4-17 summarizes these events for Orange County.

*Table 4-47 Orange County NCDC Storm Events 1/1/1950-10/31/2022**

Event Type	Number of Events	Deaths	Deaths (indirect)	Injuries	Injuries (indirect)	Property Damage	Crop Damage
Drought	26	0	0	0	0	$0	$0

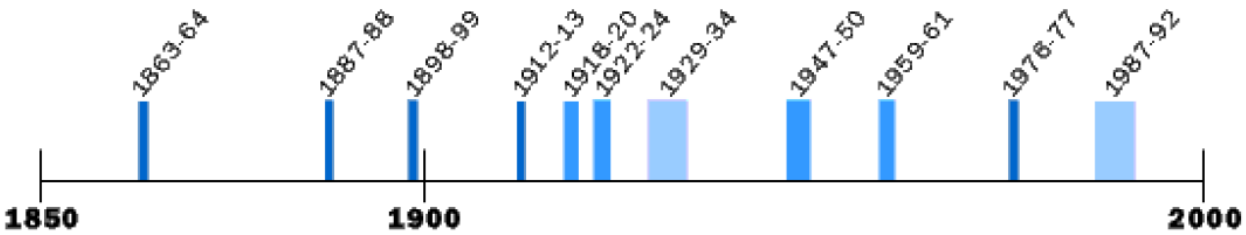
Source: NCDC

*Note: Losses reflect totals for all impacted areas, some of which fell outside of the City and outside of Orange County.

Cal-DWR (with Hazard Mitigation Planning Committee Events)

Historically, California has experienced multiple severe droughts. Figure 4-50 depicts California's Multi-Year Historical Dry Periods, 1850-2000. The 1929-34 drought established the criteria commonly used in designing storage capacity and yield of large northern California reservoirs. Figure 4-51 compares the 1929-34 drought to the 1976-77, 1987-92, 2007-09, and 2012-2016 droughts.

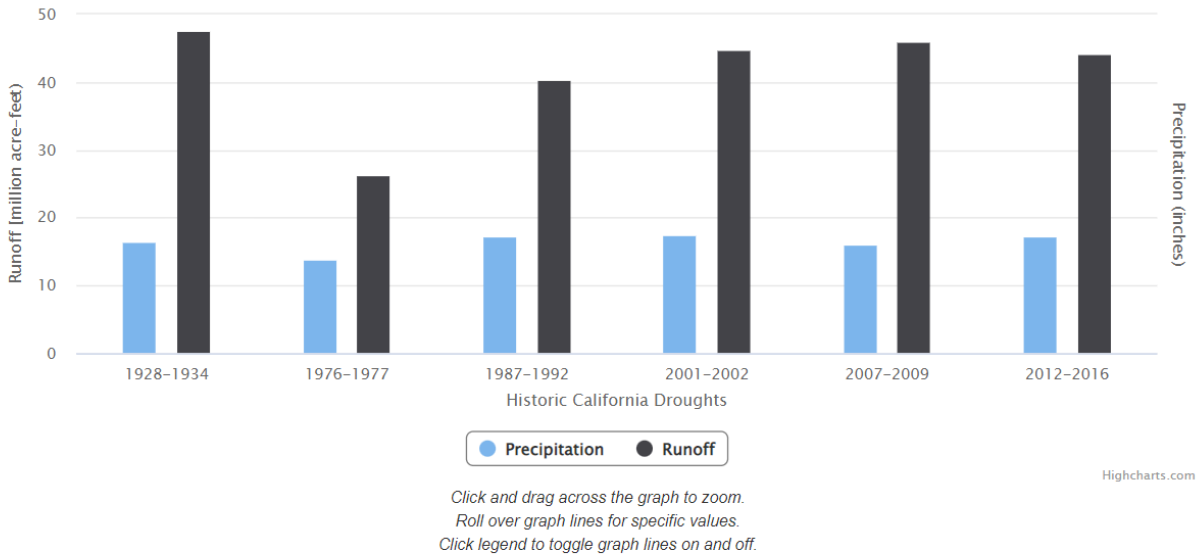
Figure 4-50 California's Multi-Year Historical Dry Periods, 1850-2000



Source: Cal DWR

Notes: Dry periods prior to 1900 estimated from limited data; covers dry periods of statewide or major regional extent

Figure 4-51 Average Annual Runoff and Precipitation for Historic Droughts

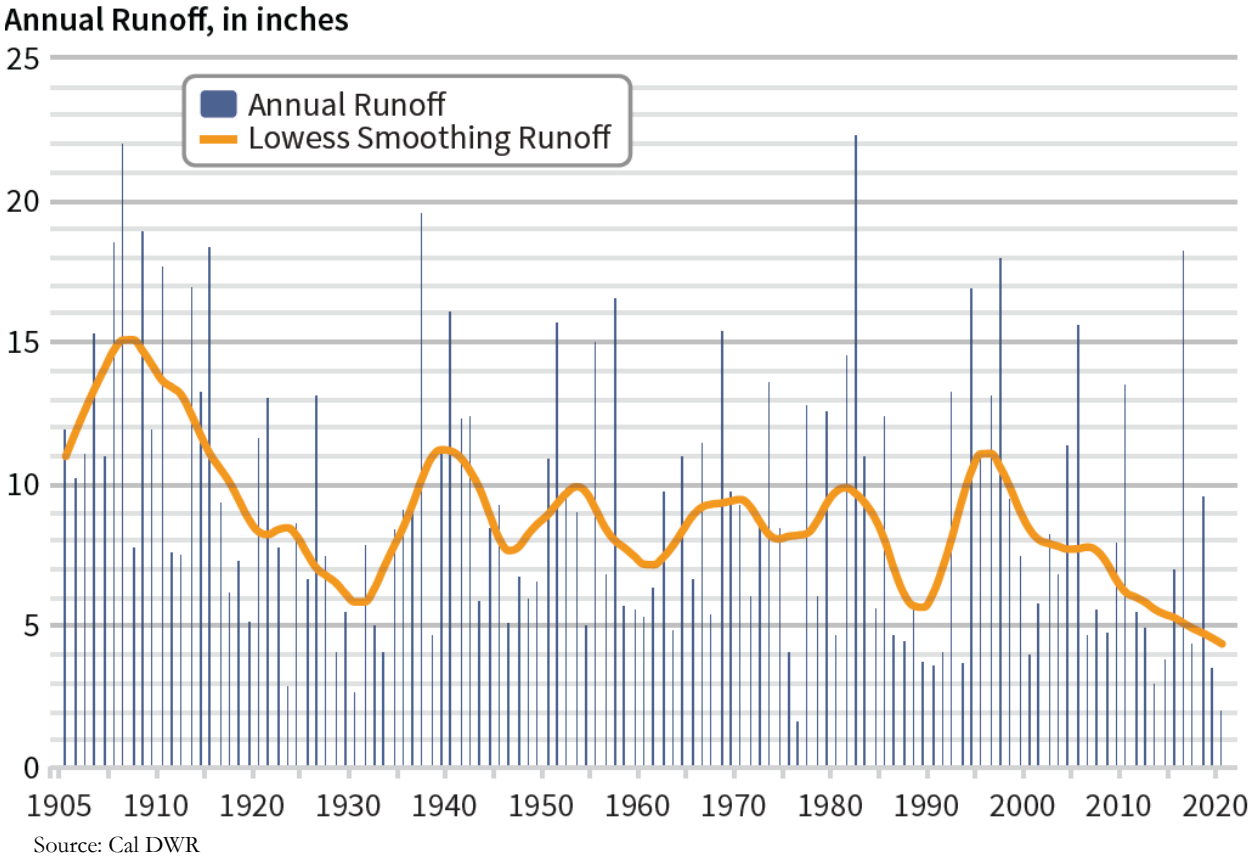


Runoff and precipitation conditions for California's six historical droughts. The most severe drought both in terms of precipitation and runoff was the drought of 1976-77. However, because it was just a two-year drought, the water supply impacts were not as severe as those associated with the longer duration droughts because shorter droughts can be partially mitigated by surface and groundwater storage.

Source: CA DWR – 2012-2016 California Drought: Historical Perspective (https://ca.water.usgs.gov/california-drought/california-drought-comparisons.html)

Figure 4-52 depicts runoff for the State from 1905 to 2021. This gives a historical context for the 2014-2021 drought to compare against past droughts.

Figure 4-52 Annual California Runoff –1905 to 2021



Source: Cal DWR

The 2018 and 2023 (Draft) State Hazard Mitigation Plan discussed the major droughts from 1900 to 2022. This discussion below appends to the tables and figures above.

The 1929-1937 Drought

The 1929–1934 drought was notable for its duration and for its occurrence within a longer period of very dry hydrology. This drought's hydrology was subsequently widely used in evaluating and designing storage capacity and yield of large Northern California reservoirs. No specific City damages from this event could be recalled.

The 1975-1977 Drought

From November 1975 through November 1977, California experienced one of its most severe droughts. Although people in many areas of the state are accustomed to very little precipitation during the growing season (April to October), they expect it in the winter. In 1976 and 1977, the winters brought only one-half and one-third of normal precipitation, respectively. Most surface storage reservoirs were substantially drained in 1976, leading to widespread water shortages when 1977 turned out to be even drier. 31 counties were affected, resulting in $2.67 billion in crop damage. No City specific damages could be recalled.

The 1987-1992 Drought

From 1987 to 1992, California again experienced a serious drought due to low precipitation and run-off levels. The hardest-hit region was the Central Coast, roughly from San Jose to Ventura. In 1988, 45 California counties experienced water shortages that adversely affected about 30 percent of the state's population, much of the dry-farmed agriculture, and over 40 percent of the irrigated agriculture. Fish and wildlife resources suffered, recreational use of lakes and rivers decreased, forestry losses and fires increased, and hydroelectric power production decreased. In February 1991, DWR and Cal OES surveyed drought conditions in all 58 California counties and found five main problems: extremely dry rangeland, irrigated agriculture with severe surface water shortages and falling groundwater levels, widespread rural areas where individual and community supplies were going dry, urban area water rationing at 25 to 50 percent of normal usage, and environmental impacts.

Storage in major reservoirs had dropped to 54 percent of average, the lowest since 1977. The shortages led to stringent water rationing and severe cutbacks in agricultural production, including threats to survival of permanent crops such as trees and vines. Fish and wildlife resources were in critical shape as well. Not since the 1928-1934 drought had there been such a prolonged dry period. In response to those conditions, the Governor established the Drought Action Team. This team almost immediately created an emergency drought water bank to develop a supply for four critical needs: municipal and industrial uses, agricultural uses, protection of fish and wildlife, and carryover storage for 1992. The large-scale transfer program, which involved over 800,000 acre-feet of water, was implemented in less than 100 days with the help and commitment of the entire water community and established important links between state agencies, local water interests, and local governments for future programs. No City specific damages could be recalled.

The 2007-2009 Drought

Water years 2007-2009 were collectively the 15th driest three-year period for DWR's eight-station precipitation index, which is a rough indicator of potential water supply availability to the State Water Project (SWP) and Central Valley Project (CVP). Water year 2007 was the driest single year of that drought and fell within the top 20 percent of dry years based on computed statewide runoff. In June 2008, a state emergency proclamation was issued due to water shortage in selected Central Valley counties. In February 2009, for the first time in its history, the State of California proclaimed a statewide drought. The state placed unprecedented restrictions on CVP and SWP diversions from the Delta to protect listed fish species, a regulatory circumstance that exacerbated the impacts of the drought for water users. The coupling of the drought and economic recession necessitated emergency response actions related to social services, such as food banks and unemployment assistance. No City specific damages could be recalled.

The 2012-2017 Drought (and still ongoing after a pause in 2017 and 2023)

The statewide drought of 2012-2017, which is still ongoing as of late 2022, but shows signs of slowing in 2023 will be remembered as one of the most severe and costliest droughts of record in California. The drought that spanned water years 2012 through 2017 included the driest four-year statewide precipitation on record (2012-2015) and the smallest Sierra-Cascades snowpack on record (2015, with 5 percent of average). It was marked by extraordinary heat: 2014, 2015, and 2016 were California's first, second, and third warmest years in terms of statewide average temperatures. By the time the drought was declared

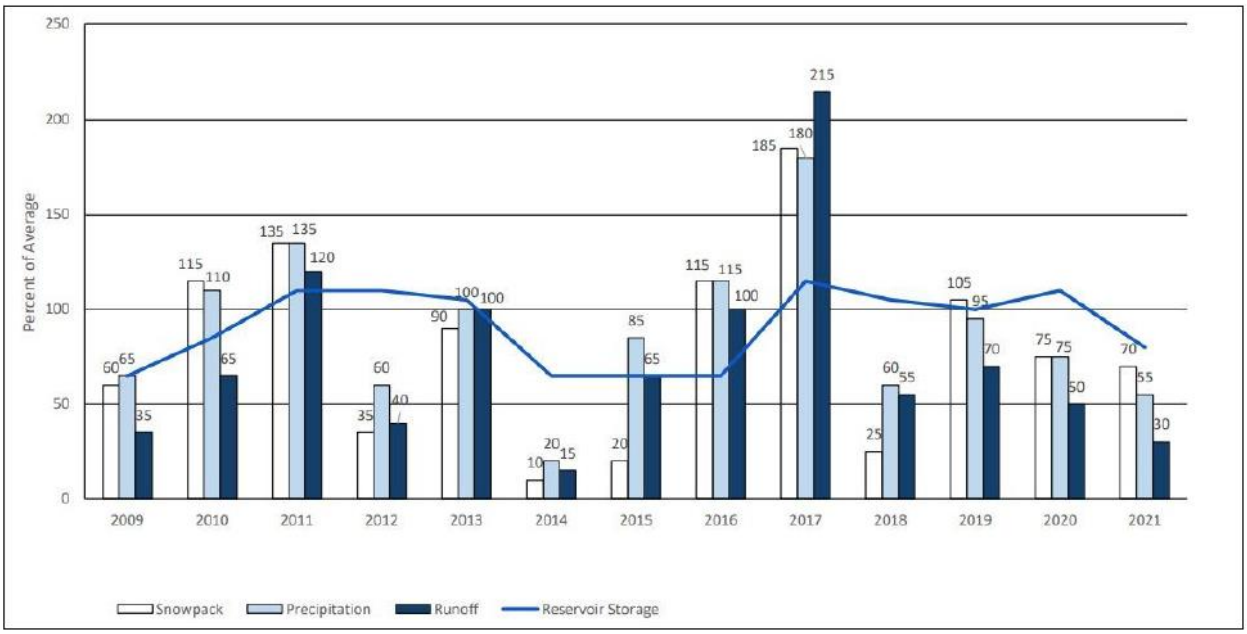
officially over in April 2017, the state had expended $6.6 billion in drought response and mitigation programs and had been declared a federal disaster area. After a particularly wet year in 2017 from atmospheric river storms (much like the winter of 2022/2023), drought conditions returned in 2018 and the City continued in and out of drought from 2018 to 2022, again with drought conditions subsiding in 2023.

The HMPC noted that during recent drought conditions, the City was forced to shut water off to most all City-owned turf; switch to drought tolerant landscaping on City lands; and reduce watering at parks by at least 50%. This resulted in multiple tree deaths. Over 50 large trees died, along with multiple smaller trees. The Arroyo Verde Park was particularly hard hit. During the drought, bark beetles and other species affected and killed off stressed trees. Two predominate species of trees in Placentia include the Liquid Amber Tree and Pine Trees -both were hard hit.

Water Shortage

Figure 4-53 illustrates several indicators commonly used to evaluate water conditions in California. The percentage of average values are determined by measurements made in each of the ten major hydrologic regions. The chart describes water conditions in California between 2007 and 2021. The chart illustrates the cyclical nature of weather patterns in California.

Figure 4-53 Water Supply Conditions, 2009 to 2021



Source: 2023 (Draft) State Hazard Mitigation Plan

Probability of Future Occurrence

Drought

Likely—Historical drought data for the City and region indicate there have been 5 significant droughts in the last 95 years. This equates to a drought every 19 years on average or a 5.2 percent chance of a drought

in any given year. Based on this data and given the multi-year length of droughts and future climate change affects, the City determined that future drought occurrence continues to be likely.

Water Shortage

Occasional — Recent historical data for water shortage indicates that California and the City may at some time be at risk to both short and prolonged periods of water shortage. Based on this it is possible that water shortages will affect the City in the future during extreme drought conditions. New development, landscaping, and road paving put stress on water resources. The supply of water is currently sufficient, but as population grows and land use patterns shift, it will be necessary to consider the added stress that new development will put on water demand and quality. The 2020 Placentia-Yorba Linda UWMP noted that the City's (through GSWC) has reliable supplies to meet its retail customer demands in normal, single dry years, and five consecutive dry year conditions through 2045. Its contract water from the MWDOC coupled with groundwater supplies derived from the Orange County Groundwater Basin are resilient during dry conditions. This helps to keep the water shortage future occurrences to occasional, even though drought is considered likely.

Climate Change and Drought and Water Shortage

Climate change and drought and water shortage are discussed in the following three sources:

- 2020 UWMP
- 2021 CAS
- Cal-Adapt

2020 UWMP

The 2020 UWMP noted that according to California's Fourth Climate Change Assessment, the Los Angeles region where Orange County is located will experience a warming climate over the next century, with average maximum temperatures projected to increase by 4 to 5°F by mid-century. Extreme temperatures are expected to increase by an even greater magnitude. The multi-year average precipitation is expected to remain relatively stable, but "normal" years will become less frequent and both wet and dry extremes will become more frequent, heightening the risk of both droughts and floods. Wildfires and their air quality impacts may also increase, but this is less certain. From the perspective of water suppliers, the increased temperatures leading to an increase in evapotranspiration and greater fluctuations between wet and dry years will be the most significant impacts.

2021 CAS

Climate scientists studying California find that drought conditions are likely to become more frequent and persistent over the 21st century due to climate change. The experiences of California during recent years underscore the need to examine more closely the state's water storage, distribution, management, conservation, and use policies. The 2021 CAS stresses the need for public policy development addressing long term climate change impacts on water supplies. The CAS notes that climate change is likely to significantly diminish California's future water supply, stating that: California must change its water

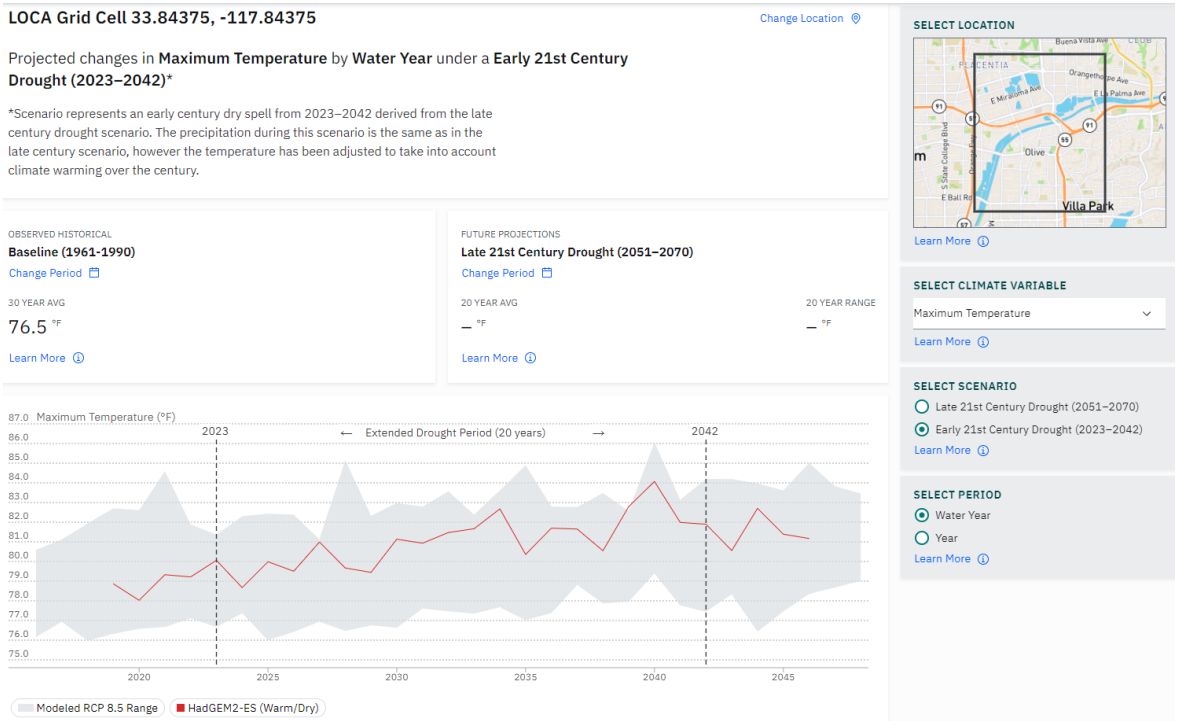
management and uses because climate change will likely create greater competition for limited water supplies needed by the environment, agriculture, and cities.

Cal-Adapt Drought Scenarios

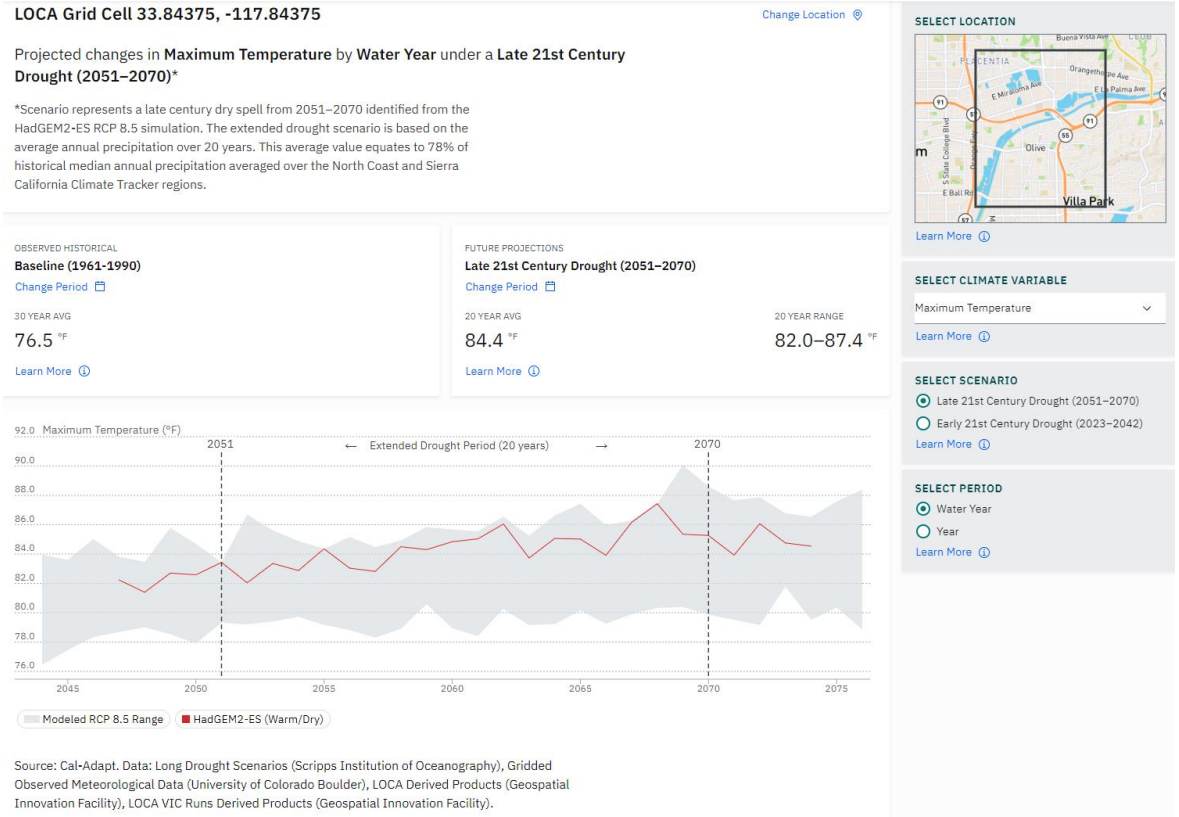
Cal-Adapt has modeled future risk of drought. Recent research suggests that extended drought occurrence ("mega-drought") could become more pervasive in future decades. This tool explores data for two 20-year drought scenarios (using the quad that contains the City in Figure 4-54) derived from LOCA downscaled meteorological and hydrological simulations – one for the earlier part of the 21st century, and one for the latter part:

- The upper chart represents a mid-century dry spell from 2023-2042 identified from the HadGEM2-ES RCP 8.5 simulation. The extended drought scenario is based on the average annual precipitation over 20 years.
- The lower chart represents a late century dry spell from 2051–2070 identified from the HadGEM2-ES RCP 8.5 simulation. The extended drought scenario is based on the average annual precipitation over 20 years.

Figure 4-54 Orange County – Future Extended Drought Scenarios



Source: Cal-Adapt. Data: Long Drought Scenarios (Scripps Institution of Oceanography), Gridded Observed Meteorological Data (University of Colorado Boulder), LOCA Derived Products (Geospatial Innovation Facility), LOCA VIC Runs Derived Products (Geospatial Innovation Facility).



Source: Cal-Adapt. Data: Long Drought Scenarios (Scripps Institution of Oceanography), Gridded Observed Meteorological Data (University of Colorado Boulder), LOCA Derived Products (Geospatial Innovation Facility), LOCA VIC Runs Derived Products (Geospatial Innovation Facility).

Source: Cal Adapt – Extended Drought Scenarios (retrieved 3/14/2023)

Vulnerability Assessment

Vulnerability—Medium

Drought is different than many of the other natural hazards in that it is not a distinct event and usually has a slow onset. Drought can severely impact a region both physically and economically. Drought affects different sectors in different ways and with varying intensities. Adequate water is the most critical issue for agricultural, manufacturing, tourism, recreation, and commercial and domestic use. Based on historical information, the occurrence of drought in California, including the City, is cyclical, driven by weather patterns. Drought has occurred in the past and will occur in the future. Periods of actual drought with adverse impacts can vary in duration, and the period between droughts is often extended. Although an area may be under an extended dry period, determining when it becomes a drought is based on impacts to individual water users.

The whole of the City is at some measure of vulnerability to drought and water shortage. Vulnerability of the community is discussed in multiple sections that detail how this hazard can affect the City. These sections include assets at risk, impacts, and how future development can be affected by this hazard.

Assets at Risk from Drought

Assets at risk from drought and water shortage include: people and populations; structures; critical facilities and infrastructure, and community lifelines; natural, historic, and cultural resources; and economic assets and community activities of value. These are discussed in the following sections.

People and Populations

The people and populations of the City Area are not directly affected by drought; although, their turfed areas, trees, and other water dependent resources can all be affected. In extreme drought conditions, however, residents and other populations within Placentia may be vulnerability to drought and water shortage issues. Water quality can be impacted causing health problems, especially to vulnerable populations where access to clean water supplies can be more challenging. Drought and water shortage can lead to an increase in wildfires threatening City residents. Water shortages can have an effect on all of the population in the City, but often have a greater effect on the unhoused and other vulnerable populations that may be unable to access clean drinking water during shortages. During periods of drought as the costs of water usage may increase, those who are economically disadvantaged may be unable to afford the increased costs of potable water.

Structures

Structures have a limited vulnerability to drought and water shortage. It is the secondary hazard of drought (increased potential for spread of urban fires and wildfires) which causes risks to structures. Drought can also stress trees, causing die off. These trees may fall on structures adjacent to them causing property damage.

Critical Facilities and Infrastructure, and Community Lifelines

Structures have a limited vulnerability to drought and water shortage. Should drought conditions be severe enough to cause water shortage reliability issues, it may be difficult for schools and elder care facilities to ensure water is available. It is the secondary hazard of drought (increased potential for spread of urban fires and wildfire) which causes risks to structures. Drought can also stress trees, causing die off. These trees may fall on structures adjacent to them.

While limited, community lifelines can have a vulnerability to drought and water shortage. This includes:

- **Safety and Security** – Agencies may need to assist in providing alternative water supplies. Agencies may also need to staff locations where water is distributed.
- **Food, Hydration, Shelter** – Drought can limit agricultural production, including timber and grazing activities. Additional water supplies may need to be procured.
- **Health and Medical –** Additional water supplies may be required for these facilities to remain fully operational during drought and water shortages.
- **Energy –** Sufficient water is required to generate electricity and power. Additional fuels and power may be required to move water to and from locations that need it.
- **Communications** – Most communication systems will not be affected. In extreme instances, additional messaging may be required during drought and water shortages.
- **Water Systems** – During period of drought and water shortage, additional pressure may be put on water companies to secure additional supplies. With reductions in available water, the ability of wastewater systems to effectively treat wastewater may be impacted.

It is unlikely that any of these community lifelines would be overwhelmed by drought and water shortages.

Natural, Historic, and Cultural Resources

Both drought and water shortage can have a significant impact to natural resources. The vulnerability of Placentia to drought may vary and include reduction in water supply, turf and landscape losses, impacts to other natural resources, and an increase in dry fuels and tree dieback. The 2019 City of Placentia Urban Forest Management Plan noted that Placentia's urban forest is a valuable segment of the community's infrastructure and ecosystem. Placentia's urban forest is comprised of the nearly 7,000 trees located along public streets or within public parks and property. These trees provide a wealth of social and environmental benefits to City residents and visitors, from shade and beauty to air quality, carbon reduction and stormwater management. All of these trees are at risk to drought impacts and a reduction in water supply. Additionally, drought conditions can also cause soil to compact and not absorb water well, potentially making an area more susceptible to flooding. It is unlikely that drought and water shortage would have a significant impact on historic and cultural resources in the City.

Economic Assets and Community Activities of Value

Economic assets and community activities of value in Placentia have a limited vulnerability to drought and water shortage unless the magnitude of this hazard increases in the future and impacts local businesses and tourism in the City. Drought is a problem which predominantly affects rural small business owners such as farmers and agricultural contractors who rely on water for their crops. However, supply issues can also

affect businesses such as cafes and restaurants in more urban areas. Drought impacts to the agricultural industry can affect the supply chain and increase the cost of food and water, and adversely impact businesses tied to these industries. Reduction in or interruption of the water supply could also lead to lower productivity or closure of manufacturing facilities. Other economic sectors with a heavy reliance on water may also be affected. Depending upon how severe the conditions get and how long they last, drought can restrict recreational and community activities, all of which can stress businesses and local economies over time. As a City that is mostly built out, it is the secondary hazards from drought (wildfire and urban fire) that could affect areas of the City.

Impacts from Drought

Drought has the potential to affect the entire City and Orange County. Drought impacts are wide-reaching and may be economic, environmental, and/or societal. The most significant impacts associated with drought in the Planning Area are those related to water intensive activities such as municipal usage, commerce, tourism, recreation, and wildfire protection. The most direct and likely most difficult drought impact to quantify is to local economies. Also, during a drought, allocations go down and water costs increase, which results in reduced water availability. Voluntary conservation measures are a normal and ongoing part of system operations and actively implemented during extended droughts. A reduction of electric power generation and water quality deterioration are also potential problems. Drought conditions can also cause soil to compact and not absorb water well, potentially making an area more susceptible to flooding and erosion.

Tracking drought impacts can be difficult. The Drought Impact Reporter from the NDMC is a useful reference tool that compiles reported drought impacts nationwide. Table 4-48 show drought impacts for City and Orange County from 1850 to March 2023. The data represented is skewed, with the majority of these impacts from records within the past ten years. It is anticipated that drought impacts to City lands and assets would be similar to those experienced in the Counties, though on a smaller scale and more focused on impacts to natural resources and open space lands. As climate change increases and populations patterns change, these impacts may grow more severe.

Table 4-48 Orange County Drought Impacts 1850-3/1/2023

Category	Number of Impacts
Agriculture	25
Business and Industry	13
Energy	3
Fire	11
Plants & Wildlife	23
Relief, Response, and Restrictions	103
Society and Public Health	45
Tourism and Recreation	8
Water Supply and Quality	114
Total	**345**

Source: National Drought Mitigation Center, retrieved 3/3/2023

All of these impacts may be exacerbated by the effects of climate change, changes in population patterns (migration, density, or the makeup of socially vulnerable populations), and changes in land use and development.

As discussed in the hazard profile section, climate change is anticipated to exacerbate this hazard over time. Regarding population patterns, the City is approaching built out conditions. Population projections for the City show very limited growth over the next 25 years. Populations are anticipated to grow by only 7.3% between 2025 and 2050, which equates to an annual growth of 0.29%, thus future population growth should not increase the potential impacts from this hazard on City assets. With respect to population patterns such as those associated with migration, density, or makeup of socially vulnerable populations the data shows that most socially vulnerable populations and disadvantaged communities are concentrated in the western portion of the City. Also, FEMA's National Risk Index for Orange County is rated as Very High. Drought can occur anywhere in the City. If these population patterns continue to show an increase in vulnerable populations, the vulnerability and potential impacts to these City assets from drought and water shortage will continue to increase in the future.

As described in the land use discussion at the end of Section 4.2.2, a new land use map was developed as part of the General Plan efforts in 2023, which establishes the basic pattern of development in the City for the next 20-25 years, including land uses and densities. Thus, while future development within hazard areas generally contributes to some increase of impacts on City assets, given the limited potential for significant future growth in Placentia and that drought and water shortage affects the whole of the City, future changes in land use and development are unlikely to contribute to any notable change in the vulnerability of City assets to this hazard. Additionally, the water companies that provide water to the City feel they have reliable and robust water sources that limit future impacts from this hazard.

Future Development

The City has ongoing access to quantities of water through its water sources. However, additional growth in the City will add additional pressure to water companies and wells during periods of drought and water shortage. The City and its water providers will need to continue to plan for and manage their water resources to support the future of the Placentia. The City continues to make efforts to be proactive on future drought and water supply issues.

4.3.8. Earthquake, Earthquake Liquefaction, and Earthquake Induced Landslides

Hazard Profile

This hazard profile contains multiple sections that detail how this hazard can affect the City. These sections include a hazard/problem description; description of location and extent; past occurrences of this hazard; and how climate change can affect this hazard.

Hazard/Problem Description

An earthquake is caused by a sudden slip on a fault. Stresses in the earth's outer layer push the sides of the fault together. Stress builds up, and the rocks slip suddenly, releasing energy in waves that travel through the earth's crust and cause the shaking that is felt during an earthquake. Earthquakes can cause structural damage, injury, and loss of life, as well as damage to infrastructure networks, such as water, power, gas, communication, and transportation. Earthquakes may also cause collateral emergencies including dam and levee failures, seiches, hazmat incidents, fires, avalanches, and landslides. The degree of damage depends on many interrelated factors. Among these are: the magnitude, focal depth, distance from the causative fault, source mechanism, duration of shaking, high rock accelerations, type of surface deposits or bedrock, degree of consolidation of surface deposits, presence of high groundwater, topography, and the design, type, and quality of building construction. This section briefly discusses issues related to types of seismic hazards.

Ground Shaking

Ground shaking is motion that occurs as a result of energy released during faulting. The damage or collapse of buildings and other structures caused by ground shaking is among the most serious seismic hazards. Damage to structures from this vibration, or ground shaking, is caused by the transmission of earthquake vibrations from the ground to the structure. The intensity of shaking and its potential impact on buildings is determined by the physical characteristics of the underlying soil and rock, building materials and workmanship, earthquake magnitude and location of epicenter, and the character and duration of ground motion.

Actual ground breakage generally affects only those buildings directly over or nearby the fault. Ground shaking generally has a much greater impact over a greater geographical area than ground breakage. The amount of breakage and shaking is a function of earthquake magnitude, type of bedrock, depth and type of soil, general topography, and groundwater. As with most communities in southern California near active faults, the City could be susceptible to violent ground shaking, depending on the location of the event.

Seismic Structural Safety

Older buildings constructed before building codes were established, and even newer buildings constructed before earthquake-resistance provisions were included in the codes, are the most likely to be damaged during an earthquake. Buildings one or two stories high of wood-frame construction are considered to be the most structurally resistant to earthquake damage. Older masonry buildings without seismic reinforcement (unreinforced masonry) and soft story buildings are the most susceptible to the type of structural failure that causes injury or death. There are twelve documented buildings in the City that are constructed of unreinforced masonry, built before 1933 and therefore are most at risk of structural damage. These structures are listed below:

- 234 S. Bradford – APN: 339-061-07
- 238 S. Bradford – APN: 339-061-08
- 109 Santa Fe Ave – APN: 339-365-25
- 141 Santa Fe Ave – APN: 339-365-10
- 110 Santa Fe Ave – APN: 339-394-06

- 100 Santa Fe Ave – APN: 339-394-07
- 214 Santa Fe Ave – APN: 339-393-07
- 226 Santa Fe Ave – APN: 339-393-02
- 301 Santa Fe Ave – APN: 339-363-19
- 352 Santa Fe Ave – APN: 339-392-01
- 330 Santa Fe Ave – APN: 339-3992-07
- 310 Santa Fe Ave – APN: 339-392-11

The HMPC noted that there are no plans to mitigate these structures as they are all privately owned. The Powell building and the Old City Hall are both under assessment by City engineering to see if these structures need to be retrofitted.

The susceptibility of a structure to damage from ground shaking is also related to the underlying foundation material. A foundation of rock or very firm material can intensify short-period motions which affect low-rise buildings more than tall, flexible ones. A deep layer of water-logged soft alluvium can cushion low-rise buildings, but it can also accentuate the motion in tall buildings. The amplified motion resulting from softer alluvial soils can also severely damage older masonry buildings.

Other potentially dangerous conditions include but are not limited to: building architectural features that are not firmly anchored, such as parapets and cornices; roadways, including column and pile bents and abutments for bridges and overcrossings; and above-ground storage tanks and their mounting devices. Such features could be damaged or destroyed during strong or sustained ground shaking.

Liquefaction Potential

Liquefaction occurs in saturated soils, that is, soils in which the space between individual particles is completely filled with water. This water exerts a pressure on the soil particles that influences how tightly the particles themselves are pressed together. Prior to an earthquake, the water pressure is relatively low. However, earthquake shaking can cause the water pressure to increase to the point where the soil particles can readily move with respect to each other. When liquefaction occurs, the strength of the soil decreases and the ability of a soil deposit to support foundations for buildings and bridges is reduced. Liquefied soil also exerts higher pressure on retaining walls, which can cause them to tilt or slide. This movement can cause settlement of the retained soil and destruction of structures on the ground surface. Increased water pressure can also trigger landslides and cause the collapse of dams. Because liquefaction only occurs in saturated soil, its effects are most commonly observed in low-lying areas near bodies of water such as rivers, lakes, bays, and oceans.

Liquefaction during major earthquakes has caused severe damage to structures on level ground as a result of settling, titling, or floating. Such damage occurred in San Francisco on bay-filled areas during the 1989 Loma Prieta earthquake, even though the epicenter was several miles away. If liquefaction occurs in or under a sloping soil mass, the entire mass may flow toward a lower elevation. Also, of particular concern in terms of developed and newly developing areas are fill areas that have been poorly compacted.

Landslide/Debris Flows

Landslides can occur as a result of horizontal seismic inertia induced in the slopes by the ground shaking. The most common earthquake-induced landslides include shallow, disrupted landslides such as rock falls, rockslides, and soil slides. Debris flows are created when surface soil on steep slopes becomes totally saturated with water. Once the soil liquefies, it loses the ability to hold together and can flow downhill at very high speeds, taking vegetation and/or structures with it. Slide risks increase after an earthquake during a wet winter. This is discussed in the vulnerability section below, and as a stand-alone hazard in Section 4.3.12.

Settlement

Settlement can occur in poorly consolidated soils during ground shaking. During settlement, the soil materials are physically rearranged by the shaking to result in a less stable alignment of the individual minerals. Settlement of sufficient magnitude to cause significant structural damage is normally associated with rapidly deposited alluvial soils or improperly founded or poorly compacted fill. These areas are known to undergo extensive settling with the addition of irrigation water, but evidence due to ground shaking is not available.

Location and Extent

The City is vulnerable to both a large damaging earthquake and smaller earthquake events. Specific areas of the City are also susceptible to the effects of earthquake liquefaction, as well as landslides following earthquakes. Starting with the location of faults near the City, the areas most at risk are discussed in this section. According to the California Geological Survey (CGS) and US Geological Survey (USGS), multiple faults are adjacent to the City. These are detailed below.

Earthquake Faults

A fault is defined as "a fracture or fracture zone in the earth's crust along which there has been displacement of the sides relative to one another." For the purpose of planning there are two types of faults, active and inactive. Active faults have experienced displacement in historic time, suggesting that future displacement may be expected. Inactive faults show no evidence of movement in recent geologic time, suggesting that these faults are dormant. This does not mean, however, that faults having no evidence of surface displacement within the last 11,000 years are necessarily inactive. For example, the 1975 Oroville earthquake, the 1983 Coalinga earthquake, and the 1987 Whittier Narrows earthquake occurred on faults not previously recognized as active. Potentially active faults are those that have shown displacement within the last 1.6 million years (Quaternary). An inactive fault shows no evidence of movement in historic (last 200 years) or geologic time, suggesting that these faults are dormant.

Two types of fault movement represent possible hazards to structures in the immediate vicinity of the fault: fault creep and sudden fault displacement. Fault creep, a slow movement of one side of a fault relative to the other, can cause cracking and buckling of sidewalks and foundations even without perceptible ground shaking. Sudden fault displacement occurs during an earthquake event and may result in the collapse of buildings or other structures that are found along the fault zone when fault displacement exceeds an inch or

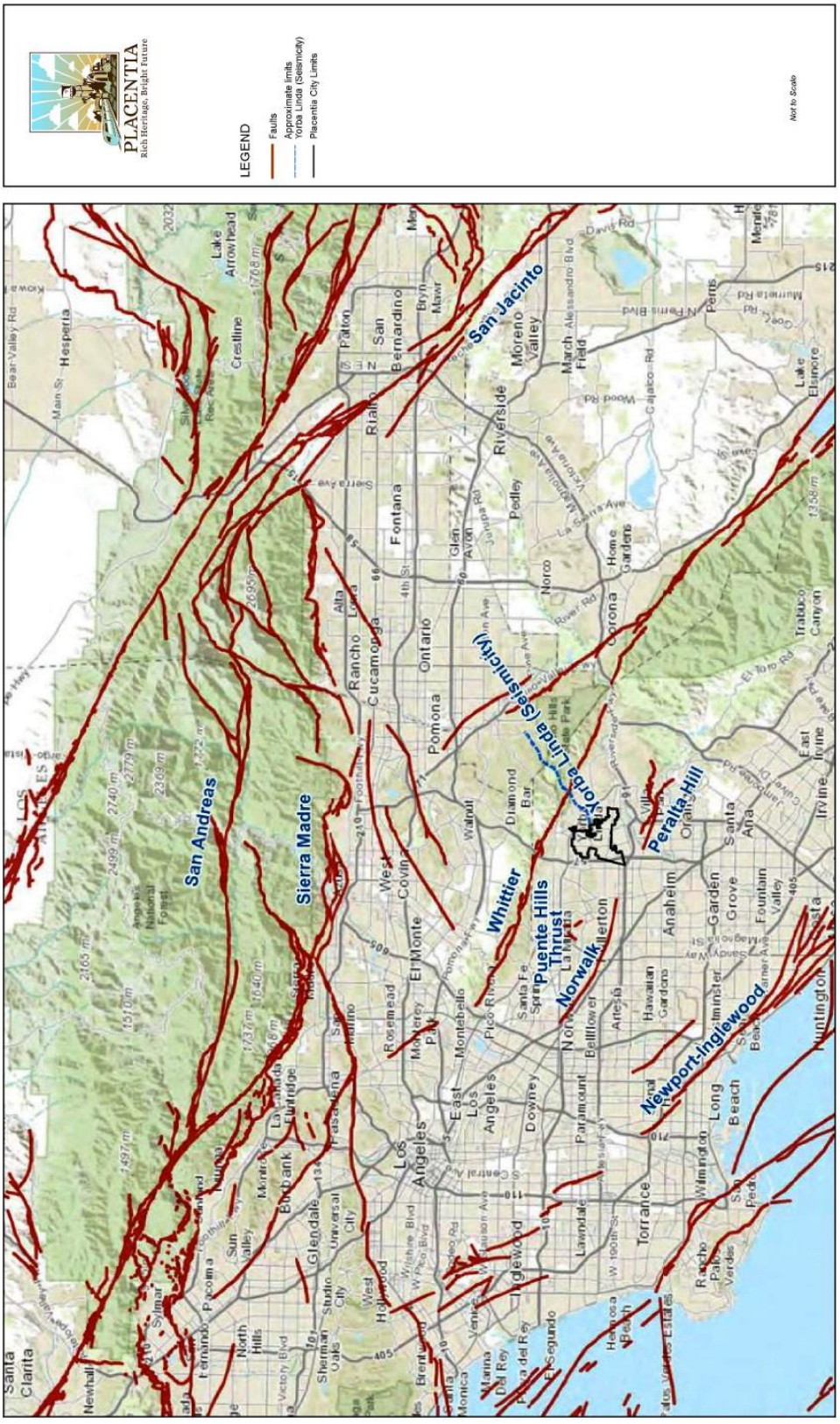
two. The only protection against damage caused directly by fault displacement is to prohibit construction in the fault zone.

The City of Placentia General Plan Safety Element was used to inform the fault discussion. Faults near the City can be seen on Figure 4-55. The faults shown on this map are summarized below:

- **Yorba Linda** seismic source zone is a group of faults located approximately 0.3 miles northeast of the City of Placentia and can produce a magnitude 6.4 earthquake.
- The **Puente Hills** (Coyote Hills) is a northwest trending blind Thrust Fault system1 that extends approximately 26 miles between downtown Los Angeles and northern Orange County. The fault is buried and extends beneath the San Gabriel Mountains where it merges with the Sierra Madre Fault System. Locally the approximate location of the fault is between Whittier fault and the City of Placentia. The Puente Hills thrust is considered to be the source of the 1987 magnitude 6.0 Whittier Narrows earthquake. In 2014, this fault produced a magnitude 5.1 quake, with over 100 aftershocks within the following few days. The Puente Hills Thrust dips about 25 degrees to the north and is considered capable of generating a magnitude 7.1 earthquake.
- **Peralta Hills Thrust** is an east-west trending thrust fault along the south flank of the Peralta Hills, about 3 miles southeast of the center of the City of Placentia. This is the closest known active fault to the City. This feature has been exposed in several excavations and displaces Tertiary-age rocks over Quaternary period deposits. Recent small earthquakes (1999-2000) with magnitudes of 1.7 to 3.9 at depths of 3.5 to 12 km under the Peralta Hills indicate right-oblique reverse active faulting below the area, supporting the concept of a deeper main break of the Peralta Hills thrust fault system. The fault is located approximately 3 miles southeast of the City. The length of the fault zone suggests that a maximum earthquake of about 6.0 to 6.5 is capable of occurring on this feature.
- **Whittier Fault** is part of the Whittier- Elsinore fault system and extends from the Los Angeles basin area to Mexico, a distance of more than 250km. The Whittier segment extends along the western margin of the Puente Hills for a distance of about 40km. The fault is about 3.8 miles north of the center of the City of Placentia. Although this fault has not generated any major earthquakes in historical time, geological relationships suggest that it is capable of generating a magnitude 6 to 7.2 earthquake.
- **Newport-Inglewood Structural Zone** is expressed as a series of discontinuous faults and folds extending from the Santa Monica fault at its northern end to the Newport Beach area where it trends offshore. The estimated total length of the fault zone is approximately 65 miles. The magnitude 6.25 Long Beach earthquake of 1933 occurred on the Newport-Inglewood fault. The epicenter of the earthquake was offshore near Newport Beach. The fault zone is located approximately 14.6 miles southwest of the City and is considered capable of producing earthquakes with a magnitude of up to 7.4.
- **Sierra Madre Fault** is part of a set of north-dipping reverse faults extending between Santa Barbara Channel east to Chino Basin. The fault is located about 17 miles north of the City. The fault is classified as Holocene in age and is considered capable of producing earthquakes with a magnitude of up to 8.0.
- The **San Jacinto Fau**lt system is highly seismically active and has been the source of several historical fault ruptures associated with the earthquake magnitudes in the range of 6 to 7. The San Jacinto fault zone extends more than 150 miles northwesterly from the Imperial segment near the Gulf of California to the San Gabriel-San Bernardino Mountains north of San Bernardino. The fault is located about 34 miles northeast of the City and is considered capable of producing earthquakes with a magnitude of up to 7.5.

- The **San Andreas Fault** system extends southeasterly from Cape Mendocino, approximately 200 miles north of San Francisco, to the east side of the Salton Sea, a distance of almost 700 miles. The central portion of the San Andreas Fault produced a major earthquake in 1857 that resulted in ground rupture over approximately 190 miles from the Cholame Valley, in San Luis Obispo County, to just northwest of the San Bernardino area. The City of Placentia is located approximately 36 miles southerly of the central segment of the San Andreas Fault. The San Andreas Fault is considered capable of producing earthquakes with a magnitude of up to 7.9.
- The **Norwalk Fault** is located approximately 4.5 miles west-northwest of the City of Placentia. It is postulated to have been the source of a magnitude 4.7 earthquake in 1929; however, the fault is not classified as an active Alquist-Priolo fault by the California Geological Survey.

Figure 4-55 City of Placentia – Faults in and near the City



Source: 2019 City of Placentia General Plan Safety Element

Alquist-Priolo Zones

According to the California Geological Survey, Alquist-Priolo earthquake fault zones are regulatory zones surrounding the surface traces of active faults in California. (A trace is a line on the earth's surface defining a fault.) Wherever an active fault exists, if it has the potential for surface rupture, a structure for human occupancy cannot be placed over the fault and must be a minimum distance from the fault (generally fifty feet). Surface fault rupture occurs when movement on a fault breaks through to the earth's surface. An active fault, for the purposes of the Alquist-Priolo Act, is one that has ruptured in the last 11,000 years.

Not all earthquakes result in surface rupture. The Loma Prieta Earthquake of 1989 caused major damage in the San Francisco Bay Area but the movement deep in the earth did not break through to the surface. Surface rupture almost always follows pre-existing faults. It may occur suddenly during an earthquake or slowly in the form of fault creep. Fault creep is slow rupture of the earth's crust.

Earthquake fault zones were conceived in the Alquist-Priolo Earthquake Fault Zoning Act (Alquist-Priolo Act). The intent of the Alquist-Priolo Act is to reduce losses from surface fault rupture. California created this law following the destructive 1971 San Fernando earthquake (magnitude 6.6), which was associated with extensive surface fault ruptures that damaged numerous structures.

According to the City of Placentia General Plan Safety Element, there are no Alquist-Priolo Earthquake Fault Zones within the City limits.

Earthquake Scales

The amount of energy released during an earthquake is usually expressed as a magnitude and is measured directly from the earthquake as recorded on seismographs. An earthquake's magnitude is expressed in whole numbers and decimals (e.g., 6.8). Seismologists have developed several magnitude scales. One of the first was the Richter Scale, developed in 1932 by the late Dr. Charles F. Richter of the California Institute of Technology. The Richter Magnitude Scale is used to quantify the magnitude or strength of the seismic energy released by an earthquake. Another measure of earthquake severity is intensity. Intensity is an expression of the amount of shaking at any given location on the ground surface (see Table 4-49). Seismic shaking is typically the greatest cause of losses to structures during earthquakes.

Table 4-49 Modified Mercalli Intensity (MMI) Scale

MMI	Felt Intensity
I	Not felt except by a very few people under special conditions. Detected mostly by instruments.
II	Felt by a few people, especially those on upper floors of buildings. Suspended objects may swing.
III	Felt noticeably indoors. Standing automobiles may rock slightly.
IV	Felt by many people indoors; by a few outdoors. At night, some people are awakened. Dishes, windows, and doors rattle.
V	Felt by nearly everyone. Many people are awakened. Some dishes and windows are broken. Unstable objects are overturned.
VI	Felt by everyone. Many people become frightened and run outdoors. Some heavy furniture is moved. Some plaster falls.

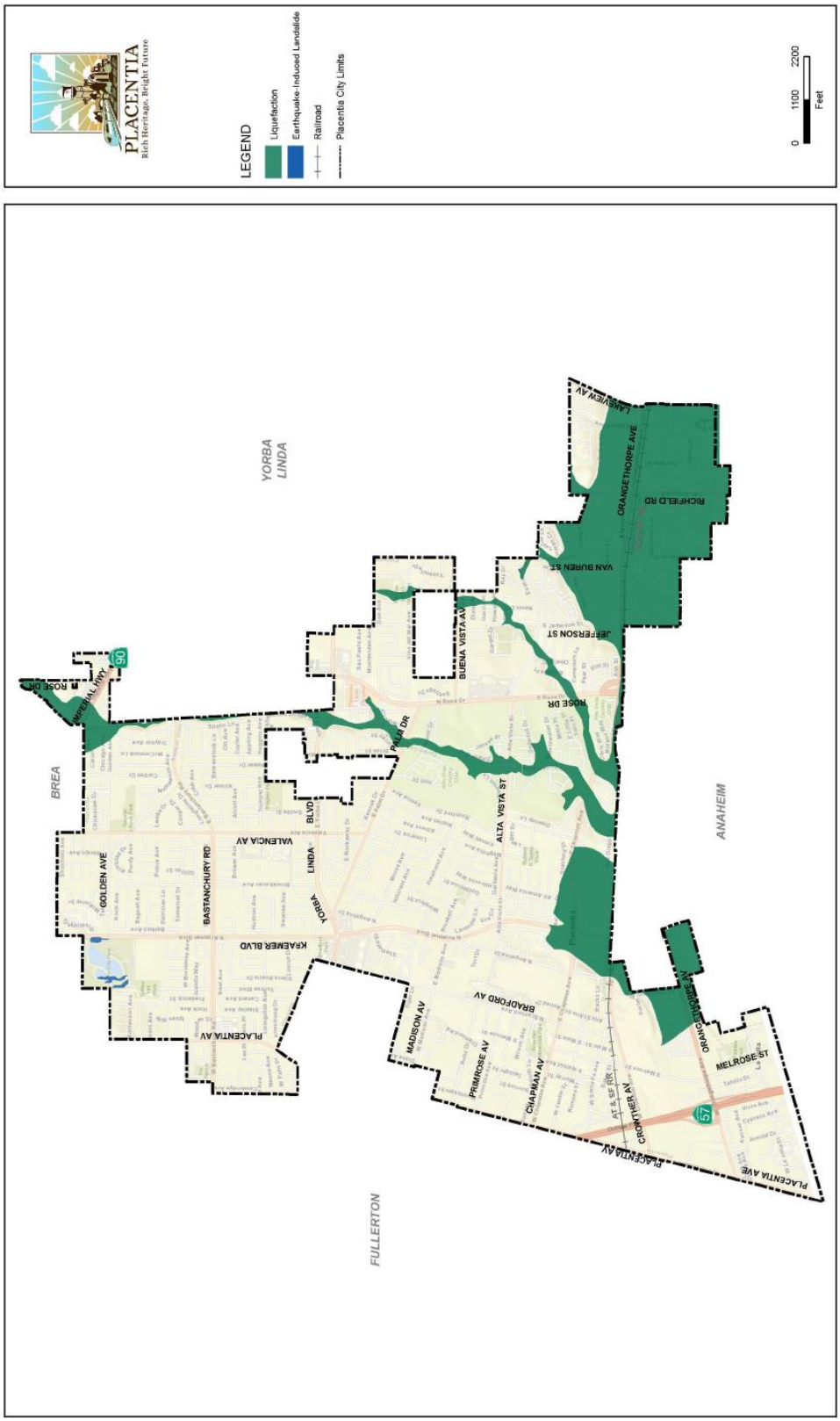
MMI	Felt Intensity
VII	Most people are alarmed and run outside. Damage is negligible in buildings of good construction, considerable in buildings of poor construction.
VIII	Damage is slight in specially designed structures, considerable in ordinary buildings, and great in poorly built structures. Heavy furniture is overturned.
IX	Damage is considerable in specially designed buildings. Buildings shift from their foundations and partly collapse. Underground pipes are broken.
X	Some well-built wooden structures are destroyed. Most masonry structures are destroyed. The ground is badly cracked. Considerable landslides occur on steep slopes.
XI	Few, if any, masonry structures remain standing. Rails are bent. Broad fissures appear in the ground.
XII	Virtually total destruction. Waves are seen on the ground surface. Objects are thrown in the air.

Source: Multi-Hazard Identification and Risk Assessment, FEMA 1997

Earthquake Liquefaction Areas

There are some areas of liquefaction in the City. These are shown on Figure 4-56. Geographic extent of these areas is shown on Table 4-50. Speed of onset of liquefaction is usually fast. Duration of liquefaction varies with the length of earthquake shaking but is usually short.

Figure 4-56 City of Placentia – Liquefaction and Earthquake Induced Landslide Areas



Source: 2019 City of Placentia General Plan Safety Element

Table 4-50 City of Placentia – Geographical Extents of Potential Liquefaction Areas

Land Use	Total Acres	% of Total Acres	Improved Acres	% of Total Improved Acres	Unimproved Acres	% of Total Unimproved Acres
Agricultural	4	0.13%	0	0.00%	4	0.56%
Commercial	75	2.36%	56	2.07%	19	2.66%
Industrial	159	4.99%	141	5.22%	18	2.52%
Miscellaneous	0	0.00%	0	0.00%	0	0.00%
Residential	238	7.47%	177	6.55%	61	8.53%
Tax Exempt	64	2.01%	23	0.85%	41	5.73%
Unknown	69	2.17%	0	0.00%	69	9.65%
Grand Total	**610**	**19.16%**	**397**	**14.69%**	**213**	**29.79%**

Source: City of Placentia GIS, Orange County GIS

Earthquake Induced Landslide Areas

There are also areas of earthquake induced landslide areas in the City. These are shown on Figure 4-56. Geographic extent of these areas is shown on Table 4-51. Speed of onset of earthquake induced landslides is usually fast. Duration of earthquake induced landslides is usually short. Very few areas in the City are prone to earthquake induced landslides.

Table 4-51 City of Placentia – Geographic Extents of Earthquake Induced Landslide Areas

Land Use	Total Acres	% of Total Acres	Improved Acres	% of Total Improved Acres	Unimproved Acres	% of Total Unimproved Acres
Agricultural	0	0.0%	0	0.0%	0	0.0%
Commercial	0	0.0%	0	0.0%	0	0.0%
Industrial	0	0.0%	0	0.0%	0	0.0%
Miscellaneous	0	0.0%	0	0.0%	0	0.0%
Residential	0	0.0%	0	0.0%	0	0.0%
Tax Exempt	3	0.01%	0	0.0%	0	0.0%
Unknown	0	0.0%	0	0.0%	0	0.0%
Grand Total	**3**	**0.01%**	**0**	**0.0%**	**0**	**0.00%**

Source: City of Placentia GIS, Orange County GIS

Past Occurrences

Disaster Declaration History

There have been two federal and two state disaster declarations from earthquake in Orange County, as shown in Table 4-52. These are from the 1987 Whittier Narrows and 1994 Northridge earthquakes. Specific disaster numbers for these state and federal disasters are shown in Table 4-4 above.

Table 4-52 Orange County Earthquake Disaster Declarations 1950-2023

Disaster Type	State Declarations		Federal Declarations	
	Count	Years	Count	Years
Earthquake	2	1987, 1994	2	1987, 1994

Source: Cal OES, FEMA

NCDC Events

The NCDC does not track earthquakes.

USGS Events

The USGS National Earthquake Information Center database contains data on earthquakes in the City. Table 4-53 shows the approximate distances earthquakes can be felt away from the epicenter. According to the USGS, a magnitude 5.0 earthquake could be felt up to 90 miles away. The USGS database was searched for magnitude 5.0 or greater on the Richter Scale within 90 miles of City. These 120 results are detailed in Table 4-54.

Table 4-53 Approximate Relationships between Earthquake Magnitude and Intensity

Richter Scale Magnitude	Maximum Expected Intensity (MM)*	Distance Felt (miles)
2.0 - 2.9	I – II	0
3.0 - 3.9	II – III	10
4.0 - 4.9	IV – V	50
5.0 - 5.9	VI – VII	90
6.0 - 6.9	VII – VIII	135
7.0 - 7.9	IX – X	240
8.0 - 8.9	XI – XII	365

*Modified Mercalli Intensity Scale.

Source: United State Geologic Survey, Earthquake Intensity Zonation and Quaternary Deposits, Miscellaneous Field Studies Map 9093, 1977.

Table 4-54 Magnitude 5.0 Earthquakes or greater within 90 Miles of Placentia

Date	Richter Magnitude	Location
6/10/2016	5.19	20km NNW of Borrego Springs, CA

Date	Richter Magnitude	Location
3/29/2014	5.1	2km NW of Brea, CA
7/7/2010	5.42	20km NNW of Borrego Springs, CA
12/6/2008	5.06	26km WNW of Ludlow, CA
7/29/2008	5.44	5km S of Chino Hills, CA
6/12/2005	5.2	10km ESE of Anza, CA
10/31/2001	5.02	16km ESE of Anza, CA
10/16/1999	5.37	32km SSW of Ludlow, California
10/16/1999	5.6	7km ENE of Running Springs, CA
10/16/1999	5.77	13km WSW of Ludlow, CA
10/16/1999	7.1	Hector Mine, CA Earthquake
4/26/1997	5.07	12km ESE of Piru, California
3/18/1997	5.26	20km ENE of Barstow, California
6/26/1995	5.02	11km SW of Valencia, California
3/20/1994	5.24	3km WNW of Panorama City, California
1/29/1994	5.06	6km NNE of Chatsworth, California
1/19/1994	5.07	10km SSW of Valencia, California
1/19/1994	5.06	8km ESE of Piru, California
1/18/1994	5.24	10km ESE of Piru, California
1/17/1994	5.58	7km NNE of Simi Valley, California
1/17/1994	5.2	9km N of Chatsworth, California
1/17/1994	5.89	1km ENE of Granada Hills, California
1/17/1994	6.7	1km NNW of Reseda, CA
8/21/1993	5	12km S of Joshua Tree, California
12/4/1992	5.26	10km SE of Lucerne Valley, California
11/27/1992	5.29	10km NNW of Big Bear City, California
9/15/1992	5.26	9km SE of Yucca Valley, California
8/17/1992	5.23	7km SE of Big Bear Lake, California
7/11/1992	5.67	12km NW of California City, California
7/5/1992	5.42	21km SW of Ludlow, California
7/5/1992	5.34	24km N of Yucca Valley, California
6/29/1992	5.08	4km ESE of Yucca Valley, CA
6/29/1992	5.69	3km ESE of Yucca Valley, California
6/28/1992	5.26	1km N of Big Bear Lake, California
6/28/1992	6.3	The 1992 Big Bear Earthquake, California
6/28/1992	5.53	11km SSE of Big Bear Lake, California
6/28/1992	5.41	26km NNW of Yucca Valley, CA
6/28/1992	5.49	0km E of Yucca Valley, CA
6/28/1992	5	1km SSE of Yucca Valley, California
6/28/1992	5	7km SSW of Yucca Valley, California

Date	Richter Magnitude	Location
6/28/1992	5.7	2km SSW of Joshua Tree, California
6/28/1992	5.77	3km NE of Yucca Valley, California
6/28/1992	7.3	The 1992 Landers Earthquake, California
4/23/1992	6.1	The 1992 Joshua Tree Earthquake, California
6/28/1991	5.8	13km NNE of Sierra Madre, CA
2/28/1990	5.51	6km NNE of Claremont, CA
12/16/1988	5.03	12km SW of Morongo Valley, CA
12/3/1988	5.02	1km SSE of Pasadena, CA
10/4/1987	5.25	2km WSW of Rosemead, CA
10/1/1987	5.9	2km SSW of Rosemead, CA
7/13/1986	5.45	47km ENE of San Clemente Is. (SE tip), CA
7/8/1986	6	6km SSW of Morongo Valley, CA
2/25/1980	5.34	18km ESE of Anza, CA
3/15/1979	5.23	23km NNW of Joshua Tree, CA
1/1/1979	5.21	13km S of Malibu Beach, CA
6/1/1975	5.28	38km SW of Ludlow, CA
2/9/1971	5.3	10km SSW of Agua Dulce, CA
2/9/1971	5.8	10km SSW of Agua Dulce, CA
2/9/1971	5.8	10km SSW of Agua Dulce, CA
2/9/1971	6.6	10km SSW of Agua Dulce, CA
9/12/1970	5.22	3km W of Lytle Creek, CA
4/28/1969	5.46	1km ENE of Borrego Springs, CA
4/9/1968	6.6	5km NNE of Ocotillo Wells, CA
9/25/1965	5.14	25km W of Ludlow, CA
9/23/1963	5.29	6km SSE of Hemet, CA
3/19/1954	5.48	8km NNE of Ocotillo Wells, CA
3/19/1954	6.4	12km W of Salton City, CA
12/4/1948	6	16km E of Desert Hot Springs, CA
7/25/1947	5.24	10km SSE of Yucca Valley, CA
7/24/1947	5.3	4km NNE of Desert Hot Springs, CA
4/10/1947	5	27km S of Fort Irwin, CA
4/10/1947	6.5	34km SSE of Fort Irwin, CA
7/18/1946	5.51	17km WSW of Amboy, CA
6/12/1944	5.24	12km WSW of Morongo Valley, CA
6/12/1944	5.06	10km NNE of Cabazon, CA
12/22/1943	5.11	22km SSW of Amboy, CA
8/29/1943	5.28	6km WNW of Big Bear Lake, CA
11/14/1941	5.12	5km E of Lomita, CA
5/18/1940	5.2	11km S of Joshua Tree, CA

Date	Richter Magnitude	Location
5/18/1940	5.31	6km SSE of Joshua Tree, CA
5/31/1938	5.23	8km ENE of Trabuco Canyon, CA
3/25/1937	6	16km WSW of Oasis, CA
3/11/1933	5	2 km NE of Carson, California
3/11/1933	5.29	7km W of Newport Beach, CA
3/11/1933	5.02	2km ENE of Westminster, CA
3/11/1933	6.4	Long Beach, California Earthquake
8/31/1930	5.25	1 km SW of Las Flores, California
1/16/1930	5.1	4 km SSE of Big Bear Lake, California
1/16/1930	5.25	4 km SSE of Big Bear Lake, California
9/26/1929	5.1	46 km E of Barstow, California
9/5/1928	5	15 km SSE of Twentynine Palms, California
8/4/1927	5.3	2 km SSW of Santa Monica, California
4/3/1926	5.5	15 km SSE of Twentynine Palms, California
7/23/1923	6.21	3 km SE of San Bernardino, California
1/1/1920	5	16 km NW of Julian, California
6/6/1918	5	4 km WNW of San Jacinto, California
4/21/1918	6.7	1 km N of Hemet, California
9/30/1916	5	Southern California
5/15/1910	5.3	7 km WNW of Lake Elsinore, California
5/13/1910	5	7 km WNW of Lake Elsinore, California
4/11/1910	5	7 km WNW of Lake Elsinore, California
9/20/1907	5.3	1 km SE of Running Springs, California
12/25/1889	6.7	Near San Jacinto, California
07/22/1899	6.36	Cajon Pass area, northwest of San Bernardino, California
7/22/1899	5.9	Near San Bernardino, California
10/23/1894	6.1	East of San Diego, California
07/30/1894	6.2	Northwest of San Bernardino, California
4/4/1893	5.8	Near Newhall, California
06/14/1892	5.5	Northeast of Rancho Cucamonga, California
05/28/1892	6.5	Near Borrego Springs, California
2/9/1890	6.75	Northeastern San Diego County, California
8/28/1889	5.6	Northwest of Pomona, California
2/7/1889	5.6	San Bernardino Mountains northeast of Beaumont, California
12/19/1880	5.9	Near San Bernardino, California
5/27/1862	6.2	Greater San Diego area, California
12/16/1858	6	Near San Bernardino, California
1/16/1857	6.3	Near Palmdale, California
1/10/1857	5.6	Southeast of Fort Tejon, California

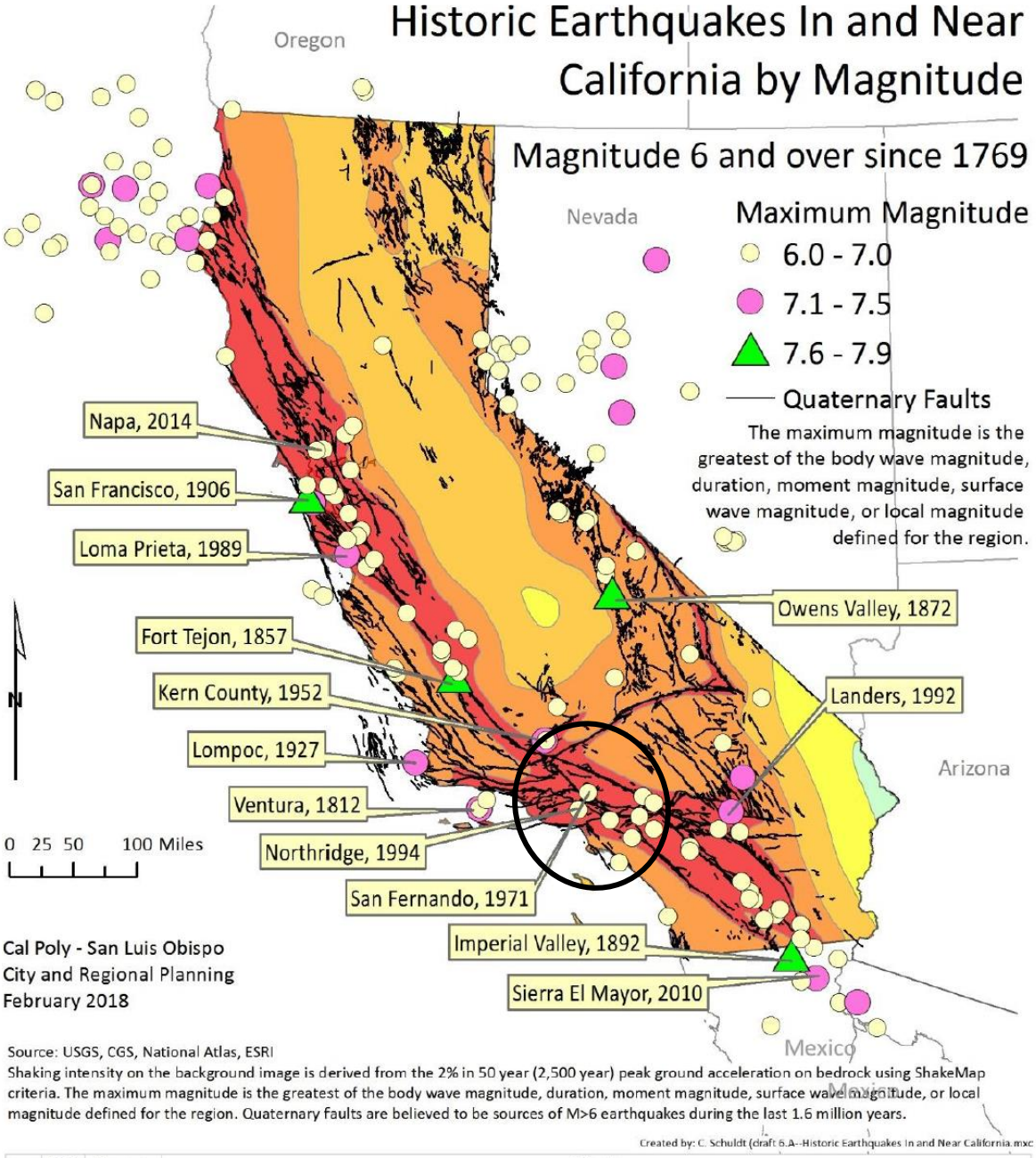
Date	Richter Magnitude	Location
9/21/1856	5.5	Near Santa Ysabel, California
7/11/1855	6	Near San Gabriel, California

Source: USGS

*Search dates January 1, 1850 – March 1, 2023

Figure 4-57 shows major historical earthquakes in California from 1769 to 2017. Since 2017, California has experienced four additional 6.0 or greater earthquakes (2022 6.4 Ferndale, 2021 6.0 Antelope Valley and 2019 6.4 and 7.1 Ridgecrest). None of these earthquakes (over 6.0) since 2017 have affected the Planning Area.

Figure 4-57 Historic Earthquakes in California 1769 to 2017



	MMI	Damage	Effects
	X	Very Heavy	Some well-built, wooden structures destroyed; most masonry and frame structures destroyed with foundations. Rails bent.
	IX	Heavy	Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb. Damage great in substantial buildings, with partial collapse. Buildings shifted off foundations.
	VIII	Moderate to Heavy	Damage slight in specially designed structures; considerable damage in ordinary substantial buildings with partial collapse. Damage great in poorly built structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned.
	VII	Moderate	Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable damage in poorly-built or badly designed structures; some chimneys broken.
	VI	Light	Felt by all, many frightened. Some heavy furniture moved; a few instance of fallen plaster. Damage slight.
	V	Very Light	Felt by nearly everyone; many awakened. Some dishes, windows broken. Unstable objects overturned. Pendulum clocks may stop.

Source: 2018 State of California Multi-Hazard Mitigation Plan

Hazard Mitigation Planning Committee Events

While a few significant earthquakes have historically occurred in the region, the HMPC indicated that for the **1987** Whittier Narrows and the **1994** Northridge earthquakes there were no damages in the City; however, people felt shaking within the City from these events. The Whittier was more of a shake within Placentia; while it was noted that the Northridge event was more of a sway.

During the **2014** La Habra Earthquake the City felt some shaking. Orange County had a local disaster declaration from it. Placentia was part of the declaration. The City EOC was activated after the event. In the City 6-7 residential retaining walls were damaged.

During the **2008** Chino Hills earthquake, there was no recorded damage in the City.

Probability of Future Occurrences

Occasional (major earthquake); Highly Likely (minor earthquake)—It is likely that Placentia will be subject to minor earthquakes in the future. Major earthquakes are considered to be occasional in the City.

Mapping of Future Occurrences

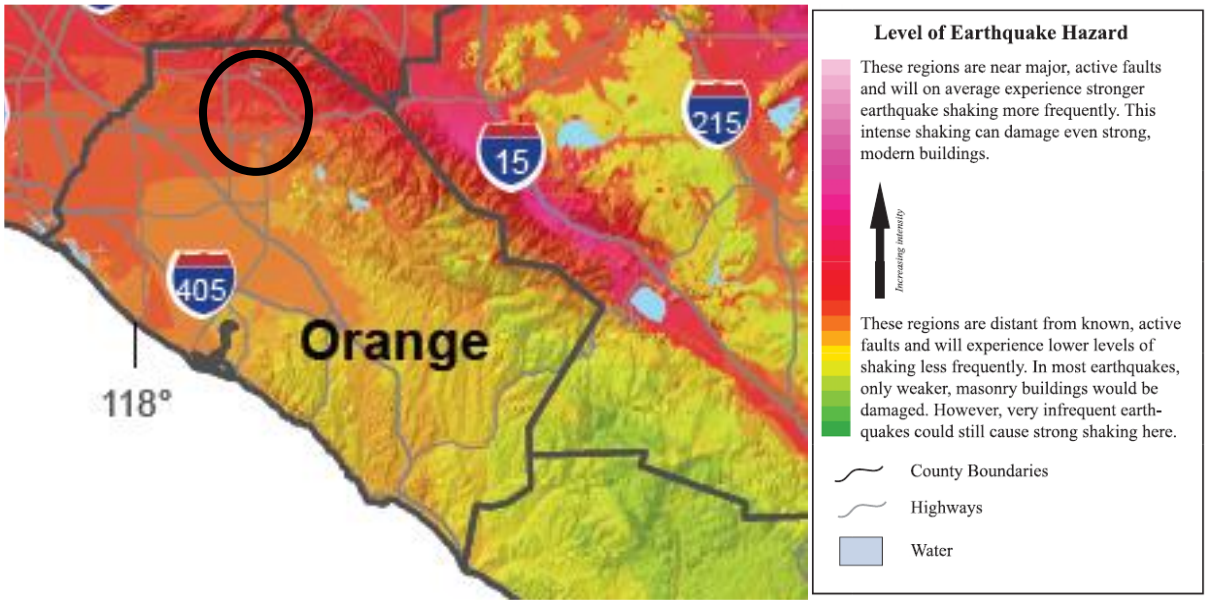
Mapping of future occurrences is presented in the following two sections:

- CGS Analysis
- UCERF Analysis

CGS Analysis

Maps indicating the maximum expectable intensity of ground shaking for the County and City are available through several sources. Figure 4-58, prepared by the California Division of Mines and Geology, shows the expected relative intensity of ground shaking and damage in California from anticipated future earthquakes. The shaking potential is calculated as the level of ground motion that has a 2% chance of being exceeded in 50 years, which is the same as the level of ground-shaking with about a 2,500-year average repeat time. Although the greatest hazard is in areas of highest intensity (as in Placentia) as shown on the map, no region is immune from potential earthquake damage.

Figure 4-58 Maximum Expectable Earthquake Intensity – 2% Chance in 50 Years

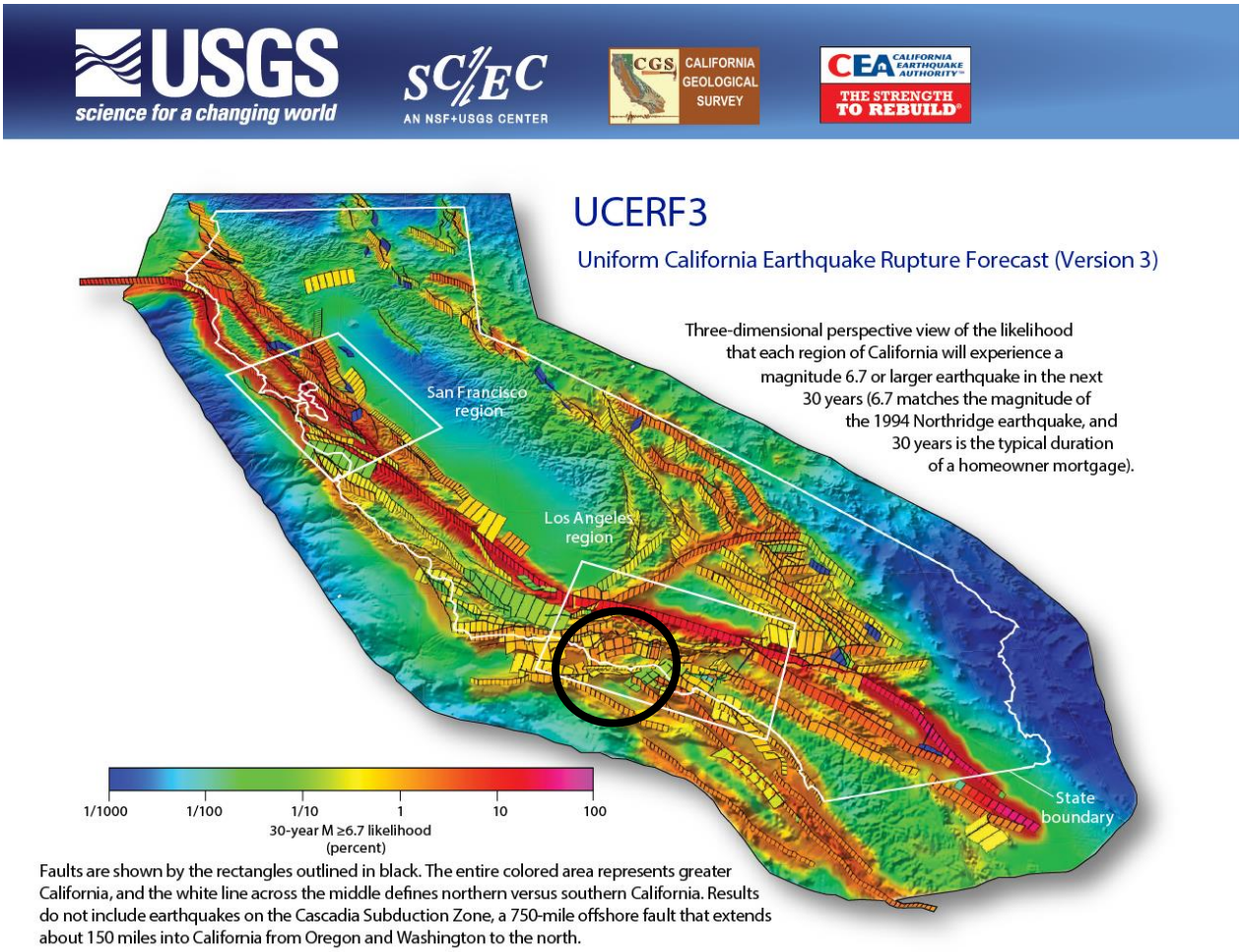


Source: California Division of Mines and Geology

UCERF Analysis

In 2014, the USGS and CGS released the time-dependent version of the Uniform California Earthquake Rupture Forecast (UCERF III) model. The UCERF III results have helped to reduce the uncertainty in estimated 30-year probabilities of strong ground motions in California. The UCERF map is shown in Figure 4-59 and indicates that the City has a predominantly moderate to high risk of earthquake occurrence, which coincides with the probability of future occurrence rating of occasional.

Figure 4-59 Probability of Earthquake Magnitudes Occurring in 30 Year Time Frame



Source: United States Geological Survey Open File Report 2015-3009

Climate Change and Earthquake

Climate change is unlikely to increase earthquake frequency or strength.

Vulnerability Assessment

Vulnerability—High

Earthquake vulnerability is primarily based on population and the built environment. Urban areas in high seismic hazard zones are the most vulnerable, while uninhabited areas are less vulnerable. The primary impacts of concern are life safety and property damage. Several faults are near the City, and seismic hazard mapping indicates that the City has high seismic hazard potential. Although ground rupture is not considered to be a major concern for the City of Placentia, it is still likely that the City will be subject to some moderate to severe seismic shaking. Some degree of structural damage due to stronger seismic shaking should be expected.

Seismic events can have particularly negative effects on older buildings constructed of URM, including materials such as brick, concrete and stone. These areas in the City were discussed above in the Seismic Structural Safety section. The Uniform Building Code (UBC) identifies four seismic zones in the United States. The zones are numbered one through four, with Zone 4 representing the highest level of seismic hazard. The UBC establishes more stringent construction standards for areas within Zones 3 and 4. All of California lies within either Zone 3 or Zone 4. The City is within the more hazardous Zone 4, which suggests that the City is more vulnerable to potential damaging earthquake events.

Vulnerability of the community is discussed in multiple sections that detail how this hazard can affect the City. These sections include assets at risk, impacts, and how future development can be affected by this hazard.

Assets at Risk from Earthquake

Assets at risk from earthquake include: people and populations; structures; critical facilities and infrastructure, and community lifelines; natural, historic, and cultural resources; and economic assets and community activities of value. These are discussed in the following sections.

People and Populations

All people and populations are at risk from earthquake shaking (including fire following earthquake) and surface fault. Those at heightened risk include:

- The unsheltered
- Infants and children under age five and their caregivers
- Elderly (65 and older)
- Individuals with disabilities
- Individuals dependent on medical equipment
- Individuals with impaired mobility

The greatest risk to people and populations from earthquake is death and injury. More information on people and populations at risk can be seen in the Hazus scenarios below. Those scenarios show a range (depending on the scenario and time of day) of fatalities from 0 to 49, and those requiring hospitalization from 21 to 161.

Structures

All structures in the City are vulnerable to earthquakes, depending on the severity and location of the shake. Unreinforced masonry is at a much greater risk to earthquakes. More information on structures at risk can be seen in the Hazus scenarios below. Those scenarios show a range of building related damages in the City between $255,080,000 and $3,256,520,000.

Critical Facilities and Infrastructure, and Community Lifelines

All critical facilities in the City are vulnerable to earthquakes, depending on the severity and location of the shake. This is especially true of underground utilities and pipes. The natural gas pipeline that traverses the

City would be at great risk, given the high pressures used inside the pipeline to transport the natural gas. More information on critical facilities at risk can be seen in the Hazus scenarios below.

Community lifelines at risk to earthquake include:

- **Safety and Security** – Many personnel from the City would be involved in response and recovery efforts. This includes police, fire, EMS, public works, and other personnel. Due to the potential for widespread and major damages citywide, these resources can be stretched and quickly overwhelmed.
- **Food, Hydration, and Shelter** – As homes are damaged, shelter needs would significantly increase. Temporary housing would be to be established. Water supplies could be offline for an extended period. Residents, visitors and others caught in a large event would need to find sources of food and water until the Planning Area recovers.
- **Health and Medical** – Substantial numbers of injuries and deaths can occur. This causes EMS calls and ER visits to spike. Portable morgues and refrigeration units may need to be brought in. Transporting patients to medical facilities may be difficult. Depending on the extent of injuries and deaths the capacity of medical facilities could be strained and eventually overwhelmed.
- **Energy** – The power grid may be damaged from earthquake. Damages to natural gas pipelines that feed homes and businesses in the City may also be disrupted. Restoring these systems may take longer during a widespread event.
- **Communications** – Communications systems may be damaged during shaking events. Once the shaking ceases, responder communications need to be back online quickly to coordinate response efforts in the City. Messaging boards and alerts need to be then put into place to ensure public safety and order. Calls to and from family and friends during a hazard event can further overwhelm communication systems such as cell towers and other infrastructure. Demand may exceed the capacity of these systems to remain operational during response efforts.
- **Transportation** – Major damage can occur to roads and bridges in the City. Damage can also occur to rail lines and airports in and near the City. Roads may be closed due to damage, or to debris on the roads from earthquake events. These closures could be place for an extended period while debris clearing efforts are undertaken to allow repairs to be made.
- **Hazardous Material** – Hazardous materials facilities can be compromised during times of earthquake events causing releases of contaminants into the environment. Natural gas pipelines can be affected by earthquakes. This can affect not only residents, but those who are charged with responding to or resolving the spill/rupture.
- **Water Systems** – Damages to underground pipes may occur. These take time to locate and fix in normal circumstances. During periods of earthquake, this becomes even more difficult. Water and wastewater systems and their respective piping can be damaged.

All lifelines in the City are vulnerable to earthquakes, depending on the severity and location of the shake. Earthquake could cause these lifelines to be overwhelmed. Some of these would be able to be restored to service quickly, while others would take more time. More information on lifelines at risk can be seen in the Hazus scenarios below.

Natural, Historic, and Cultural Resources

The 2023 State Hazard Mitigation Plan noted that environmental problems from earthquakes can be numerous. Earthquake-induced landslides can significantly damage surrounding habitats. It is also possible

for earthquakes to reroute streams, which can change the water quality, possibly damaging habitat and feeding areas. Streams fed by groundwater and/or springs may dry up because of changes in underlying geology. Another threat to the environment from earthquakes is the potential release of hazardous materials. Historical and cultural resources are at risk, often due to their age and construction types. The Hazus scenarios below are relatively silent on the vulnerability to natural, historic, and cultural resources, but impacts to these resources could be long lasting.

Any natural, historic, or cultural resource that is in the earthquake liquefaction zone would be at potential risk. For the natural resources, this is likely to be more limited than those associated with the ground shaking but may include uprooting of trees and vegetation and disruption to habitat areas. Historic and cultural resources that are structures or housed in structures could be vulnerable to liquefaction. It is more likely that earthquake would have a much greater effect than the follow-on liquefaction.

Any natural, historic, or cultural resource that is in the earthquake-induced landslide areas would be at potential risk. The Hazus scenarios below are relatively silent on the vulnerability to natural, historic, and cultural resources.

Economic Assets and Community Activities of Value

All economic assets in the City are vulnerable to earthquakes, depending on the severity and location of the shake. More information on economic assets at risk can be seen in the Hazus scenarios below. All community activities of value would be affected by an earthquake if they were occurring during a period of earthquake shaking.

Hazus Earthquake Scenarios

Earthquake losses will vary across the City depending on the source and magnitude of the event. To further evaluate potential losses associated with earthquake activity in the Planning Area, the nine fault zones for the City were considered for analysis. Three of these could not be analyzed in Hazus due to data limitations. Those three faults were the following:

- Yorba Linda Fault
- Peralta Hills Thrust
- Norwalk Fault

After removing those three faults, six Hazus earthquake scenarios were run for this 2023 LHMP Update:

- A deterministic 7.1 earthquake event on the Puente Hills (Coyote Hills) Fault
- A deterministic 7.4 earthquake event on the Newport-Inglewood Fault
- A deterministic 7.9 earthquake event on the Mohave (San Andreas) Fault
- A deterministic 7.5 earthquake event on the San Jacinto Fault
- A deterministic 8.0 earthquake event on the Sierra Fault
- A deterministic 7.2 earthquake event on the Whittier Fault

These events were chosen from data gathered from the General Plan Safety Element. For all scenarios, Level 1 analyses were run, meaning that only the default data was used and not supplemented with local

building inventory or hazard data. There are certain data limitations when using the default data, so the results should be interpreted accordingly; this is a planning level analysis. The methodology for running the deterministic earthquake scenario used seismic hazard contour maps developed by the U.S. Geological Survey (USGS) for the update of the National Seismic Hazard Maps that are included with HAZUS-MH. The USGS maps provide estimates of potential ground acceleration and spectral acceleration at periods of 0.3 second and 1.0 second, respectively. The 2,500-year return period analyzes ground shaking estimates with a 2 percent probability of being exceeded in 50 years, from the various seismic sources in the area. The International Building Code uses this level of ground shaking for building design in seismic areas and is more of a worst-case scenario.

Deterministic 7.1 Coyote Hills Event

HAZUS-MH 6.0 was utilized to model earthquake losses for the City. Specifically, this scenario was based on a 7.1 Coyote Hills Fault magnitude earthquake. The results of the Coyote Hills scenario are captured in Table 4-55. Key losses included the following:

- Total economic loss estimated for the earthquake was $3,522,900,000, which includes building losses and lifeline losses based on the HAZUS-MH inventory.
- Building-related losses, including direct building losses and business interruption losses, totaled $3,256,520,000.
- 7,970 buildings in the City were at least moderately damaged. 507 buildings were completely destroyed.
- Over 30 percent of the building- and income-related losses were residential structures.
- 15 percent of the estimated losses were related to business interruptions.
- Transportation, Essential Facilities, and Utility Systems were damaged.
- The mid-afternoon strike modeled the highest number of estimated fatalities with 49.
- 1,148 households were displaced, with 625 people seeking shelter.
- 25,403 households experienced a loss of potable water the first day after the earthquake.
- No households experienced a loss of electricity the first day after the earthquake.
- No fire following earthquake events were noted.

Table 4-55 City of Placentia – HAZUS-MH Earthquake Loss Estimation Deterministic 2,500-Year Scenario Results for Puente Hills (Coyote Hills) 7.1 Magnitude Event

Type of Impact	Impacts to City from 7.1 Deterministic Earthquake
Total Buildings Damaged (based on 28,000 buildings)	Slight: 11,019 Moderate: 5,846 Extensive: 1,317 Complete: 507
Building and Income Related Losses	$3,256,520,000
Total Economic Losses (Includes building, income and lifeline losses)	$3,522,900,000
Casualties (Based on 2 a.m. time of occurrence)	Without requiring hospitalization: 183 Requiring hospitalization: 37 Life threatening: 4 Fatalities: 8

Type of Impact	Impacts to City from 7.1 Deterministic Earthquake	
Casualties (Based on 2 p.m. time of occurrence)	Without requiring hospitalization: 606 Requiring hospitalization: 161 Life threatening: 25 Fatalities: 49	
Casualties (Based on 5 p.m. time of occurrence)	Without requiring hospitalization: 379 Requiring hospitalization: 103 Life threatening: 24 Fatalities: 30	
Damage to Transportation Systems	2 bridges with at least moderate damage	
Damage to Essential Facilities	9 hospitals and 1 fire station with at least moderate damage. 0 facilities with complete damage.	
Damage to Utility Systems	5 power facilities with at least moderate damage 307 potable water line breaks, 184 wastewater line breaks, and 42 natural gas line breaks.	
Households without Power/Water Service (Based on 31,131 total households)	Power loss, Day 1: 25,403 Power loss, Day 3: 18,184 Power loss, Day 7: 8,660 Power loss, Day 30: 1,006 Power loss, Day 90: 31	Water loss, Day 1: 7,447 Power loss, Day 3: 0 Power loss, Day 7: 0 Water loss, Day 30: 0 Water loss, Day 90: 0
Displaced Households	1,148 displaced households	
Shelter Requirements	625 persons	
Debris Generation	546,000 tons	

Source: Hazus 6.0

Deterministic 7.4 Newport-Inglewood Event

HAZUS-MH 6.0 was utilized to model earthquake losses for the City. Specifically, this scenario was based on a 7.4 Newport-Inglewood Fault magnitude earthquake. The results of the Newport-Inglewood scenario are captured in Table 4-56. Key losses included the following:

- Total economic loss estimated for the earthquake was $464,880,000, which includes building losses and lifeline losses based on the HAZUS-MH inventory.
- Building-related losses, including direct building losses and business interruption losses, totaled $$339,380,000.
- 908 buildings in the City were at least moderately damaged. 16 buildings were completely destroyed.
- Over 30 percent of the building- and income-related losses were residential structures.
- 14 percent of the estimated losses were related to business interruptions.
- Utility Systems were damaged.
- The mid-afternoon and late afternoon strike modeled the highest number of estimated fatalities with 1.
- 119 households were displaced, with 68 people seeking shelter.
- No households experienced a loss of potable water the first day after the earthquake.
- No households experienced a loss of electricity the first day after the earthquake.
- No fire following earthquake events were noted.

Table 4-56 City of Placentia – HAZUS-MH Earthquake Loss Estimation Deterministic 2,500-Year Scenario Results for Newport-Inglewood 7.4 Magnitude Event

Type of Impact	Impacts to City from 7.4 Deterministic Earthquake	
Total Buildings Damaged (based on 28,000 buildings)	Slight: 6,360 Moderate: 1,659 Extensive: 216 Complete: 28	
Building and Income Related Losses	$773,970,000	
Total Economic Losses (Includes building, income and lifeline losses)	$889,360,000	
Casualties (Based on 2 a.m. time of occurrence)	Without requiring hospitalization: 32 Requiring hospitalization: 3 Life threatening: 0 Fatalities: 0	
Casualties (Based on 2 p.m. time of occurrence)	Without requiring hospitalization: 76 Requiring hospitalization: 12 Life threatening: 1 Fatalities: 3	
Casualties (Based on 5 p.m. time of occurrence)	Without requiring hospitalization: 49 Requiring hospitalization: 8 Life threatening: 1 Fatalities: 2	
Damage to Transportation Systems	None with at least moderate damage	
Damage to Essential Facilities	None with at least moderate damage.	
Damage to Utility Systems	4 power facilities with at least moderate damage 307 potable water line breaks, 184 wastewater line breaks, and 42 natural gas line breaks.	
Households without Power/Water Service (Based on 31,131 total households)	Power loss, Day 1: 0 Power loss, Day 3: 0 Power loss, Day 7: 0 Power loss, Day 30: 0 Power loss, Day 90: 0	Water loss, Day 1: 0 Power loss, Day 3: 0 Power loss, Day 7: 0 Water loss, Day 30: 0 Water loss, Day 90: 0
Displaced Households	119 displaced households	
Shelter Requirements	68 persons	
Debris Generation	106,000 tons	

Source: Hazus 6.0

Deterministic 7.9 Mohave (San Andreas) Event

HAZUS-MH 6.0 was utilized to model earthquake losses for the City. Specifically, this scenario was based on a 7.9 Mohave (San Andreas) Fault magnitude earthquake. The results of the 7.9 Mohave scenario are captured in Table 4-57. Key losses included the following:

- Total economic loss estimated for the earthquake was $$464,880,000, which includes building losses and lifeline losses based on the HAZUS-MH inventory.
- Building-related losses, including direct building losses and business interruption losses, totaled $339,380,000.

- 908 buildings in the City were at least moderately damaged. 16 buildings were completely destroyed.
- Over 30 percent of the building- and income-related losses were residential structures.
- 14 percent of the estimated losses were related to business interruptions.
- Utility Systems were damaged.
- The mid-afternoon and late afternoon strike modeled the highest number of estimated fatalities with 1.
- 43 households were displaced, with 23 people seeking shelter.
- No households experienced a loss of potable water the first day after the earthquake.
- No households experienced a loss of electricity the first day after the earthquake.
- No fire following earthquake events were noted.

Table 4-57 City of Placentia – HAZUS-MH Earthquake Loss Estimation Deterministic 2,500-Year Scenario Results for Mohave (San Andreas) 7.9 Magnitude Event

Type of Impact	Impacts to City from 7.9 Deterministic Earthquake	
Total Buildings Damaged (based on 28,000 buildings)	Slight: 3,778 Moderate: 786 Extensive: 106 Complete: 16	
Building and Income Related Losses	$339,380,000	
Total Economic Losses (Includes building, income and lifeline losses)	$464,880,000	
Casualties (Based on 2 a.m. time of occurrence)	Without requiring hospitalization: 15 Requiring hospitalization: 1 Life threatening: 0 Fatalities: 0	
Casualties (Based on 2 p.m. time of occurrence)	Without requiring hospitalization: 43 Requiring hospitalization: 7 Life threatening: 1 Fatalities: 1	
Casualties (Based on 5 p.m. time of occurrence)	Without requiring hospitalization: 27 Requiring hospitalization: 4 Life threatening: 1 Fatalities: 1	
Damage to Transportation Systems	None with at least moderate damage	
Damage to Essential Facilities	None with at least moderate damage.	
Damage to Utility Systems	1 power facility with at least moderate damage 307 potable water line breaks, 184 wastewater line breaks, and 42 natural gas line breaks.	
Households without Power/Water Service (Based on 31,131 total households)	Power loss, Day 1: 0 Power loss, Day 3: 0 Power loss, Day 7: 0 Power loss, Day 30: 0 Power loss, Day 90: 0	Water loss, Day 1: 0 Power loss, Day 3: 0 Power loss, Day 7: 0 Water loss, Day 30: 0 Water loss, Day 90: 0
Displaced Households	43 displaced households	
Shelter Requirements	23 persons	
Debris Generation	56,000 tons	

Source: Hazus 6.0

Deterministic 7.5 San Jacinto Event

HAZUS-MH 6.0 was utilized to model earthquake losses for the City. Specifically, this scenario was based on a 7.5 San Jacinto Fault magnitude earthquake. The results of the 7.5 San Jacinto scenario are captured in Table 4-58. Key losses included the following:

- Total economic loss estimated for the earthquake was $301,210,000, which includes building losses and lifeline losses based on the HAZUS-MH inventory.
- Building-related losses, including direct building losses and business interruption losses, totaled $255,080,000.
- 586 buildings in the City were at least moderately damaged. 5 buildings were completely destroyed.
- Over 29 percent of the building- and income-related losses were residential structures.
- 13 percent of the estimated losses were related to business interruptions.
- Utility Systems were damaged.
- The late afternoon strike modeled the highest number of estimated fatalities with 1.
- 23 households were displaced, with 12 people seeking shelter.
- No households experienced a loss of potable water the first day after the earthquake.
- No households experienced a loss of electricity the first day after the earthquake.
- No fire following earthquake events were noted.

Table 4-58 City of Placentia – HAZUS-MH Earthquake Loss Estimation Deterministic 2,500-Year Scenario Results for San Jacinto 7.5 Event

Type of Impact	Impacts to City from 7.5 Deterministic Earthquake
Total Buildings Damaged (based on 28,000 buildings)	Slight: 2,875 Moderate: 525 Extensive: 56 Complete: 5
Building and Income Related Losses	$255,080,000
Total Economic Losses (Includes building, income and lifeline losses)	$301,210,000
Casualties (Based on 2 a.m. time of occurrence)	Without requiring hospitalization: 9 Requiring hospitalization: 1 Life threatening: 0 Fatalities: 0
Casualties (Based on 2 p.m. time of occurrence)	Without requiring hospitalization: 23 Requiring hospitalization: 3 Life threatening: 0 Fatalities: 0
Casualties (Based on 5 p.m. time of occurrence)	Without requiring hospitalization: 15 Requiring hospitalization: 2 Life threatening: 0 Fatalities: 1
Damage to Transportation Systems	None with at least moderate damage
Damage to Essential Facilities	None with at least moderate damage.
Damage to Utility Systems	None with at least moderate damage

Type of Impact	Impacts to City from 7.5 Deterministic Earthquake	
	307 potable water line breaks, 184 wastewater line breaks, and 42 natural gas line breaks.	
Households without Power/Water Service (Based on 31,131 total households)	Power loss, Day 1: 0 Power loss, Day 3: 0 Power loss, Day 7: 0 Power loss, Day 30: 0 Power loss, Day 90: 0	Water loss, Day 1: 0 Power loss, Day 3: 0 Power loss, Day 7: 0 Water loss, Day 30: 0 Water loss, Day 90: 0
Displaced Households	23 displaced households	
Shelter Requirements	12 persons	
Debris Generation	33,000 tons	

Source: Hazus 6.0

Deterministic 8.0 Sierra Madre Event

HAZUS-MH 6.0 was utilized to model earthquake losses for the City. Specifically, this scenario was based on an 8.0 Sierra Madre Fault magnitude earthquake. The results of the 8.0 Sierra Madre Fault scenario are captured in Table 4-59. Key losses included the following:

- Total economic loss estimated for the earthquake was $1,719,510,000, which includes building losses and lifeline losses based on the HAZUS-MH inventory.
- Building-related losses, including direct building losses and business interruption losses, totaled $1,577,970,000.
- 3,424 buildings in the City were at least moderately damaged. 188 buildings were completely destroyed.
- Over 24 percent of the building- and income-related losses were residential structures.
- 16 percent of the estimated losses were related to business interruptions.
- Utility Systems were damaged.
- The mid-afternoon strike modeled the highest number of estimated fatalities with 21.
- 412 households were displaced, with 284 people seeking shelter.
- No households experienced a loss of potable water the first day after the earthquake.
- No households experienced a loss of electricity the first day after the earthquake.

Table 4-59 City of Placentia – HAZUS-MH Earthquake Loss Estimation Deterministic 2,500-Year Scenario Results for Sierra Madre 8.0 Magnitude Event

Type of Impact	Impacts to City from 8.0 Deterministic Earthquake
Total Buildings Damaged (based on 28,000 buildings)	Slight: 7,925 Moderate: 2,626 Extensive: 610 Complete: 188
Building and Income Related Losses	$1,577,970,000
Total Economic Losses (Includes building, income and lifeline losses)	$1,719,510,000
Casualties (Based on 2 a.m. time of occurrence)	Without requiring hospitalization: 72 Requiring hospitalization: 13 Life threatening: 2

Type of Impact	Impacts to City from 8.0 Deterministic Earthquake	
	Fatalities: 3	
Casualties (Based on 2 p.m. time of occurrence)	Without requiring hospitalization: 281 Requiring hospitalization: 70 Life threatening: 11 Fatalities: 21	
Casualties (Based on 5 p.m. time of occurrence)	Without requiring hospitalization: 169 Requiring hospitalization: 41 Life threatening: 8 Fatalities: 12	
Damage to Transportation Systems	None with at least moderate damage	
Damage to Essential Facilities	None with at least moderate damage.	
Damage to Utility Systems	4 power facilities with at least moderate damage 307 potable water line breaks, 184 wastewater line breaks, and 42 natural gas line breaks.	
Households without Power/Water Service (Based on 31,131 total households)	Power loss, Day 1: 0 Power loss, Day 3: 0 Power loss, Day 7: 0 Power loss, Day 30: 0 Power loss, Day 90: 0	Water loss, Day 1: 0 Power loss, Day 3: 0 Power loss, Day 7: 0 Water loss, Day 30: 0 Water loss, Day 90: 0
Displaced Households	412 displaced households	
Shelter Requirements	224 persons	
Debris Generation	280,000 tons	

Source: Hazus 6.0

Deterministic 7.2 Whittier Event

HAZUS-MH 6.0 was utilized to model earthquake losses for the City. Specifically, this scenario was based on a 7.2 Whittier Fault magnitude earthquake. The results of the 7.2 Whittier scenario are captured in Table 4-60. Key losses included the following:

- Total economic loss estimated for the earthquake was $986,250,000, which includes building losses and lifeline losses based on the HAZUS-MH inventory.
- Building-related losses, including direct building losses and business interruption losses, totaled $873,390,000.
- 2,231 buildings in the City were at least moderately damaged. 35 buildings were completely destroyed.
- Over 31 percent of the building- and income-related losses were residential structures.
- 14 percent of the estimated losses were related to business interruptions.
- Utility Systems were damaged.
- The mid-afternoon strike modeled the highest number of estimated fatalities with 21.
- 7,447 households experienced a loss of potable water the first day after the earthquake.
- No households experienced a loss of electricity the first day after the earthquake.

Table 4-60 City of Placentia – HAZUS-MH Earthquake Loss Estimation Deterministic 2,500-Year Scenario Results for Whittier 7.2 Magnitude Event

Type of Impact	Impacts to City from 7.2 Deterministic Earthquake	
Total Buildings Damaged (based on 28,000 buildings)	Slight: 7,017 Moderate: 1,943 Extensive: 253 Complete: 35	
Building and Income Related Losses	$873,390,000	
Total Economic Losses (Includes building, income and lifeline losses)	$986,250,000	
Casualties (Based on 2 a.m. time of occurrence)	Without requiring hospitalization: 72 Requiring hospitalization: 13 Life threatening: 2 Fatalities: 3	
Casualties (Based on 2 p.m. time of occurrence)	Without requiring hospitalization: 281 Requiring hospitalization: 70 Life threatening: 11 Fatalities: 21	
Casualties (Based on 5 p.m. time of occurrence)	Without requiring hospitalization: 169 Requiring hospitalization: 41 Life threatening: 8 Fatalities: 12	
Damage to Transportation Systems	None with at least moderate damage	
Damage to Essential Facilities	None with at least moderate damage.	
Damage to Utility Systems	4 power facilities with at least moderate damage 307 potable water line breaks, 184 wastewater line breaks, and 42 natural gas line breaks.	
Households without Power/Water Service (Based on 31,131 total households)	Power loss, Day 1: 0 Power loss, Day 3: 0 Power loss, Day 7: 0 Power loss, Day 30: 0 Power loss, Day 90: 0	Water loss, Day 1: 0 Power loss, Day 3: 0 Power loss, Day 7: 0 Water loss, Day 30: 0 Water loss, Day 90: 0
Displaced Households	145 displaced households	
Shelter Requirements	77 persons	
Debris Generation	119,000 tons	

Source: Hazus 6.0

Hazus Scenario Comparison

It is useful to compare the damages from all of the above scenarios. This is done in Table 4-61 and Table 4-62. These tables sort the earthquake damages from greatest (7.1 Puente Hills) to least (7.5 San Jacinto). As shown, vast differences in these exist. Total economic loss in the Puente Hills scenario is over $3.25 billion versus the $301 million in the San Jacinto scenario, a ten-fold increase. 49 fatalities are expected in the Puente Hills scenario versus 0 in the San Jacinto scenario. This and additional information can be found in the tables below.

Table 4-61 City of Placentia – Hazus Scenario Results Comparison From Greatest to Least Damage

Type of Impact	Impacts to City from 7.1 Puente Hills		Impacts to City from 8.0 Sierra Madre		Impacts to City from 7.2 Whittier Fault	
Total Buildings Damaged (based on 28,000 buildings)	Slight: 11,019 Moderate: 5,846 Extensive: 1,317 Complete: 507		Slight: 7,925 Moderate: 2,626 Extensive: 610 Complete: 188		Slight: 7,017 Moderate: 1,943 Extensive: 253 Complete: 35	
Building and Income Related Losses	$3,256,520,000		$1,577,970,000		$873,390,000	
Total Economic Losses (Includes building, income and lifeline losses)	$3,522,900,000		$1,719,510,000		$986,250,000	
Casualties (Based on 2 a.m. time of occurrence)	Without requiring hospitalization: 183 Requiring hospitalization: 37 Life threatening: 4 Fatalities: 8		Without requiring hospitalization: 72 Requiring hospitalization: 13 Life threatening: 2 Fatalities: 3		Without requiring hospitalization: 72 Requiring hospitalization: 13 Life threatening: 2 Fatalities: 3	
Casualties (Based on 2 p.m. time of occurrence)	Without requiring hospitalization: 606 Requiring hospitalization: 161 Life threatening: 25 Fatalities: 49		Without requiring hospitalization: 281 Requiring hospitalization: 70 Life threatening: 11 Fatalities: 21		Without requiring hospitalization: 281 Requiring hospitalization: 70 Life threatening: 11 Fatalities: 21	
Casualties (Based on 5 p.m. time of occurrence)	Without requiring hospitalization: 379 Requiring hospitalization: 103 Life threatening: 24 Fatalities: 30		Without requiring hospitalization: 169 Requiring hospitalization: 41 Life threatening: 8 Fatalities: 12		Without requiring hospitalization: 169 Requiring hospitalization: 41 Life threatening: 8 Fatalities: 12	
Damage to Transportation Systems	2 bridges with at least moderate damage		None with at least moderate damage		None with at least moderate damage	
Damage to Essential Facilities	9 hospitals and 1 fire station with at least moderate damage. 0 facilities with complete damage.		None with at least moderate damage.		None with at least moderate damage.	
Damage to Utility Systems	5 power facilities with at least moderate damage 307 potable water line breaks, 184 wastewater line breaks, and 42 natural gas line breaks.		4 power facilities with at least moderate damage 307 potable water line breaks, 184 wastewater line breaks, and 42 natural gas line breaks.		4 power facilities with at least moderate damage 307 potable water line breaks, 184 wastewater line breaks, and 42 natural gas line breaks.	
Households without Power/Water Service	Power loss, Day 1: 25,403 Power loss, Day 3: 18,184 Power loss, Day 7: 8,660	Power loss, Day 1: 0 Power loss, Day 3: 0 Power loss, Day 7: 0	Water loss, Day 1: 0 Water loss, Day 3: 0 Water loss, Day 7: 0	Power loss, Day 1: 0 Power loss, Day 3: 0 Power loss, Day 7: 0	Water loss, Day 1: 0 Water loss, Day 3: 0 Water loss, Day 7: 0	Water loss, Day 1: 7,447 Water loss, Day 3: 0

Type of Impact	Impacts to City from 7.1 Puente Hills		Impacts to City from 8.0 Sierra Madre		Impacts to City from 7.2 Whittier Fault	
(Based on 31,131 total households)	Power loss, Day 30: 1,006 Power loss, Day 90: 31	Power loss, Day 30: 0 Power loss, Day 90: 0	Water loss, Day 30: 0 Water loss, Day 90: 0	Power loss, Day 30: 0 Power loss, Day 90: 0	Water loss, Day 30: 0 Water loss, Day 90: 0	Water loss, Day 7: 0 Water loss, Day 30: 0 Water loss, Day 90: 0
Displaced Households	1,148 displaced households		412 displaced households		145 displaced households	
Shelter Requirements	625 persons		224 persons		77 persons	
Debris Generation	546,000 tons		280,000 tons		119,000 tons	

Source: Hazus MH 6.0

Table 4-62 City of Placentia – Hazus Scenario Results Comparison From Greatest to Least Damage continued

Type of Impact	Impacts to City from 7.4 Newport-Inglewood	Impacts to City from 7.9 Mohave San Andreas	Impacts to City from 7.5 San Jacinto
Total Buildings Damaged (based on 28,000 buildings)	Slight: 3,778 Moderate: 786 Extensive: 106 Complete: 16	Slight: 3,778 Moderate: 786 Extensive: 106 Complete: 16	Slight: 2,875 Moderate: 525 Extensive: 56 Complete: 5
Building and Income Related Losses	$339,380,000	$339,380,000	$255,080,000
Total Economic Losses (Includes building, income and lifeline losses)	$464,880,000	$464,880,000	$301,210,000
Casualties (Based on 2 a.m. time of occurrence)	Without requiring hospitalization: 15 Requiring hospitalization: 1 Life threatening: 0 Fatalities: 0	Without requiring hospitalization: 15 Requiring hospitalization: 1 Life threatening: 0 Fatalities: 0	Without requiring hospitalization: 9 Requiring hospitalization: 1 Life threatening: 0 Fatalities: 0
Casualties (Based on 2 p.m. time of occurrence)	Without requiring hospitalization: 43 Requiring hospitalization: 7 Life threatening: 1 Fatalities: 1	Without requiring hospitalization: 43 Requiring hospitalization: 7 Life threatening: 1 Fatalities: 1	Without requiring hospitalization: 23 Requiring hospitalization: 3 Life threatening: 0 Fatalities: 0
Casualties (Based on 5 p.m. time of occurrence)	Without requiring hospitalization: 27 Requiring hospitalization: 4 Life threatening: 1 Fatalities: 1	Without requiring hospitalization: 27 Requiring hospitalization: 4 Life threatening: 1 Fatalities: 1	Without requiring hospitalization: 15 Requiring hospitalization: 2 Life threatening: 0 Fatalities: 1

Type of Impact	Impacts to City from 7.4 Newport-Inglewood		Impacts to City from 7.9 Mohave San Andreas		Impacts to City from 7.5 San Jacinto	
Damage to Transportation Systems	None with at least moderate damage		None with at least moderate damage		None with at least moderate damage	
Damage to Essential Facilities	None with at least moderate damage.		None with at least moderate damage.		None with at least moderate damage.	
Damage to Utility Systems	1 power facility with at least moderate damage 307 potable water line breaks, 184 wastewater line breaks, and 42 natural gas line breaks.		1 power facility with at least moderate damage 307 potable water line breaks, 184 wastewater line breaks, and 42 natural gas line breaks.		None with at least moderate damage 307 potable water line breaks, 184 wastewater line breaks, and 42 natural gas line breaks.	
Households without Power/Water Service (Based on 31,131 total households)	Power loss, Day 1: 0 Power loss, Day 3: 0 Power loss, Day 7: 0 Power loss, Day 30: 0 Power loss, Day 90: 0	Water loss, Day 1: 0 Water loss, Day 3: 0 Water loss, Day 7: 0 Water loss, Day 30: 0 Water loss, Day 90: 0	Power loss, Day 1: 0 Power loss, Day 3: 0 Power loss, Day 7: 0 Power loss, Day 30: 0 Power loss, Day 90: 0	Water loss, Day 1: 0 Water loss, Day 3: 0 Water loss, Day 7: 0 Water loss, Day 30: 0 Water loss, Day 90: 0	Power loss, Day 1: 0 Power loss, Day 3: 0 Power loss, Day 7: 0 Power loss, Day 30: 0 Power loss, Day 90: 0	Water loss, Day 1: 0 Water loss, Day 3: 0 Water loss, Day 7: 0 Water loss, Day 30: 0 Water loss, Day 90: 0
Displaced Households	43 displaced households		43 displaced households		23 displaced households	
Shelter Requirements	23 persons		23 persons		12 persons	
Debris Generation	56,000 tons		56,000 tons		33,000 tons	

Source: Hazus MH 6.0

Great Shakeout Scenario

The Great Shakeout Scenario, developed by the USGS in 2008 and being updated in late 2023, is a key source of potential earthquake information and possible impacts for the Southern California region, including the City. The Great Shakeout 2019 noted that the Southern California Coast area is highly susceptible to earthquakes and earthquake related effects. Numerous earthquake faults crisscross southern California and no one within the area resides more than 10 miles from an active fault. In addition to damage caused directly by ground shaking and related ground failure, other hazards such as fires can easily start during and shortly after an earthquake.

It also noted that fires may spread quickly in densely built neighborhoods like the City of Placentia, enabling them to sustain for long periods, spread over large areas and, due to broken water pipes and the number of ignitions, simply overwhelm the abilities of firefighters to control them. On the other hand, earthquakes occurring during periods of heavy rain can produce destructive and life-threatening slurry-like debris flows that originate on the steep slopes and gullies of the many rugged mountain areas and can flow into adjacent communities.

Assets at Risk from Earthquake Liquefaction and Earthquake Induced Landslide

Earthquake shaking can cause liquefaction to occur in the City. Areas with loose soils and high water tables are at risk from liquefaction. There are several areas within the City prone to liquefaction. Earthquakes can also induce landslides, especially if an earthquake occurs during the rainy season and soils are saturated with water. The areas prone to earthquake-induced landslides are largely the same as those areas prone to landslides in general, which in the City of Placentia is very limited. As with all landslides, areas of steep slopes with loose rock or soils and high water tables are most prone to earthquake-induced landslides. The City has limited locations with landslide risk. These are discussed below, and in Section 4.3.12.

Methodology

The Earthquake Liquefaction and Earthquake Induced Landslide Area data was obtained from the City of Placentia GIS. The Orange County 2022 Parcel/Assessor data was used as the basis for the inventory of all parcels within the City. GIS was used to overlay both the Earthquake Liquefaction and Earthquake Induced Landslide hazard layers onto the parcel layer centroids, and where each intersected a parcel centroid, it was assigned with that hazard zone for the entire parcel.

Assets at risk from earthquake liquefaction and earthquake induced landslide include people and populations; structures; critical facilities and infrastructure, and community lifelines; natural, historic, and cultural resources, economic assets, and community activities of value). These are discussed in the following sections.

People and Populations

All people and populations are at risk from earthquake liquefaction and earthquake induced landslide in these mapped hazard areas. Those at heightened risk include:

- The unsheltered

- Infants and children under age five and their caregivers
- Non-English speakers
- Elderly (65 and older)
- Individuals with disabilities
- Individuals dependent on medical equipment
- Individuals with impaired mobility

To further evaluate the impact to the residential population within the City, those residential parcel centroids that intersect the earthquake liquefaction areas, and the earthquake induced landslide areas were counted and multiplied by the 2020 Census Bureau average household factors for the City of Placentia (3.14). According to this analysis, there is a total population of 3,740 residents in Placentia in earthquake liquefaction areas. There are no improved residential parcels in the earthquake induced landslide areas. This is shown in Table 4-73.

Table 4-63 City of Placentia – Improved Residential Parcels and Populations in Earthquake Liquefaction and Earthquake induced Landslide Areas

Jurisdiction	Earthquake Liquefaction Areas		Earthquake Induced Landslide Areas	
	Improved Residential Parcels	Population	Improved Residential Parcels	Population
Placentia	1,191	3,740	0	0

Source: City of Placentia GIS, Orange County GIS, US Census Bureau, Orange County 2022 Parcel/Assessor's Data

Structures

Structures in the City have a measure of risk from both liquefaction and earthquake induced landslides. The Earthquake Liquefaction and Earthquake Induced Landslide layers were overlaid with the City parcel layer in GIS to obtain results. These results are shown on Figure 4-60. Table 4-64 summarizes the potential estimated damages to the City from properties in the Earthquake Liquefaction Areas. Table 4-65 summarizes the potential estimated damages to the City from properties in the Earthquake Induced Landslide Areas. Each table summarizes by total parcel counts, improved parcel (structure) counts, and their improved and land values and the estimated contents replacement values based on the CRV factors detailed in Table 4-7. Also, it is important to keep in mind that these assessed values may be well below the actual market value of improved parcels located within the landslide incidence and susceptibility areas due primarily to Proposition 13.

Figure 4-60 City of Placentia – Earthquake Liquefaction and Earthquake Induced Landslide Areas

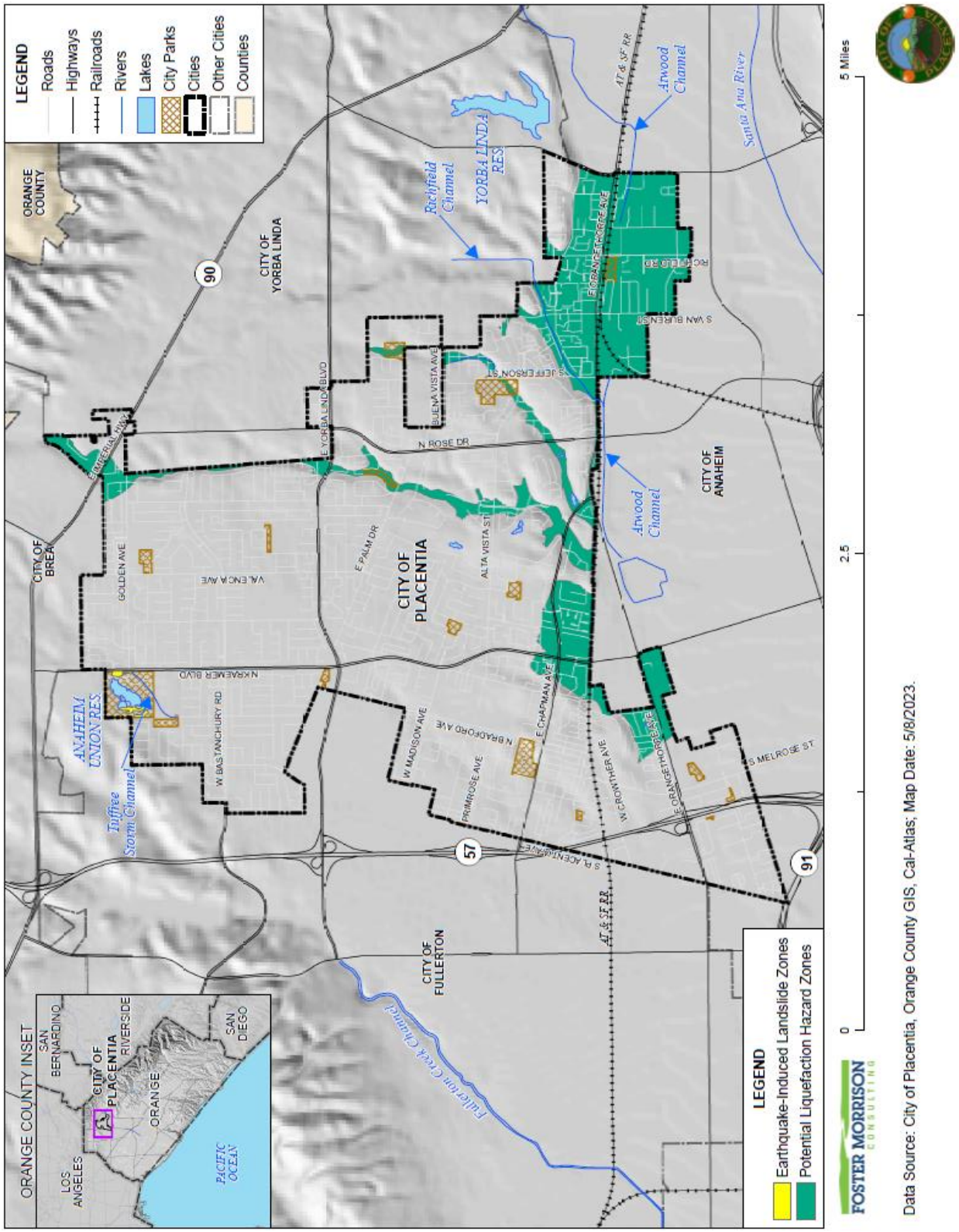


Table 4-64 City of Placentia – Count and Value of Parcels (and Structures) in Potential Liquefaction Areas by Land Use

Land Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Agricultural	9	0	$81,474	$0	$0	$81,474
Commercial	36	28	$35,453,159	$44,887,633	$44,887,633	$125,228,425
Industrial	135	120	$182,174,885	$117,207,435	$175,811,148	$488,414,630
Miscellaneous	1	0	$0	$0	$0	$0
Residential	1,349	1,191	$407,768,731	$299,229,328	$149,614,686	$856,612,745
Tax Exempt	61	7	$4,170,994	$10,105,142	$15,157,711	$29,433,847
Unknown	27	0	$0	$0	$0	$0
Grand Total	**1,618**	**1,346**	**$629,649,243**	**$471,429,538**	**$385,471,178**	**$1,499,771,121**

Source: City of Placentia GIS, Orange County GIS, Orange County 2022 Parcel/Assessor's Data

Table 4-65 City of Placentia – Count and Value of Parcels (and Structures) in Earthquake Induced Landslide Areas by Land Use

Land Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Agricultural	0	0	$0	$0	$0	$0
Commercial	0	0	$0	$0	$0	$0
Industrial	0	0	$0	$0	$0	$0
Miscellaneous	0	0	$0	$0	$0	$0
Residential	0	0	$0	$0	$0	$0
Tax Exempt	3	0	$3,774,779	$0	$0	$3,774,779
Unknown	0	0	$0	$0	$0	$0
Grand Total	**3**	**0**	**$3,774,779**	**$0**	**$0**	**$3,774,779**

Source: City of Placentia GIS, Orange County GIS, Orange County 2022 Parcel/Assessor's Data

Critical Facilities and Infrastructure, and Community Lifelines

Earthquake liquefaction and earthquake induced landslides presents a threat to critical facilities, infrastructure, and community lifelines. The following analysis discusses critical facilities and infrastructure, followed by community lifelines.

Critical Facilities and Infrastructure

Earthquake liquefaction and earthquake induced landslides presents a risk to the critical facilities and infrastructure in the City. A separate analysis was performed on the critical facility inventory in the City of Placentia to determine critical facilities in both the earthquake induced landslide and potential liquefaction hazard zones. Using GIS, these zones were overlayed on the critical facility GIS layer. Figure

4-61 shows critical facilities, as well as the earthquake induced landslide and potential liquefaction hazard zones. Table 4-66 provides information by category of critical facilities in the potential liquefaction hazard zones. Details of critical facility type, name, and address by fire hazard severity zone are listed in Appendix F. As shown in Table 4-66, 40 facilities fall in the liquefaction areas. There are no critical facilities at risk to earthquake induced landslides as all fall outside the areas affected by these landslides. As such, no tabular analysis was performed.

Figure 4-61 City of Placentia – Critical Facilities in Earthquake Induced Landslide Zones and Potential Liquefaction Hazard Zones

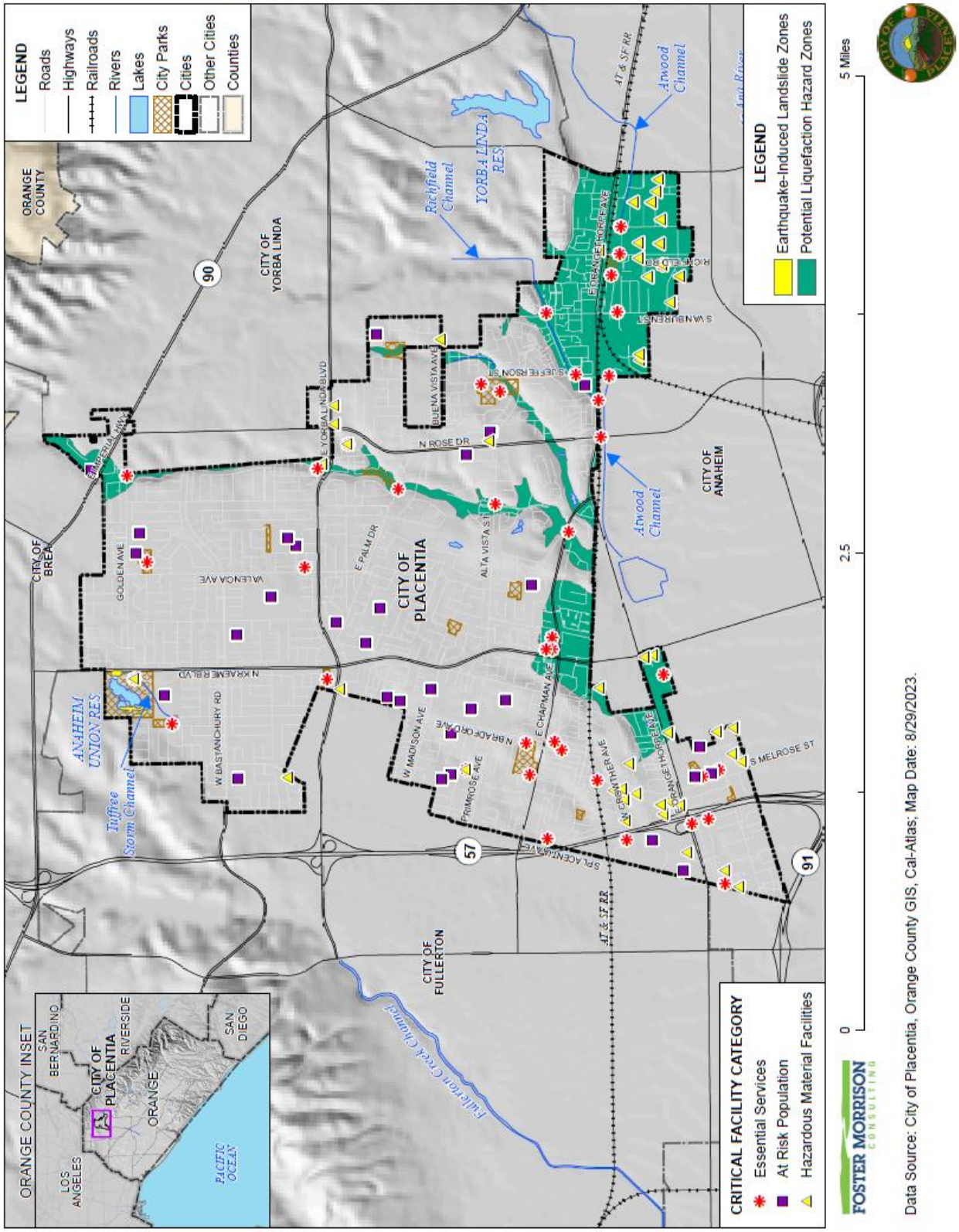


Table 4-66 City of Placentia – Critical Facility Counts by Potential Liquefaction Zone and Critical Facility Type

Potential Liquefaction Hazard Zone/ Critical Facility Category	Critical Facility Type	Facility Count
Potential Liquefaction Hazard Zone		
Essential Services Facilities	Bridge	12
	City Facility	4
	Police Station	1
	Water Treatment Facilities	1
	Essential Services Facilities Total	**18**
At Risk Population Facilities	Daycare Center	1
	Primary/Secondary School	1
	At Risk Population Facilities Total	**2**
Hazardous Material Facilities	Gas Station	1
	Hazardous Material Business	17
	Hospital	1
	Water Utilities	1
	Hazardous Material Facilities Total	**20**
Potential Liquefaction Hazard Zone Total		**40**
Outside of Potential Liquefaction Hazard Zone		
Essential Services Facilities	Bridge	6
	City Facility	10
	Electric Substation	1
	Fire Station	2
	Hospital	1
	Water Facilities	2
	Essential Services Facilities Total	**22**
At Risk Population Facilities	Daycare Center	8
	Primary/Secondary School	16
	Rehabilitation Center	1
	Senior Apartment	2
	Senior Assisted Living	2
	Senior Hospice	1
	At Risk Population Facilities Total	**30**
Hazardous Material Facilities	Gas Station	4
	Hazardous Material Business	18
	Hospital	1
	Oil Tank Farm	1

Potential Liquefaction Hazard Zone/ Critical Facility Category	Critical Facility Type	Facility Count
	Propane Tank Facility	1
	Water Utilities	2
	Hazardous Material Facilities Total	**27**
Outside of Potential Liquefaction Hazard Zone Total		**79**
Grand Total		**119**

Source: City of Placentia GIS, Orange County GIS

Community Lifelines

Earthquake liquefaction and earthquake induced landslides presents a threat to life and property, including community lifelines in the City. Community lifelines (that may be vulnerable include:

- **Safety and Security** – Many City personnel would be involved in response and recovery efforts. This includes police, fire, EMS, public works, and other personnel.
- **Food, Hydration, and Shelter** – As homes are damaged by earthquake liquefaction and earthquake induced landslide, shelter needs would increase. Those whose homes are damaged would need to find sources of food and water. The unsheltered would also need to find alternate sources of food and water until the City recovers.
- **Health and Medical** – Injuries and deaths can occur. This causes EMS calls and ER visits to spike temporarily. Medical facilities damaged by earthquake liquefaction and earthquake induced landslides may have difficulty transporting patients to facilities with open beds.
- **Energy** – the power grid may be damaged from earthquake liquefaction and earthquake induced landslides.
- **Communications** – Communications systems may be damaged during shaking events. Once the shaking ceases, responder communications need to be back online quickly to coordinate response efforts in the City. Messaging boards and alerts need to be then put into place to ensure public safety and order.
- **Transportation** – Damage can occur to roads and bridges in the City from earthquake liquefaction and earthquake induced landslides.
- **Hazardous Material** – Hazardous materials facilities can be compromised during times of earthquake shaking. Natural gas pipelines (both local and transmission sized lines) can be affected by earthquake liquefaction and earthquake induced landslides. This can affect not only residents, but those who are charged with responding to or resolving the spill/rupture.
- **Water Systems** – Damages to underground pipes may occur from liquefaction. These take time to locate and fix in normal circumstances. During periods of earthquake, this becomes even more difficult.

Earthquake liquefaction and earthquake induced landslides occurring as part of a significant earthquake event will compound the impacts and vulnerability of all community lifelines in the City.

Natural, Historic, and Cultural Resources

Any natural, historic, or cultural resource that is in the earthquake liquefaction and earthquake induced landslide areas would be at potential risk. Given the limited area affected by liquefaction and earthquake

induced landslides, the vulnerability of City natural, historic, and cultural resources is believed to be low. It is more likely that earthquake would have a much greater effect than the follow-on liquefaction.

Economic Assets and Community Activities of Value

Any economic asset that is in the earthquake liquefaction and earthquake induced landslide areas would be at potential risk. Given the limited area affected by liquefaction and earthquake induced landslides, the vulnerability of City economic assets and community activities of value is believed to be low. It is more likely that earthquake would have a much greater effect than the follow-on liquefaction.

Impacts from Earthquake, Earthquake Liquefaction, and Earthquake Induced Landslides

Earthquakes can strike without warning and cause dramatic changes to the landscape of an area that can have devastating impacts on the built environment. The greatest impact is to life safety of the City residents and visitors. Other impacts to the Planning Area would include damages to infrastructure such as roads, bridges, and dams; damages and loss of services to utilities and critical infrastructure, including those related to gas, power, water, wastewater and communication systems; damages to structures and other development; and possible loss of life and injuries.

Earthquakes can also cause failure of dams, levees, and reservoirs. Facilities and land downslope from dams or water reservoirs or behind levees might be subject to flooding, if the dams, reservoirs, or levees fail as a result of an earthquake. The Planning Area has locations with significant flood risk that include facilities downslope from dams or reservoirs or behind levees.

Impacts that are not quantified, but can be anticipated in large future events, include:

- Injury and loss of life;
- Commercial and residential structural and property damage;
- Disruption of and damage to public infrastructure, utilities, and services;
- Damage to roads/bridges resulting in loss of mobility;
- Significant economic impact (jobs, sales, tax revenue) to the community; and
- Negative impact on commercial and residential property values

These losses may be worsened in the future due to the effects of climate change, changes in population patterns (migration, density, or the makeup of socially vulnerable populations), and changes in land use and development.

As discussed in the hazard profile section, it is unlikely that climate change will influence this hazard overtime. The City is approaching built out conditions. Population projections for the City show very limited growth over the next 25 years. Populations are anticipated to grow by only 7.3% between 2025 and 2050, which equates to an annual growth of 0.29%, thus future population growth should not increase the potential impacts from this hazard on City assets. With respect to population patterns such as those associated with migration, density, or makeup of socially vulnerable populations the data shows that most socially vulnerable populations and disadvantaged communities are concentrated in the western portion of the City. Also, FEMA's National Risk Index for Orange County is rated as Very High. Since earthquake would affect the whole of the City, if these population patterns continue to show an increase in vulnerable

populations, the vulnerability and potential impacts to City assets from earthquake may continue to increase in the future.

As described in the land use discussion at the end of Section 4.2.2, a new land use map was developed as part of the General Plan efforts in 2023, which establishes the basic pattern of development in the City for the next 20-25 years, including land uses and densities. Thus, future development within hazard areas generally contributes to some increase of impacts on City assets, given the limited potential for significant future growth in Placentia and that earthquake can affect the whole of the City, future changes in land use and development are unlikely to contribute to any notable change in the vulnerability of the City to this hazard. In addition, the City has a development review process which includes the consideration of hazard constraints and updated building codes that should further limit the impacts of these hazards on City assets.

A large nearby earthquake can also increase the probability of secondary earthquake hazards affecting the Planning Area, including a surface fault rupture, liquefaction, landslides, and fire following earthquakes. These cascading events compound the impacts to the Planning Area during an earthquake.

Surface Fault Rupture

When a fault rupture extends to the earth's surface, the displacement can catastrophically damage structures or utilities. Fissuring, settlement, and permanent horizontal and vertical ground shifting often accompany large earthquakes. Such ground failures can significantly increase damage and may be a contributing cause of damage. Studies after the 1994 Northridge Earthquake showed that when ground failure was involved, damage to residential dwellings was three to four times greater than average shake damage. Because of their geographic extent and their tendency to be buried, networked infrastructures such as water, power, communication, and transportation lines are particularly vulnerable to ground failures.

Fault ruptures itself contributes very little to damage unless the structure or system element crosses the active fault; however, liquefaction can occur further from the source of the earthquake. In general, newer construction is more earthquake resistant than older construction due to enforcement of improved building codes. Manufactured housing is very susceptible to damage because their foundation systems are rarely braced for earthquake motions. Locally generated earthquake motions and associated liquefaction, even from very moderate events, tend to be more damaging to smaller buildings, especially those constructed of unreinforced masonry (URM) and soft story buildings.

Liquefaction

Ground settlement during liquefaction can cause damage when the amount of settlement varies significantly across the length of a structure. Liquefaction can occur in susceptible soils and can severely damage bridges, wharves, piers, and other structures at ports and harbors, as well as underground utility lines and structures.

Earthquake-Induced Landslides

Landslides caused by earthquakes can be widespread over the area of highest shaking intensity and also at greater distances if hillsides are in a susceptible condition. Earthquake landslides can significantly damage structures and transportation and utility lifelines.

Fire Following Earthquake

Earthquakes are often responsible for igniting fires that can contribute to a considerable share of the overall damage in a disaster. The fires can start from a variety of sources: appliances with natural gas pilot lights might tip, damaged electrical equipment might spark, and gas line connections might break. Recently, in the South Napa Earthquake, a number of mobile homes were destroyed and damaged when the gas connection to a home broke. In the Loma Prieta Earthquake, 36 fires broke out in San Francisco alone but luckily were quickly contained in large part due to the abnormally calm wind that evening, and the fires' proximity to the Bay that allowed a fire boat to pump water to the fire where the water lines had failed. In the 1906 earthquake, over 3.5 square miles of San Francisco burned, representing 80 percent of San Francisco's property value at the time.

Fires after earthquakes may severely strain fire departments that must respond to multiple simultaneous ignitions. Impaired communications, water supply, transportation, and other demands such as structural collapses, hazardous materials releases, or medical emergencies affect fire department response. A few characteristics can make specific facilities more vulnerable to fire following earthquake. If a building collapses, there is a high risk for gas or electrical lines to start "seed" fires that then impact undamaged neighboring structures or start wildfires. Areas of liquefaction, fault rupture, and landslide are more vulnerable to fire. There is a greater potential for underground gas mains to break due to ground displacements, and water lines in the area might also be damaged, which could prevent the ability to fight a fire with regular water resources. Areas that are largely built with wood frames or shingle roofs might be less prone to earthquake damage but are at a heightened risk for the spread of fires.

A few characteristics can make specific facilities more vulnerable to fire following earthquake. If a building collapses, there is a high risk for gas or electrical lines to start "seed" fires that then impact undamaged neighboring structures or start wildfires. Areas of liquefaction, fault rupture, and landslide are more vulnerable to fire. There is a greater potential for underground gas mains to break due to ground displacements, and water lines in the area might also be damaged, which could prevent the ability to fight a fire with regular water resources. Areas that are largely built with wood frames or shingle roofs might be less prone to earthquake damage but are at a heightened risk for the spread of fires. Urban fire is discussed in greater detail in Section 4.3.17. Wildfire is discussed in greater detail in Section 4.3.14.

Other vulnerable structures of concern include hazardous materials facilities located within the City that could create an issue if damaged by shaking: Suburban Propane, Corporate Yard gas pumps, Metro Water District – chlorine infusion, and the Tri-City Park Water Tank. This could impact those who work, live, or happen to be in the area of these facilities.

These losses may be worsened in the future due to the effects of climate change, changes in population patterns (migration, density, or the makeup of socially vulnerable populations), and changes in land use and development.

Future Development

Although ground rupture is not considered to be a major concern for the City of Placentia, it is still likely that the City will be subject to some moderate to severe seismic shaking. A sizable degree of structural

damage due to stronger seismic shaking could be expected, but the risk can be reduced through adherence to seismic design codes (such as the currently City adopted California Building Code). The City noted that future development has been and will likely contain multi-family and other larger structures. However, large hotels and multi-story buildings are being built to current code. The City noted that even though built to code, these structures are untested and could be at risk both from earthquake shaking and liquefaction. Future development areas at risk to earthquake liquefaction and earthquake induced landslides is evaluated further below using GIS.

Future Development GIS Analysis

The City provided 19 future development areas which were used as the basis for the inventory of future development areas for the City. Utilizing the future development area spatial layer, the parcel centroid data was intersected to determine the parcel counts and acreage within each area. Figure 4-62 shows the locations of the future development areas overlayed on the earthquake liquefaction and earthquake-induced landslide zones. Table 4-67 shows the parcels and acreages of each future development area in the City by earthquake liquefaction and earthquake-induced landslide zones. No earthquake-induced landslide areas are shown on the table as no future development areas intersect these zones.

Figure 4-62 City of Placentia – Future Development Areas by Earthquake-Induced Landslide and Potential Liquefaction Hazard Zones

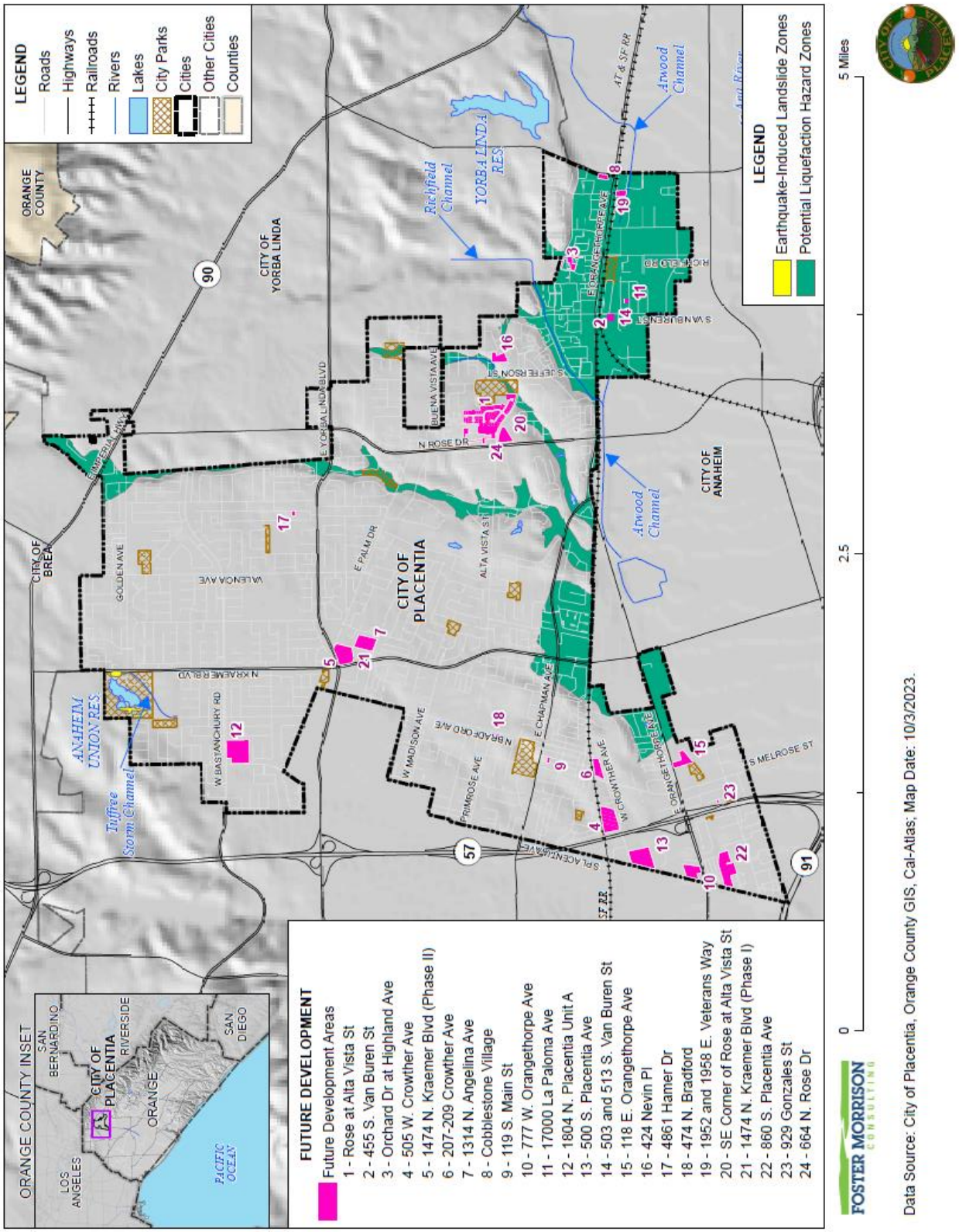


Table 4-67 City of Placentia – Future Development Areas by Potential Liquefaction Hazard Zones

Potential Liquefaction Zones/Map #	Future Development Areas	Total Parcel Count	Improved Parcel Count	Total Acres
Potential Liquefaction Hazard Zone				
1	Rose at Alta Vista St	1	0	0.20
2	455 S. Van Buren St	1	1	0.17
3	Orchard Dr at Highland Ave	1	0	1.15
8	Cobblestone Village	1	0	0.59
11	17000 La Paloma Ave	1	0	0.26
14	503 & 513 S. Van Buren St	2	2	0.38
19	1952 & 1958 E. Veterans Way	1	0	0.78
Potential Liquefaction Hazard Zone Total		**8**	**3**	**3.53**

Source: City of Placentia GIS

4.3.9. Flood: (1% and 0.2% Annual Chance)

Hazard Profile

This hazard profile contains multiple sections that detail how this hazard can affect City. These sections include a hazard/problem description; description of location and extent; past occurrences of this hazard; and how climate change can affect this hazard.

Hazard/Problem Description

Flooding is the rising and overflowing of a body of water onto normally dry land. Floods are among the costliest natural disasters in terms of human hardship and economic loss nationwide. Floods can cause substantial damage to structures, landscapes, and utilities and can cause life safety issues. Floods can be extremely dangerous. Six inches of moving water can knock over a person given a strong current. A car will float in less than two feet of moving water and can be swept downstream into deeper waters. Floods kill more people trapped in vehicles than anywhere else.

During a flood, people can also suffer heart attacks or electrocution due to electrical equipment short outs. Floodwaters can transport large objects downstream which can damage or remove stationary structures, such as dam spillways. Ground saturation can result in instability, collapse, or other damage. Objects can also be buried or destroyed through sediment deposition. Floodwaters can also break utility lines and interrupt services. Standing water can cause damage to roads, foundations, and electrical circuits. Direct impacts, such as drowning, can be limited with adequate warning and public education about what to do during floods. Where flooding occurs in populated areas, warning and evacuation will be of critical importance to reduce life and safety impacts from any type of flooding.

There are three primary types of freshwater flood events in the City: riverine, flash flooding, and urban stormwater. Regardless of the type of flood, the cause is often the result of severe weather and excessive rainfall, either in the flood area or upstream reaches.

- **Riverine flooding** is the most common type of flood event and occurs when a watercourse exceeds its "bank-full" capacity. Riverine flooding generally occurs as a result of prolonged rainfall, or rainfall that is combined with already saturated soils from previous rain events. The duration of riverine floods may vary from a few hours to many days. Factors that directly affect the amount of flood runoff include precipitation amount, intensity and distribution, the amount of soil moisture, seasonal variation in vegetation, snow depth, and water-resistance of the surface due to urbanization. The warning time associated with slow rise floods assists in life and property protection.
- The term "**flash flood**" describes localized floods of great volume and short duration. In contrast to riverine flooding, this type of flood usually results from heavy rainfall on a relatively small drainage area. Precipitation of this sort usually occurs in the winter and spring. Flash floods often require immediate evacuation within a very short period of time.
- **Stormwater/Urban** flood events have increased as land has been converted from fields or woodlands to roads and parking lots and lost its ability to absorb rainfall. Urbanization increases runoff by two to six times that of natural terrain. This is discussed in the Section 4.3.10 below.

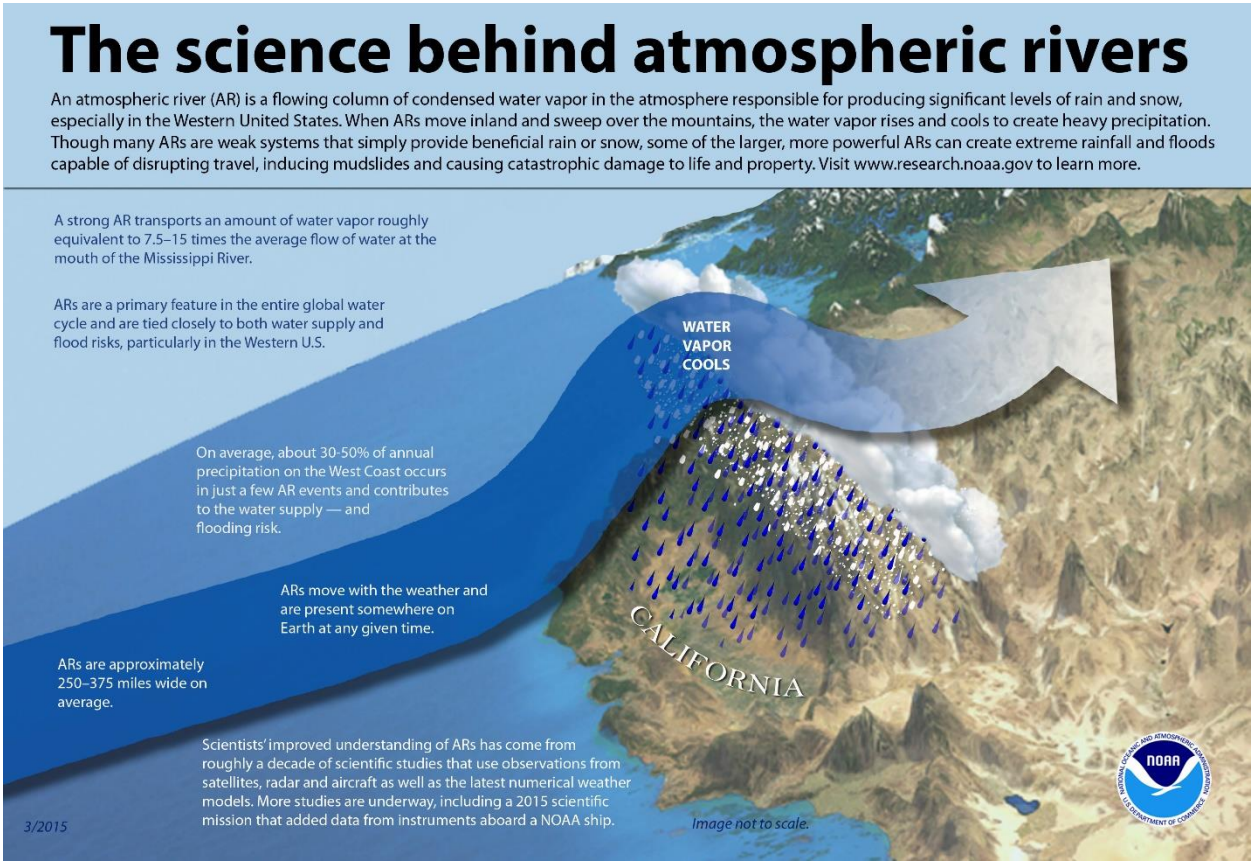
The City is also at risk to flooding resulting from dam and levee failures. Dam failure flooding is discussed separately in Section 4.3.6 of this document, while levee failures are discussed in Section 4.3.13. Regardless of the type of flood, the cause is often the result of severe weather and excessive rainfall, either in the flood area or upstream reach.

The potential for flooding can change and increase through various land use changes and changes to land surface, resulting in a change to the floodplain. Environmental changes can create localized flooding problems in and outside of natural floodplains by altering or confining natural drainage channels. These changes are most often created by human activity.

Special Types of Flooding

Placentia and much of California can be affected by a phenomenon known as an atmospheric river. These types of storms occurred frequently in the winter of 2022/2023. According to the NOAA, atmospheric rivers are relatively long, narrow regions in the atmosphere – like rivers in the sky – that transport most of the water vapor outside of the tropics. These columns of vapor move with the weather, carrying an amount of water vapor roughly equivalent to the average flow of water at the mouth of the Mississippi River. When the atmospheric rivers make landfall, they often release this water vapor in the form of rain or snow. This can be seen in Figure 4-63.

Figure 4-63 Atmospheric Rivers



Source: NOAA

Although atmospheric rivers come in many shapes and sizes, those that contain the largest amounts of water vapor and the strongest winds can create extreme rainfall and floods, often by stalling over watersheds vulnerable to flooding. These events can disrupt travel, induce mudslides and cause catastrophic damage to life and property. A well-known example is the "Pineapple Express," a strong atmospheric river that can bring moisture from the tropics near Hawaii over to the U.S. West Coast.

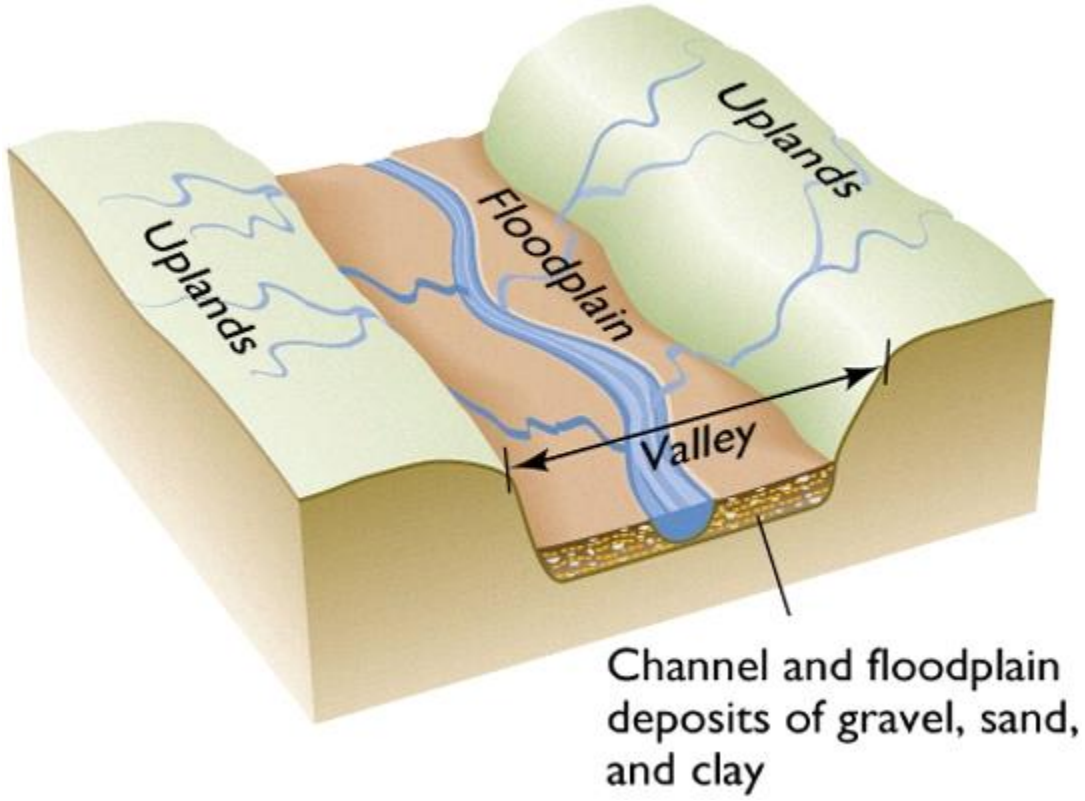
Not all atmospheric rivers cause damage; most are weak systems that often provide beneficial rain or snow that is crucial to the water supply. Atmospheric rivers are a key feature in the global water cycle and are closely tied to both water supply and flood risks — particularly in the western United States.

While atmospheric rivers are responsible for great quantities of rain that can produce flooding, they also contribute to beneficial increases in snowpack. A series of atmospheric rivers fueled the strong winter storms that battered the U.S. West Coast from western Washington to southern California from Dec. 10–22, 2010, producing 11 to 25 inches of rain in certain areas. These rivers also contributed to the snowpack in the Sierras, which received 75 percent of its annual snow by Dec. 22, the first full day of winter. This also occurred in and around the City in the winter of 2022/2023. In 2023, it resulted in two federal disaster declarations.

Location and Extent

The area adjacent to a channel is the floodplain (see Figure 4-64). Floodplains are illustrated on inundation maps, which show areas of potential flooding and water depths. In its common usage, the floodplain most often refers to that area that is inundated by the 100-year flood, the flood that has a one percent chance in any given year of being equaled or exceeded (1% annual chance flood). The 1% annual chance flood is the national standard to which communities regulate their floodplains through the National Flood Insurance Program (NFIP). The 500-year flood is the flood that has a 0.2 percent chance of being equaled or exceeded in any given year (0.2% annual chance flood). The potential for flooding can change and increase through various land use changes and changes to land surface, which result in a change to the floodplain. A change in environment can create localized flooding problems inside and outside of natural floodplains by altering or confining natural drainage channels. These changes are most often created by human activity.

Figure 4-64 Floodplain Schematic



Source: FEMA

Hydrologic Regions

According to Cal DWR, California is divided into 10 hydrologic regions The City is traversed by one hydrologic region:

- The South Coast hydrologic region (HR) covers approximately 6.78 million acres (10,600 square miles) of the southern California watershed that drains to the Pacific Ocean. The HR is bounded on the west by the Pacific Ocean and the watershed divide near the Ventura-Santa Barbara County line. The

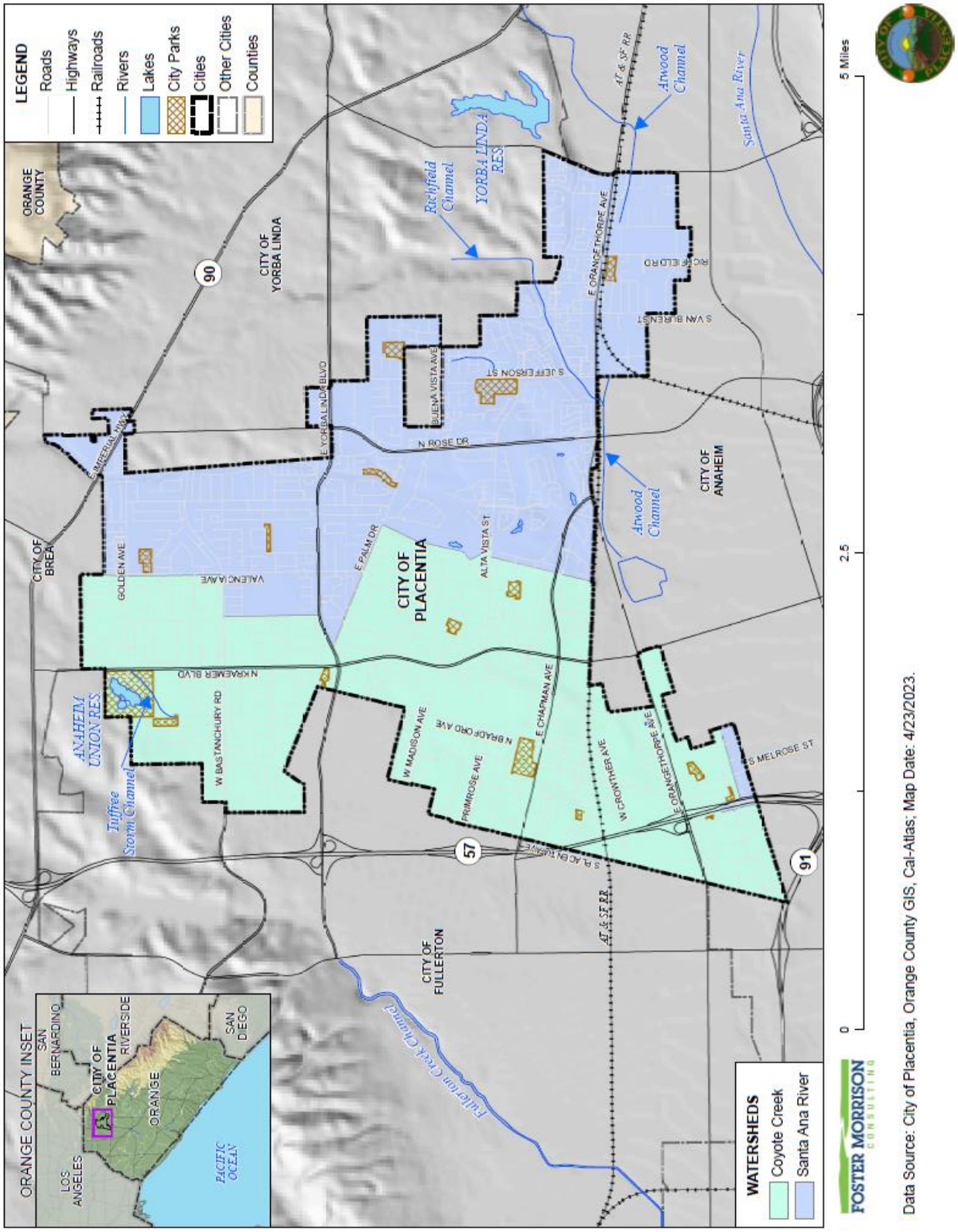
northern boundary corresponds to the crest of the Transverse Ranges through the San Gabriel and San Bernardino mountains. The eastern boundary lies along the crest of the San Jacinto Mountains and low-lying hills of the Peninsular Range that form a drainage boundary with the Colorado River HR. The southern boundary is the international boundary with the Republic of Mexico. Significant geographic features include the coastal plain, the central Transverse Ranges, the Peninsular Ranges, and the San Fernando, San Gabriel, Santa Ana River, and Santa Clara River valleys. The South Coast HR includes all of Orange County, most of San Diego and Los Angeles Counties, parts of Riverside, San Bernardino, and Ventura counties, and a small amount of Kern and Santa Barbara Counties. According to 2020 census data, about 18 million people live within the boundaries of the South Coast HR, approximately 50 percent of the population of California. Because this HR amounts to only about 7 percent of the surface area of the State, this has the highest population density of any HR in California (DWR 1998). Major population centers include the metropolitan areas surrounding Ventura, Los Angeles, San Diego, San Bernardino, and Riverside.

A map of the California's hydrological regions is provided in Figure 4-65. A map of watersheds in the City is shown on Figure 4-66.

Figure 4-65 California Hydrologic Regions

Source: California Department of Water Resources

Figure 4-66 City of Placentia – Watersheds



Floodplain Mapping

FEMA established standards for floodplain mapping studies as part of the National Flood Insurance Program (NFIP). The NFIP makes flood insurance available to property owners in participating communities adopting FEMA-approved local floodplain studies, maps, and regulations. Floodplain studies that may be approved by FEMA include federally funded studies; studies developed by state, city, and regional public agencies; and technical studies generated by private interests as part of property annexation and land development efforts. Such studies may include entire stream reaches or limited stream sections depending on the nature and scope of a study.

Flood Insurance Study (FIS)

The FIS develops flood-risk data for various areas of the community that will be used to establish flood insurance rates and to assist the community in its efforts to promote sound floodplain management. The City is covered by the Orange County FIS (dated 03/21/2019).

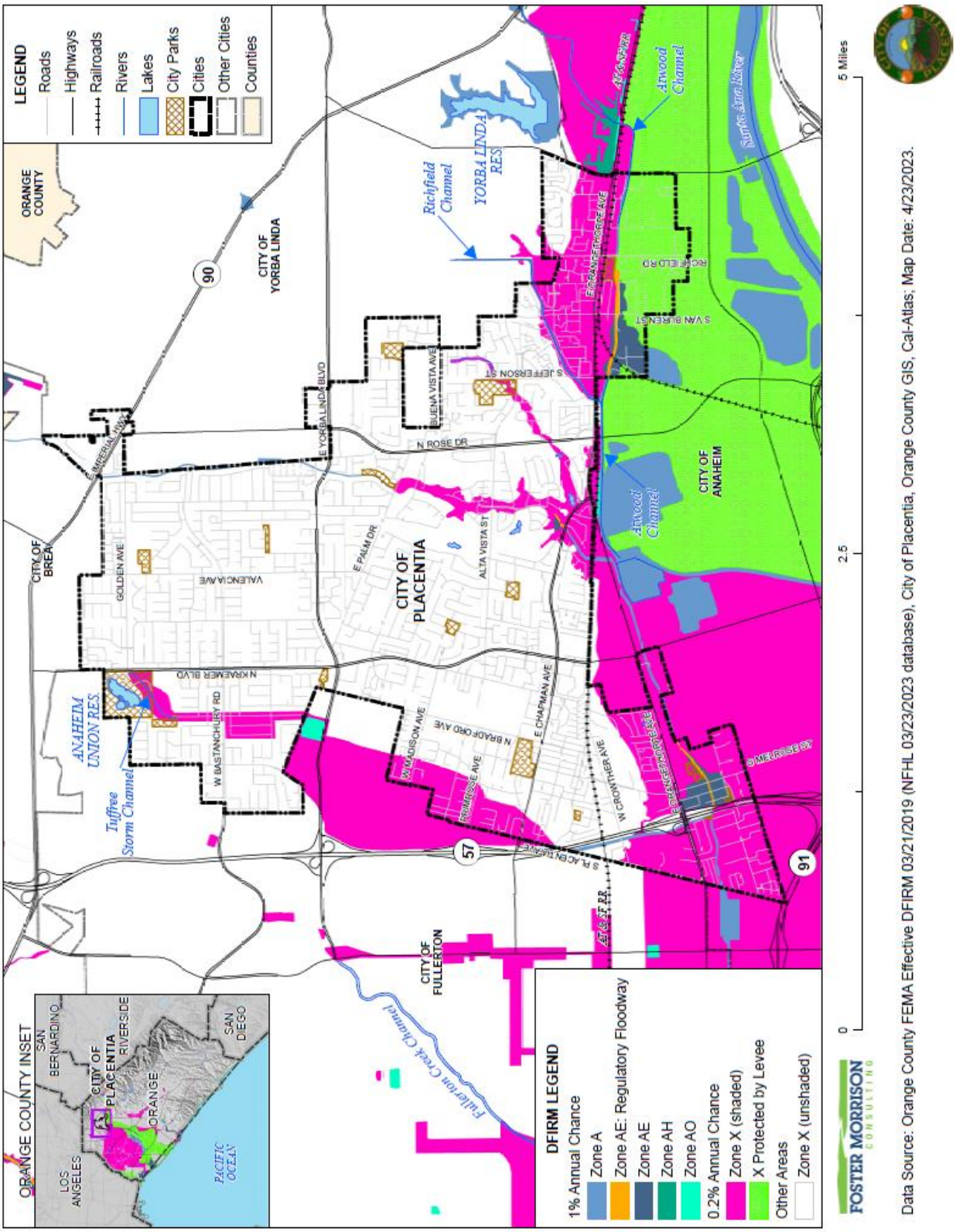
Digital Flood Insurance Rate Maps (DFIRM)

As part of its Map Modernization program, FEMA has been converting paper FIRMS to digital FIRMs (DFIRMs). These digital maps:

- Incorporate the latest updates (Letters of Map Revision (LOMRs) and Letters of Map Amendment (LOMAs)
- Utilize community supplied data
- Verify the currency of the floodplains and refit them to community supplied basemaps
- Upgrade the FIRMs to a GIS database format to set the stage for future updates and to enable support for GIS analyses and other digital applications
- Solicit community participation

DFIRMs for each county have been developed and are being used for the flood analysis for this LHMP. The City is covered by the Orange County DFIRM (dated 03/21/2019). FEMA DFIRM flood zones are shown in Figure 4-67.

Figure 4-67 City of Placentia – FEMA DFIRM Flood Zones



Each of the DFIRM flood zones that begins with the letter 'A' depict the Special Flood Hazard Area, or the 1% annual chance flood event (commonly referred to as the 100-year flood). Table 4-68 explains the difference between DFIRM mapped flood zones within the City and within the flood map extent.

Table 4-68 City of Placentia – DFIRM Flood Zones

Flood Zone	Description
A	1% annual chance flooding: No base flood elevations provided
AE	1% annual chance flooding: Base flood elevations provided
AE Floodway	1% annual chance flood: Regulatory floodway; Base flood elevations provided
AH	1% annual chance flood areas of shallow flooding between one to three feet deep. Regulatory floodway; Base flood elevations provided
AO	1% annual chance flooding: sheet flow areas. BFEs derived from detailed hydraulic analyses are shown in this zone.
Shaded X	0.2% annual chance flooding: The areas between the limits of the 1% annual chance flood and the 0.2-percent-annual-chance (or 500-year) flood
X Protected by Levee	Areas protected by levees from 1% annual chance flood event. Levee protection places these areas in the 0.2% annual chance flood zone.
X (unshaded)	No flood hazard

Source: FEMA

Flood extents are usually measured in depths of flooding, aerial extent of the floodplain, as well as flood zones that a location falls in (i.e., 1% or 0.2% annual chance flood). Expected flood depths in the City vary and are not well defined. Flood durations in the City tend to be short to medium term, or until either the storm drainage system can catch up or flood waters move downstream.

Also of interest is the aerial extent of flooding (i.e. the land area affected by the various flood zones). GIS was used to calculate flooded acres by FEMA flood zones and land use categories. The Placentia parcel layer and FEMA DFIRM were intersected, and flooded acres were calculated by detailed FEMA floodzone. Each segment divided by the intersection of flood zone and parcels was calculated for acres. In the tables below, the 1% and 0.2% annual chance flood zones are summarized and then split out by land use, their total flooded acres, total improved acres, and percent of improved acres that are flooded. The following tables represent a detailed and summary analysis of total acres for each FEMA DFIRM flood zone. Table 4-69 gives a summary of acres in the 1% and 0.2% annual chance floodplains. Table 4-70 provides flooded acre results for the entire Planning Area by land use and detailed flood zone.

Table 4-69 City of Placentia – Geographical DFIRM Summary Flood Extents

Flood Zone	Total Acres	% of Total Acres	Improved Acres	% of Total Improved Acres	Unimproved Acres	% of Total Unimproved Acres
1% Annual Chance Flood	94	2.75%	45	1.66%	49	6.85%
0.2% Annual Chance Flood*	764	22.34%	597	22.09%	167	23.28%
Other Areas	2,561	74.92%	2,061	76.25%	500	69.86%
Placentia Total	**3,418**	**100.00%**	**2,703**	**100.00%**	**715**	**100.00%**

Source: FEMA 3/21/2019 DFIRM
*This acre count only includes those acres in the 0.2% annual chance floodplain, exclusive of the 1% annual chance floodplain. The 0.2% annual chance flood, in actuality, also includes all acres in the 1% annual chance floodplain.

Table 4-70 City of Placentia – Geographical DFIRM Detailed Flood Extents by Land Use

Flood Zone	Total Acres	% of Total Acres	Improved Acres	% of Total Improved Acres	Unimproved Acres	% of Total Unimproved Acres
1% Annual Chance Flood						
Zone A						
Agricultural	0.8	0.024%	0.0	0.0%	0.8	0.115%
Commercial	0.7	0.019%	0.3	0.012%	0.3	0.048%
Industrial	1.0	0.029%	0.7	0.025%	0.3	0.048%
Miscellaneous	0.0	0.0%	0.0	0.0%	0.0	0.0%
Residential	3.6	0.105%	1.1	0.040%	2.5	0.350%
Tax Exempt	21.7	0.636%	0.8	0.029%	20.9	2.929%
Unknown	7.3	0.213%	0.0	0.0%	7.3	1.016%
Zone A Total	**35.1**	**1.026%**	**2.8**	**0.105%**	**32.2**	**4.505%**
Zone AE						
Agricultural	0.0	0.0%	0.0	0.0%	0.0	0.0%
Commercial	2.4	0.071%	1.2	0.044%	1.2	0.173%
Industrial	26.3	0.771%	22.1	0.818%	4.2	0.594%
Miscellaneous	0.0	0.0%	0.0	0.0%	0.0	0.0%
Residential	14.0	0.410%	12.7	0.470%	1.3	0.183%
Tax Exempt	5.4	0.159%	4.1	0.152%	1.3	0.183%
Unknown	1.9	0.054%	0.0	0.0%	1.9	0.259%
Zone AE Total	**50.1**	**1.465%**	**40.1**	**1.484%**	**10.0**	**1.393%**
Zone AE Floodway						
Agricultural	0.0	0.0%	0.0	0.0%	0.0	0.0%
Commercial	0.1	0.002%	0.1	0.002%	0.0	0.0%
Industrial	1.5	0.045%	0.7	0.027%	0.8	0.113%
Miscellaneous	0.0	0.0%	0.0	0.0%	0.0	0.0%
Residential	0.7	0.021%	0.7	0.027%	0.0	0.001%
Tax Exempt	5.5	0.161%	0.4	0.016%	5.1	0.708%
Unknown	1.0	0.028%			1.0	0.135%
Zone AE Floodway Total	**8.8**	**0.257%**	**1.9**	**0.071%**	**6.8**	**0.957%**
1% Annual Chance Flood Total	**93.9**	**2.747%**	**44.9**	**1.660%**	**49.0**	**6.854%**
0.2% Annual Chance Flood*						
Zone X (shaded)						

Flood Zone	Total Acres	% of Total Acres	Improved Acres	% of Total Improved Acres	Unimproved Acres	% of Total Unimproved Acres
Agricultural	1.9	0.056%	0.0	0.0%	1.9	0.265%
Commercial	113.5	3.320%	95.6	3.538%	17.8	2.495%
Industrial	98.1	2.871%	84.9	3.143%	13.2	1.847%
Miscellaneous	0.0	0.001%	0.0	0.0%	0.0	0.007%
Residential	305.7	8.944%	267.0	9.877%	38.7	5.417%
Tax Exempt	70.6	2.065%	44.6	1.649%	26.0	3.636%
Unknown	46.6	1.365%	0.0	0.0%	46.6	6.522%
Zone X (shaded) Total	**636.5**	**18.622%**	**492.1**	**18.207%**	**144.4**	**20.190%**
X Protected by Levee						
Agricultural	0.0	0.0%	0.0	0.0%	0.0	0.0%
Commercial	0.1	0.003%	0.1	0.004%	0.0	0.0%
Industrial	99.2	2.902%	96.8	3.580%	2.4	0.341%
Miscellaneous	0.0	0.0%	0.0	0.0%	0.0	0.0%
Residential	8.3	0.243%	8.0	0.296%	0.3	0.043%
Tax Exempt	8.3	0.242%	0.0	0.0%	8.3	1.155%
Unknown	11.1	0.326%	0.0	0.0%	11.1	1.556%
X Protected by Levee Total	**127.0**	**3.716%**	**104.9**	**3.880%**	**22.1**	**3.095%**
0.2% Annual Chance Flood Total	**763.5**	**22.338%**	**597.0**	**22.087%**	**166.5**	**23.284%**
Other Areas						
Zone X (unshaded)						
Agricultural	22.8	0.666%	0.4	0.015%	22.4	3.127%
Commercial	279.8	8.185%	244.8	9.059%	34.9	4.883%
Industrial	70.7	2.069%	68.2	2.522%	2.5	0.354%
Miscellaneous	0.8	0.025%	0.0	0.0%	0.8	0.119%
Residential	1727.1	50.528%	1545.2	57.170%	181.8	25.425%
Tax Exempt	324.6	9.498%	202.3	7.486%	122.3	17.101%
Unknown	134.8	3.945%	0.0	0.0%	134.8	18.854%
Zone X (unshaded) Total	**2560.7**	**74.915%**	**2061.0**	**76.253%**	**499.7**	**69.862%**
Other Areas Total	**2560.7**	**74.915%**	**2061.0**	**76.253%**	**499.7**	**69.862%**
Grand Total	**3418.1**	**100.000%**	**2702.9**	**100.000%**	**715.2**	**100.000%**

Source: FEMA 3/21/2019 DFIRM

*This acre count only includes those acres in the 0.2% annual chance floodplain, exclusive of the 1% annual chance floodplain. The 0.2% annual chance flood, in actuality, also includes all acres in the 1% annual chance floodplain.

Department of Water Resource (DWR) Floodplain Mapping

FEMA DFIRMs are just one measure of flood risk in a community. Also to be considered when evaluating the flood risks in the City are various floodplain maps developed by Cal DWR for various areas throughout California, including Placentia.

DWR Best Available Maps

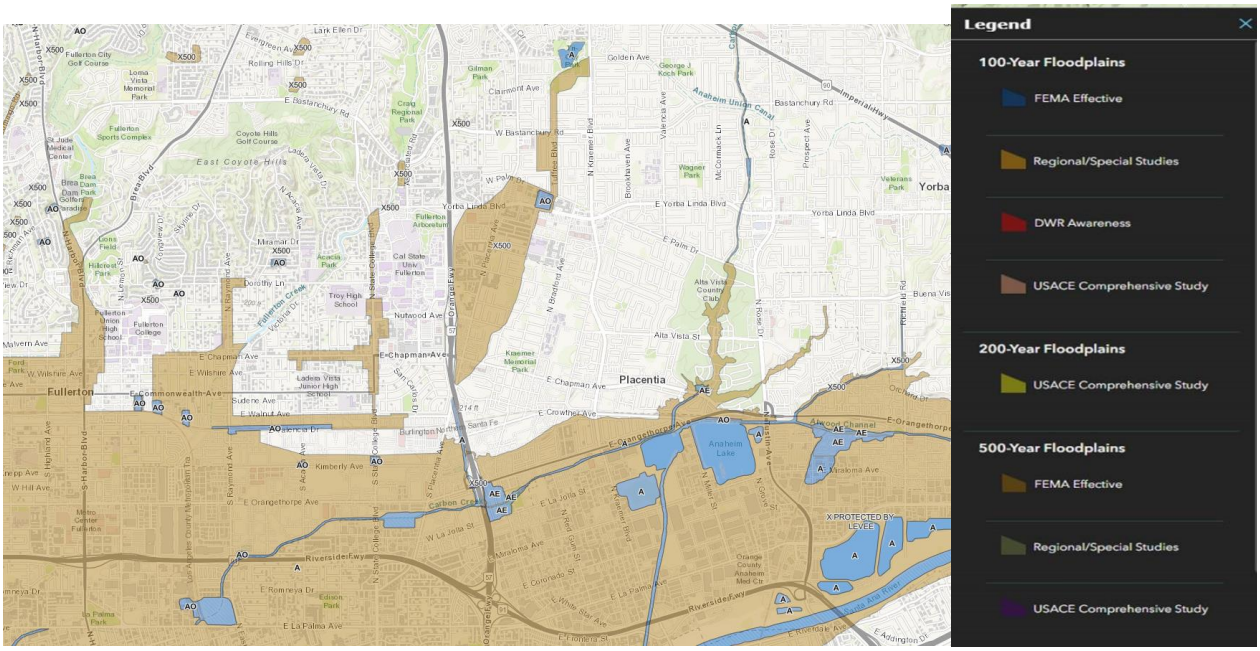
The FEMA regulatory maps provide just one perspective on flood risks in the City. Senate Bill 5 (SB 5), enacted in 2007, authorized the California DWR to develop the Best Available Maps (BAM) displaying 100- and 200-year floodplains originally for areas located within the Sacramento-San Joaquin (SAC-SJ) Valley watershed. DWR has expanded the BAM to cover all counties in the State and to include 500-year floodplains.

Different than the FEMA DFIRMs which have been prepared to support the NFIP and determining the need for flood insurance, the BAMs are provided for informational purposes and are intended to reflect current 100- and 500-year (0.2%) event risks using the best available data. The 100-year floodplain limits on the BAM are a composite of multiple 100-year floodplain mapping sources. It is intended to show all currently identified areas at risk for a 100-year flood event, including FEMA's 100-year floodplains. The BAM maps are comprised of different engineering studies performed by FEMA, Corps, and DWR for assessment of potential 100- and 500-year floodplain areas. These studies are used for different planning and/or regulatory applications. They are for the same flood frequency; however, they may use varied analytical and quality control criteria depending on the study type requirements.

The value in the BAMs is that they provide a bigger picture view of potential flood risk to the City than that provided in the FEMA DFIRMs. This provides the community and residents with an additional tool for understanding potential flood hazards not currently mapped as a regulated floodplain. Improved awareness of flood risk can reduce exposure to flooding for new structures and promote increased protection for existing development. Informed land use planning will also assist in identifying levee maintenance needs and levels of protection. By including the FEMA 100-year floodplain, it also supports identification of the need and requirement for flood insurance.

These BAM floodplain maps for the City of Placentia can be seen in Figure 4-68.

Figure 4-68 City of Placentia– Best Available Map



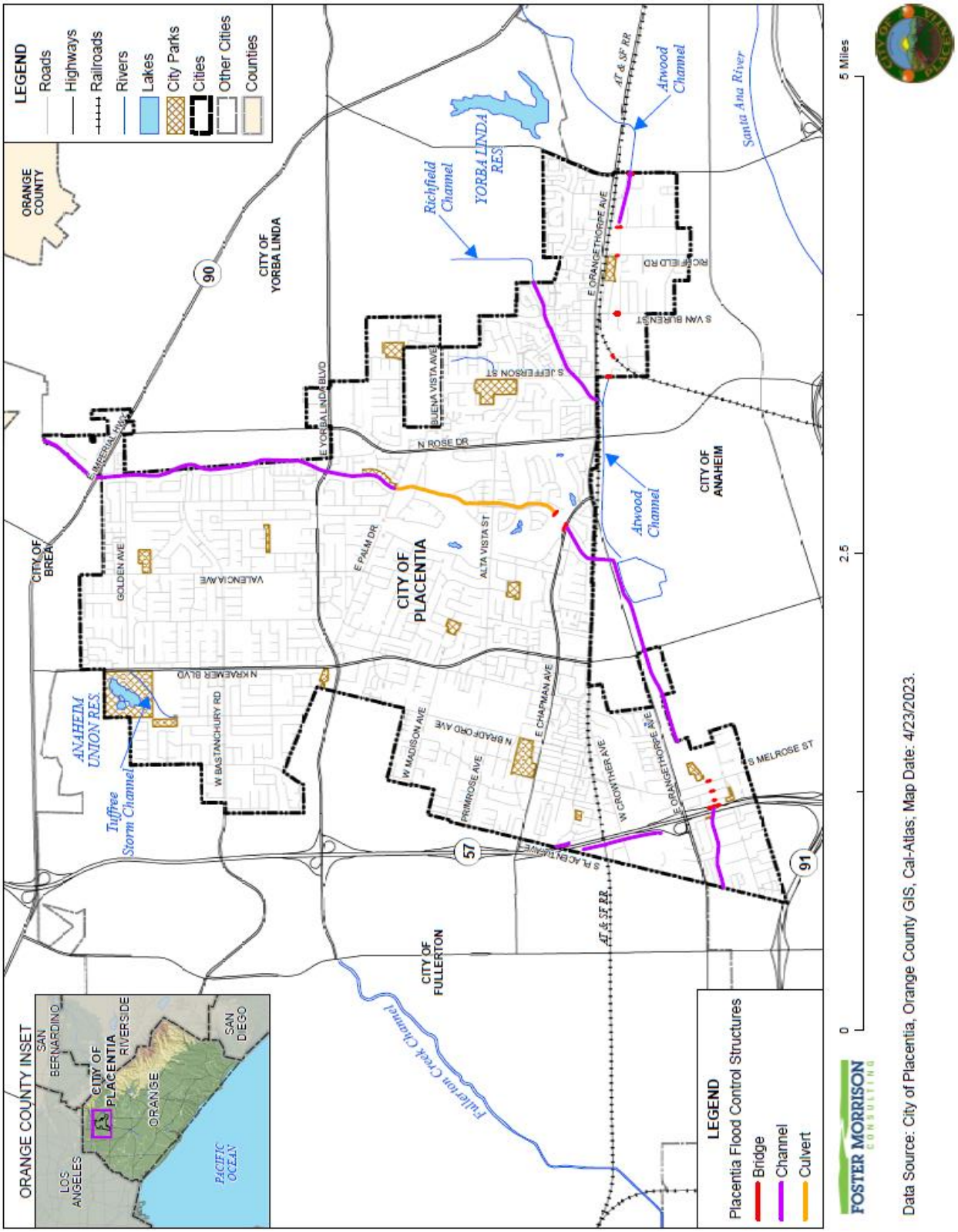
Source: California DWR, map created 03/16/2023

Legend explanation: **Blue** - FEMA 100-Year, **Orange** – Local 100-Year (developed from local agencies), **Red** – DWR 100-year (Awareness floodplains identify the 100-year flood hazard areas using approximate assessment procedures.), **Pink** – USACE 100-Year (2002 Sac and San Joaquin River Basins Comp Study), **Yellow** – USACE 200-Year (2002 Sac and San Joaquin River Basins Comp Study), **Tan** – FEMA 500-Year, Grey – Local 500-Year (developed from local agencies), **Purple** – USACE 500-Year (2002 Sac and San Joaquin River Basins Comp Study).

Other Flood Control Systems in Placentia

In addition to the levees that protect the City, there are other flood control systems in place. These are shown on Figure 4-69. While these might slow down or prevent areas from flooding, they were not designed to provide the level of protection that a certified levee provides.

Figure 4-69 City of Placentia – Flood Control Structures



Past Occurrences

Disaster Declaration History

There have been 20 state and 19 federal disaster declarations due to flooding in Orange County as shown in Table 4-71. Specific disaster numbers for these state and federal disasters are shown in Table 4-4 above.

Table 4-71 Orange County Disaster Declarations from Flood 1950-2023

Disaster Type	State Declarations		Federal Declarations	
	Count	Years	Count	Years
Flood (with heavy rain and storms)	21	1950, 1955, 1958 (twice), 1969, 1978, 1980, 1982, 1988, 1992, 1993, 1995 (twice), 1997, 1998, 2005 (twice), 2011, 2017, 2021, 2022	19	1955, 1958, 1969, 1978, 1980, 1982, 1983, 1988, 1992, 1993, 1995 (twice), 1998, 2005 (twice), 2011, 2017, 2023 (twice)

Source: Cal OES, FEMA

NCDC Events

The NCDC tracks flood events for Orange County since 1996. These are shown on Table 4-72. Specific events affecting Placentia are discussed below the table.

*Table 4-72 Orange County NCDC Flooding Events 1/1/1996-10/31/2022**

Event Type	Number of Events	Deaths	Deaths (indirect)	Injuries	Injuries (indirect)	Property Damage	Crop Damage
Coastal Flood	8	0	0	2	0	$75,000	$0
Flash Flood	51	2	2	0	0	$64,730,000	$480,000
Flood	49	0	0	0	3	$40,735,000	$242,000
Heavy Rain	37	1	0	19	0	$36,820,000	$0
Total	**145**	**3**	**2**	**21**	**3**	**$142,360,000**	**$722,000**

Source: NCDC

*Note: Losses reflect totals for all impacted areas, some of which fell outside of the City and outside of Orange County.

February 14, 1998 – a series of strong low pressure troughs moved rapidly through California from the west. During the afternoon and evening hours, most coastal areas received between one and two inches of rain, with as much as four inches reported in Placentia, in northeast Orange County.

January 9, 2005 – Widespread flooding was reported.

December 19, 2013 – Heavy rains caused urban street flooding and standing water up to 6 inches deep along roads.

February 28, 2014 – Fire department reported a swift water rescue in a storm drain at Placentia and Crowther Avenues, just north of Anaheim.

December 12, 2014 – A spotter reported flooding on Bastanchury Road with streets under up to a foot of standing water. Flooding was also reported by a spotter at the Miraloma and Lakeview Avenue low water crossing with 6 inches of water on the roadway. A nearby mesonet station in Yorba Linda recorded a 3-hour rain total of 1.06 inches.

Hazard Mitigation Planning Committee Events

The Santa Ana River, flowing through the heart of Orange County (and next to the City of Placentia) to the Pacific Ocean is the City's greatest flood threat. Research of flooding in Orange County and the City illustrates these flood hazard issues, citing loss of life as well as damage to personal and public property.

According to the book "*A Children's History of Placentia*" (Carpenter, 1984), one such flood occurred in **1938**, wiping out roads, bridges, and railroads near the river when an 8-foot wall of water swept out of the Santa Ana Canyon. The area from Placentia to Santa Ana turned into a shallow lake. Thousands were left homeless. Regionally, the Army Corps of Engineers estimated that the disaster inflicted $78.6 million in damage — $1.7 billion in today's money — and killed 87 people, with another nine reported missing. Nearly half of the dead — 43, according to historians — were from the Atwood area of Placentia (see Figure 4-70). The flood and its damage were a catalyst for construction of Prado Dam, developed as part of the Army Corps of Engineers flood control protection plan. Government officials estimated that today without the protection of Prado Dam, a flood of this magnitude would cause as many as 3,000 deaths and top $25 billion in damages. More than 110 acres would be flooded with 3 feet of water and 255,000 structures damaged as documented by S. Gold, in the Los Angeles Times, in 1999.

Figure 4-70 City of Placentia – 1938 Flooding

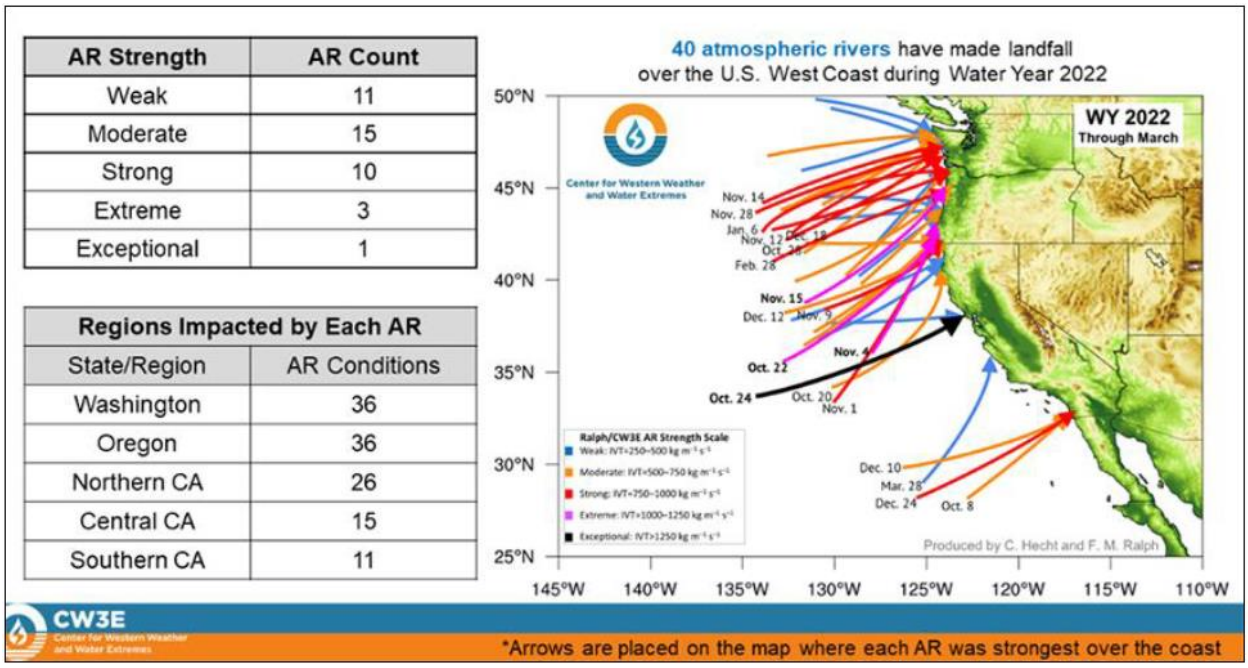
Source: Orange County Archives via LA Times story - https://www.latimes.com/california/story/2023-01-11/1938-flood-southern-california

Residents also reported damaging floods caused by the Santa Ana River, known as the "Great Floods," as early as 1770. A massive flood recorded on **January 7, 1770** is in the Notes of Father John Crespi. Major floods in Orange County on the Santa Ana River have occurred in **1810**, **1815**, **1825**, **1884**, **1891**, **1916**, **1927, 1938**, **1969**, **1983**, and **1993**. The greatest flood in terms of water flow was in **1862** with an estimated flow rate of 317,000 cubic feet per second (cfs). This was three times greater than the Great Flood of **1938** estimated at 110,000 cfs. The most damaging flood in terms of cost was the Great Flood of **1969**. The City could not provide damage estimates.

In **2017**, the City did lose some trees that were downed during the heavy rains and storms. There were flooded streets and intersections, but no roads were forced to close.

The winter of **2022/2023** saw heavy rain events. Rains in the City caused localized flooding to occur. The City only had minor issues from this event, though there was a disaster declaration for Orange County. This was due to the fact that some of these events were from atmospheric river events (as shown on Figure).

Figure 4-71 City of Placentia – Atmospheric River Flood Events in 2022



Source: Center for Western Weather and Water Extremes

In **2023**, Hurricane Hillary did cause some locally heavy rains, but its effects in the City were minor.

Probability of Future Occurrences

1% Annual Chance Flood

Occasional—This is the flood that has a 1- percent chance of being equaled or exceeded in the City in any given year. Thus, the 1% annual chance flood could occur more than once in a relatively short period of time.

0.2% Annual Chance Flood

Unlikely—The flood has a 0.2 percent chance of being equaled or exceeded in the City in any given year.

Climate Change and Flood

Climate change and its effect on flooding is discussed using three sources:

- 2021 CAS
- Cal-Adapt
- National Center for Atmospheric Research

California Climate Adaptation Strategy

According to the CAS, climate change may affect flooding in California and the City. While average annual rainfall may increase or decrease slightly, the intensity of individual rainfall events is likely to increase during the 21st century. It is possible that average soil moisture and runoff could decline, however, due to increasing temperature, evapotranspiration rates, and spacing between rainfall events. Reduced snowpack and increased number of intense rainfall events are likely to put additional pressure on water infrastructure which could increase the chance of flooding associated with breaches or failures of flood control structures such as levees and dams.

Cal Adapt

Cal Adapt future precipitation projections were shown in Figure 4-35 in Section 4.3.3 Cal-Adapt noted that, on average, the projections show little change in total annual precipitation in California.

National Center for Atmospheric Research

Also, according to the National Center for Atmospheric Research in Boulder, Colorado, atmospheric rivers are likely to grow more intense in coming decades, as climate changes warms the atmosphere enabling it to hold more water.

Vulnerability Assessment

Vulnerability—Medium

Historically, the City has always been at risk to flooding during the rainy season from November through April. The Orange County FIS noted that floods result from prolonged heavy rainfall and are characterized by high peak flows of moderate duration and by a large volume of runoff. Flooding is more severe when antecedent rainfall has resulted in saturated ground conditions. Several areas of Placentia are subject to flooding by the overtopping of rivers and creeks, levee failure, and the failure of urban drainage systems that cannot accommodate large volumes of water during severe rainstorms. In addition to the major rivers (like the Santa Ana River), there are streams, channels, canals, and creeks that serve the drainage needs of the City and communities surrounding it. There is significant threat of flooding in areas of the City from some of these streams. These streams can be prone to rapid flooding with little notice.

Vulnerability of the community is discussed in multiple sections that detail how this hazard can affect the City. These sections include assets at risk, impacts, and how future development can be affected by this hazard. The methodologies for these following sections are discussed below.

Methodology (Parcel and Structures)

Orange County 2022 Parcel/Assessor Data wase used as the basis for the City inventory of parcels, values, and acres. Orange County, including Placentia, has a FEMA effective DFIRM dated 3/21/2019, which was obtained from FEMA's National Flood Hazard Layer to perform the flood analysis. In some cases, there are parcels in multiple flood zones, such as Zone A, Zone X, or Shaded X. GIS was used to create a centroid, or point representing the center of the parcel polygon. DFIRM flood data was then overlaid on

the parcel layer. For the purposes of this analysis, the flood zone that intersected a parcel centroid was assigned the flood zone for the entire parcel. The parcels and associated values were segregated and analyzed in this fashion to determine parcels and values at risk to the flood hazard for the Placentia Planning Area.

Methodology (Loss Estimate)

The loss estimate for flood is based on the total of improved and contents value. Improved parcels include those with improved structure values identified in the Orange County Assessor's database. Only improved parcels and the value of their structure improvements were included in the flood loss analysis. The value of land is not included in the loss estimates as generally the land is not at loss to floods, just the value of improvements and structure contents. The land value is represented in the detailed flood tables, but is primarily present to show the value of the land associated with each flood zone.

The land use categories for the City (derived from general plan land use descriptions) were used to develop estimated content replacement values (CRV) that are potentially at loss from hazards, using FEMA Hazus methodologies as previously described in Section 4.2. The CRVs were added to the improved parcel values.

Once the potential value of affected parcels was calculated, a damage factor was applied to obtain loss estimates by flood zone. When a flood occurs, seldom does the event cause total loss of an area or building. Potential losses from flooding are related to a variety of factors including flood depth, flood velocity, building type, and construction. The percentage of damage is primarily related to the flood depth. FEMA's flood benefit/cost module uses a simplified approach to model flood damage based on building type and flood depth. The values at risk in the flood analysis tables were refined by applying an average damage estimation of 20% of the total building value. The 20% damage estimate utilized FEMA's Flood Building Loss Table based on an assumed average flood depth of 2 feet. The end result of the flood hazard analysis is an inventory of the numbers, types, and values of parcels subject to the flood hazard.

Limitations

It also should be noted that the resulting flood loss analysis may actually be more or less than that presented in the below tables as the City may include structures located within the 1% or 0.2% annual chance floodplain that are elevated at or above the level of the base flood elevation, according to local floodplain development requirements. Also, it is important to keep in mind that these assessed values may be well below the actual market value of improved parcels located within the floodplain due primarily to Proposition 13.

Assets at Risk from 1% and 0.2% Annual Chance Flooding

The City of Placentia has mapped FEMA flood hazard areas. Assets at risk from flood include: people and populations; structures; critical facilities and infrastructure, and community lifelines; natural, historic, and cultural resources; and economic assets and community activities of value. These are discussed in the following sections.

Population at Risk

All people and populations located in the 1% and 0.2% annual chance floodplains are at some risk to flooding. Certain vulnerable populations located within areas prone to flooding may be at increased risk to this hazard, especially during a large event with minimal advance notice. These vulnerable populations include: the unhoused, those with limited mobility, and those that lack the resources to leave the area.

The 2019 City of Placentia General Plan Safety Element noted that the La Jolla community in the southwest corner of Placentia is located in the 100-year flood zone, with a portion in the 500-year flood zone. The La Jolla community is one of the two communities designated by the California Environmental Protection Agency as a disadvantaged area (i.e., more vulnerable to climate change due to the confluence of existing health and economic factors).

To further evaluate the impact to the residential population within the City, utilizing the parcel/structure hazard analysis methodology described above, an estimate of residents who residents living in the 1% and 0.2% annual chance floodplains was conducted. The residential parcel centroids that intersect the DFIRM flood zones were counted and multiplied by the 2020 Census Bureau average household factors for the City of Placentia (3.14). According to this analysis, there is a total population of 355 and 4,500 residents in Placentia in 1% annual chance and 0.2% annual chance flood zones, respectively. This is shown in Table 4-73. It should be noted that all of the residents in the 1% annual chance floodplain would also fall in the 0.2% annual chance floodplain.

Table 4-73 City of Placentia – Improved Residential Parcels and Population by FEMA DFIRM 1% and 0.2% Annual Chance Flood Zone

Jurisdiction	1% Annual Chance		0.2% Annual Chance	
	Improved Residential Parcels	Population	Improved Residential Parcels	Population
Placentia	113	355	1,433	4,500

Source: FEMA 3/21/2019 DFIRM, US Census Bureau, Orange County 2022 Parcel/Assessor's Data

Structures

Certain structures in the City are vulnerable to flooding. Table 4-74 and Table 4-75 contain flood analysis results for the Placentia Planning Area utilizing the methodology described above. These tables show the number of parcels, structures (improved parcels) and values at risk to the 1% and 0.2% annual chance event for the City of Placentia. Table 4-74 shows a summary of the value of total and improved parcels by 1% and 0.2% annual chance flood zone. Table 4-75 shows the total and improved parcels by land use category in each detailed flood zone by land use for the City. The estimated contents replacement values for these tables are based on the CRV factors detailed in Table 4-7.

*Table 4-74 City of Placentia – Count and Value of Parcels (and Structures) by FEMA DFIRM 1% and 0.2% Annual Chance Flood Zone**

Flood Zone	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
1% Annual Chance Flood	202	123	$44,126,648	$22,594,817	$25,526,660	$92,513,080
0.2% Annual Chance Flood**	1,886	1,664	$865,760,095	$553,493,188	$474,661,696	$1,906,933,106
Other Areas	10,715	10,126	$3,663,016,708	$2,124,391,977	$1,271,875,148	$7,067,186,205
Grand Total	**12,803**	**11,913**	**$4,572,903,451**	**$2,700,479,982**	**$1,772,063,504**	**$9,066,632,391**

Source: FEMA 3/21/2019 DFIRM, Orange County 2022 Parcel/Assessor Data

*With respect to improved parcels within the floodplain, the actual structures on the parcels may not be located within the actual floodplain, may be elevated and or otherwise outside of the identified flood zone

**This parcel count only includes those parcels in the 0.2% annual chance floodplain, exclusive of the 1% annual chance floodplain. The 0.2% annual chance flood, in actuality, also includes all parcels in the 1% annual chance floodplain.

*Table 4-75 City of Placentia – Count and Value of Parcels (and Structures) by Detailed FEMA DFIRM Flood Zone and Land Use**

Flood Zone / Land Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
1% Annual Chance Flood						
Zone A						
Agricultural	1	0	$30,748	$0	$0	$30,748
Commercial	1	0	$482,908	$0	$0	$482,908
Industrial	0	0	$0	$0	$0	$0
Miscellaneous	0	0	$0	$0	$0	$0
Residential	9	0	$90,955	$0	$0	$90,955
Tax Exempt	22	0	$2,934,912	$0	$0	$2,934,912
Unknown	9	0	$0	$0	$0	
Zone A Total	**42**	**0**	**$3,539,523**	**$0**	**$0**	**$3,539,523**
Zone AE Floodway						
Agricultural	0	0	$0	$0	$0	$0
Commercial	0	0	$0	$0	$0	$0
Industrial	1	0	$103,056	$0	$0	$103,056
Miscellaneous	0	0	$0	$0	$0	$0
Residential	5	5	$1,002,304	$991,006	$495,503	$2,488,813
Tax Exempt	8	0	$147,406	$0	$0	$147,406
Unknown	5	0	$0	$0	$0	$0
Zone AE Floodway Total	**19**	**5**	**$1,252,766**	**$991,006**	**$495,503**	**$2,739,275**

Flood Zone / Land Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Zone AE						
Agricultural	0	0	$0	$0	$0	$0
Commercial	4	4	$2,243,828	$745,218	$745,218	$3,734,264
Industrial	9	6	$12,210,261	$13,856,642	$20,784,962	$47,116,820
Miscellaneous	0	0	$0	$0	$0	$0
Residential	122	108	$24,277,294	$7,001,951	$3,500,977	$34,780,222
Tax Exempt	4	0	$602,976	$0	$0	$602,976
Unknown	2	0	$0	$0	$0	$0
Zone AE Total	**141**	**118**	**$39,334,359**	**$21,603,811**	**$25,031,157**	**$86,234,282**
1% Annual Chance Flood Hazard Total	**202**	**123**	**$44,126,648**	**$22,594,817**	**$25,526,660**	**$92,513,080**
0.2% Annual Chance Flood**						
Zone X (shaded)						
Agricultural	5	0	$1,779	$0	$0	$1,779
Commercial	64	52	$81,438,521	$50,644,224	$50,644,224	$182,788,889
Industrial	80	72	$120,805,659	$52,790,464	$79,185,696	$252,781,819
Miscellaneous	1	0	$0	$0	$0	$0
Residential	1,499	1,363	$504,251,927	$324,651,751	$162,325,886	$991,229,564
Tax Exempt	37	12	$22,040,221	$28,225,899	$42,338,850	$92,604,970
Unknown	20	0	$0	$0	$0	$0
Zone X (shaded) Total	**1,706**	**1,499**	**$728,538,107**	**$456,312,338**	**$334,494,656**	**$1,519,407,021**
X Protected by Levee						
Agricultural	0	0	$0	$0	$0	$0
Commercial	1	1	$294,330	$73,581	$73,581	$441,492
Industrial	99	94	$123,208,680	$91,539,825	$137,309,733	$365,014,445
Miscellaneous	0	0	$0	$0	$0	$0
Residential	72	70	$13,330,336	$5,567,444	$2,783,726	$21,681,506
Tax Exempt	3	0	$388,642	$0	$0	$388,642
Unknown	5	0	$0	$0	$0	$0
X Protected by Levee Total	**180**	**165**	**$137,221,988**	**$97,180,850**	**$140,167,040**	**$387,526,085**

Flood Zone / Land Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
0.2% Annual Chance Flood Hazard Total**	**1,886**	**1,664**	**$865,760,095**	**$553,493,188**	**$474,661,696**	**$1,906,933,106**
Other Areas						
Zone X (unshaded)						
Agricultural	13	2	$1,216,646	$223,742	$223,742	$1,664,130
Commercial	171	158	$199,939,809	$181,111,426	$181,111,426	$570,033,680
Industrial	48	44	$78,152,504	$61,902,717	$92,854,081	$232,909,302
Miscellaneous	2	0	$76,908	$0	$0	$76,908
Residential	10,298	9,883	$3,339,881,562	$1,824,045,273	$912,022,674	$6,075,980,862
Tax Exempt	122	39	$43,749,279	$57,108,819	$85,663,225	$186,521,323
Unknown	61	0	$0	$0	$0	$0
Zone X (unshaded) Total	**10,715**	**10,126**	**$3,663,016,708**	**$2,124,391,977**	**$1,271,875,148**	**$7,067,186,205**
Other Areas Total	**10,715**	**10,126**	**$3,663,016,708**	**$2,124,391,977**	**$1,271,875,148**	**$7,067,186,205**
Grand Total	**12,803**	**11,913**	**$4,572,903,451**	**$2,700,479,982**	**$1,772,063,504**	**$9,066,632,391**

Source: FEMA 3/21/2019 DFIRM, Orange County 2022 Parcel/Assessor Data

*With respect to improved parcels within the floodplain, the actual structures on the parcels may not be located within the actual floodplain, may be elevated and or otherwise outside of the identified flood zone

**This parcel count only includes those parcels in the 0.2% annual chance floodplain, exclusive of the 1% annual chance floodplain. The 0.2% annual chance flood, in actuality, also includes all parcels in the 1% annual chance floodplain.

Structure Loss Estimates

Structures in the City have some measure of risk to flooding. Floods can affect the built environment of the City. Table 4-76 shows a summary table of loss estimates by flood zone for the Placentia Planning Area, and gives potential losses summarized by the 1% and 0.2% annual chance flood event with loss estimate and loss ratios for the Placentia Planning Area. The loss ratio is the loss estimate divided by the total potential exposure (i.e., total of improved and contents value for all parcels located in the Planning Area as shown in Table 4-8) and displayed as a percentage of loss. FEMA considers loss ratios greater than 10% to be significant and an indicator that a community may have more difficulties recovering from a flood. The City should keep in mind that the loss ratio could increase with additional development in the 1% and 0.2% annual chance floodplain unless development is elevated in accordance with the local floodplain management ordinance.

*Table 4-76 City of Placentia – Flood Loss Estimate Summary**

Flood Zone	Total Parcel Count	Improved Parcel Count	Improved Structure Value	Estimated Contents Value	Total Value	Loss Estimate	Loss Ratio
1% Annual Chance Flood	202	123	$22,594,817	$25,526,660	$48,121,477	$9,624,295	0.13%
0.2% Annual Chance Flood**	1,886	1,664	$553,493,188	$474,661,696	$1,028,154,884	$205,630,977	2.83%
Grand Total	**2,088**	**1,787**	**$576,088,005**	**$500,188,356**	**$1,076,276,361**	**$215,255,272**	**2.96%**

Source: FEMA 3/21/2019 DFIRM, Orange County 2022 Parcel/Assessor Data

*With respect to improved parcels within the floodplain, the actual structures on the parcels may not be located within the actual floodplain, may be elevated and or otherwise outside of the identified flood zone

**This parcel count only includes those parcels in the 0.2% annual chance floodplain, exclusive of the 1% annual chance floodplain. The 0.2% annual chance flood, in actuality, also includes all parcels in the 1% annual chance floodplain.

According to the information in Table 4-74 through Table 4-76, the Placentia Planning Area has 123 improved parcels and roughly $48.1 million of structure and contents value in the 1% annual chance floodplain. There are an additional 1,664 improved parcels and roughly $1.02 billion of structure and contents value in the 0.2% annual chance flood event. A loss ratio of 0.13% and 2.83% indicates that while the City does have structural assets at risk to flood, the City should be able to effectively recover from a major flood event.

Insurance Coverage, Claims Paid, and Repetitive Losses

Standard property insurance does not include flood coverage because of the relatively high risk. The National Flood Insurance Program (NFIP) provides flood insurance to residents in those communities that participate in the NFIP. Federal financial assistance requires the purchase of flood for structures located within a 100-year floodplain – a requirement that affects nearly all mortgages financed through commercial lending institutions. Flood insurance is also recommended for all structures protected by levees, even if not mapped within a floodplain.

The City of Placentia joined the NFIP on February 15, 1980. The City does not participate in the CRS program. NFIP insurance data indicates that as of March 2, 2023, there were 40 policies in force in the City, resulting in $10,437,900 of insurance in force. Of these, 36 are for residential properties and 4 are nonresidential. 25 of these are in the A zone and 15 policies are for parcels in the B, C, & X zones.

There have been 12 closed paid losses totaling $57,128.07. 11 of these were for residential properties and 1 was for nonresidential. Of these 12 paid losses, 4 were parcels in the A zone and 7 parcels were in B, C, & X zones, and 1 was unknown. Of the 12 claims, 8 claims were associated with pre-FIRM structures, 3 with post-FIRM structures, and 1 was unknown. There have been 2 substantial damage claims since 1978. There are 0 repetitive loss (RL) and 0 severe repetitive loss (SRL) properties in the City.

Based on this analysis of insurance coverage, the City has assets at risk to the 1% annual chance and greater floods. Of the 123 improved parcels within the 1% annual chance floodplain, 25 (or 18.4 percent) of those parcels maintain flood insurance.

Critical Facilities and Infrastructure, and Community Lifelines

Flooding presents a threat to critical facilities, infrastructure, and community lifelines. The following analysis discusses critical facilities and infrastructure, followed by community lifelines.

Critical Facilities and Infrastructure

Flooding presents a risk to the critical facilities and infrastructure in the City. A separate analysis was performed on the critical facility inventory in the City of Placentia to determine critical facilities in the FEMA DFIRM flood zones. Using GIS, the flood zones were overlayed on the critical facility GIS layer. Figure 4-72 shows critical facilities, as well as the DFIRM flood zones. Table 4-77 provides summary information of critical facilities in the DFIRM zones by 1% and 0.2% annual chance floodplain. Table 4-78 provides these critical facilities fall by facility type and count and by detailed DFIRM flood zone. Details of critical facility categories, type, name, and address by FEMA DFIRM flood zone are listed in Appendix F.

Figure 4-72 City of Placentia – Critical Facilities in DFIRM Flood Zones

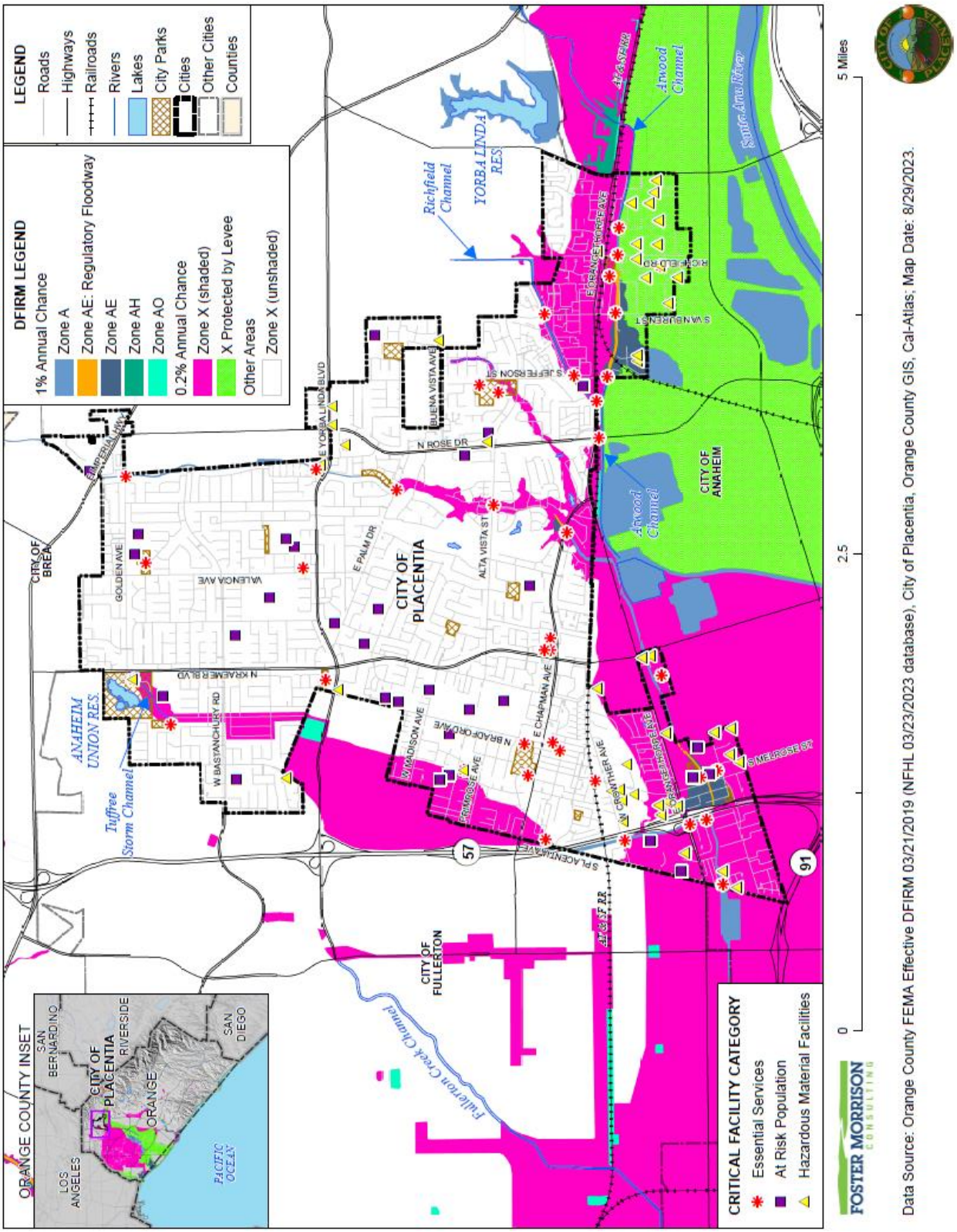


Table 4-77 City of Placentia – Critical Facilities in DFIRM Flood Zones Summary

Flood Zone	Critical Facility Category	Facility Count
1% Annual Chance Flood Hazard	Essential Services Facilities	10
	At Risk Population Facilities	3
	Hazardous Material Facilities	2
	1% Annual Chance Flood Hazard Total	**15**
0.2% Annual Chance Flood Hazard	Essential Services Facilities	13
	At Risk Population Facilities	7
	Hazardous Material Facilities	30
	0.2% Annual Chance Flood Hazard Total	**50**
Other Areas	Essential Services Facilities	17
	At Risk Population Facilities	22
	Hazardous Material Facilities	15
	Other Areas Total	**54**
Grand Total		**119**

Source: Placentia GIS, FEMA DFIRM 3/21/2019

*This count only includes those critical facilities in the 0.2% annual chance floodplain, exclusive of the 1% annual chance floodplain. The 0.2% annual chance flood, in actuality, also includes all critical facilities in the 1% annual chance floodplain.

Table 4-78 City of Placentia – Critical Facilities in Detailed DFIRM Flood Zones by Category

Flood Zone	Critical Facility Category	Facility Count
1% Annual Chance Flood Hazard		
Zone AE	At Risk Population Facilities	2
	Hazardous Material Facilities	2
	Zone AE Total	**4**
Zone AE Floodway	Essential Services Facilities	2
	Zone AE Floodway Total	**2**
Zone A	Essential Services Facilities	8
	At Risk Population Facilities	1
	Zone A Total	**9**
1% Annual Chance Flood Hazard Total		**15**
0.2% Annual Chance Flood Hazard		
X Protected by Levee	Essential Services Facilities	1
	Hazardous Material Facilities	12
	X Protected by Levee Total	**13**
Zone X (shaded)	Essential Services Facilities	12
	At Risk Population Facilities	7

Flood Zone	Critical Facility Category	Facility Count
	Hazardous Material Facilities	18
	Zone X (shaded) Total	**37**
0.2% Annual Chance Flood Hazard Total		**50**
Other Areas		
Zone X (unshaded)	Essential Services Facilities	17
	At Risk Population Facilities	22
	Hazardous Material Facilities	15
	Zone X (unshaded) Total	**54**
Other Areas Total		**54**
Grand Total		**119**

Source: Placentia GIS, FEMA DFIRM 3/21/2019

*This count only includes those critical facilities in the 0.2% annual chance floodplain, exclusive of the 1% annual chance floodplain. The 0.2% annual chance flood, in actuality, also includes all critical facilities in the 1% annual chance floodplain.

Community Lifelines

1% and 0.2% annual chance flooding presents a threat to life and property, including community lifelines in the City. Lifelines that would be vulnerable to flooding include:

- **Safety and Security** – Search and rescue and swiftwater teams may be called on to perform riskier duties during times of flooding. Police, Fire, EMS, and Public Works personnel are often called on to respond during flood emergencies. During large events, these services may become stretched.
- **Food, Health and Medical** – Loss of life and injuries can occur during significant flood events, Flooding may complicate the ability to transport the injured possibly requiring rerouting of injured to other facilities. Public health can also be at risk from flooding. Floodwater is often contaminated with sewage, which can lead to illness and affect clean drinking water
- **Energy** – Floods can cause power grid issues and lead to power outages. During extreme flood events gas lines may break or otherwise be damaged from erosion and debris in floodwaters
- **Communications** – An influx of service calls to dispatch centers for reporting of flooding, power outages, or other issues can occur. Messaging systems need to be deployed during these times to let the public know about road closures, washouts, debris on roads, or lane closures and requirements for evacuations or sheltering.
- **Transportation** – Transport networks can be affected, such as flood damage to bridges, railways and roads. This can cause lane closures and road closures. These closures can affect response personnel (EMS, Fire, Police) as well as cause additional traffic issues for residents. Life safety can also be an issue on flooded roads.
- **Hazardous Material** – Hazardous material facilities can be affected by flooding. Releases during these times can cause incidents to drinking water, as well as additional exposure to the environment.
- **Water Systems** – Floods can affect the ability for wastewater systems to operate, since many are located near flood zones.

Generally, even major flood events are temporary events with flood waters receding back to pre-storm levels at the conclusion of the storm. Given the limited area of flood risk shown on Figure 4-69, these community lifelines are not likely to be overwhelmed, at least not for the long term.

Natural, Historic, and Cultural Resources

Large flood events can affect natural, historic, and cultural resources. There are a number of ways floodwaters can impact natural resources and the environment: Wildlife habitats can be destroyed by floodwaters. Contaminated floodwater can pollute rivers and habitats. Silt and sediment can destroy natural areas. Riverbanks and natural levées can be eliminated as rivers reach bankfull capacity. Rivers can be widened, and deposition can increase downstream. Trees can be uprooted by high-velocity water flow. Plants that survive the initial flood may die due to being inundated with water. Historic and cultural resources may also be affected. Generally, the impacts are associated with damage to structures within the flooded areas, but other cultural resources such as those associated with Native Americans and old tribal areas can also be disturbed, damaged and lost during extreme flood events. Any of these resources that fall in the flood zones would be vulnerable.

Any natural, historic, and cultural resources that fall in the flood zones shown on Figure 4-67 would be vulnerable.

Economic Assets and Community Activities of Value

Major flood events could affect any economic asset that lies in the floodplain and can have long lasting effects. As shown on Figure 4-69, flooding could affect any economic asset that lies in the floodplain. If the flooding occurs during a community activity, that activity would need to be cancelled or rescheduled. This would most likely not occur during the Heritage Parade (since little rain falls in the summer months) but could affect the December Tamale Festival. If flooding causes business closures, the City would see reduced revenue from local sales tax. Recreation and tourism may be affected, causing a loss of sales tax revenue.

Impacts from 1% and 0.2% Annual Chance Flood

Floods are among the costliest natural disasters in terms of human hardship and economic loss nationwide. Large flood events, including those associated with 1% and 0.2% annual chance floods, can cause substantial damage to structures, landscapes, and utilities as well as life safety issues. People may be swept away in floodwaters, causing injuries or deaths. Floods can be extremely dangerous, and even six inches of moving water can knock over a person given a strong current. During a flood, people can also suffer heart attacks or electrocution due to electrical equipment short outs. Direct impacts, such as drowning, can be limited with adequate warning and public education about what to do during floods. Floodwaters can transport large objects downstream which can damage or remove stationary structures. Structures can be damaged directly from floodwaters and can also be damaged from trees falling as a result of water-saturated soils. Ground saturation can result in instability, collapse, or other damage. Objects can also be buried or destroyed through sediment deposition. Floodwaters can also break utility lines and interrupt services causing power outages. The interruption of power causes major problems and can result in the closure of governmental offices and community businesses. Public schools may also be required to close or be placed on a delayed start schedule. Roads can be damaged and closed, causing safety and evacuation issues.

Standing water can cause damage to crops, roads, foundations, and electrical circuits. Other problems connected with flooding and stormwater runoff include erosion, sedimentation, degradation of water quality, loss of environmental resources, and economic impacts.

Impacts that are not quantified, but can be anticipated in large future events, include:

- Injury and loss of life;
- Commercial and residential structural and property damage;
- Disruption of and damage to public infrastructure, utilities, and services;
- Damage to roads/bridges resulting in loss of mobility;
- Significant economic impact (jobs, sales, tax revenue) to the community; and
- Negative impact on commercial and residential property values

These impacts may be exacerbated by the effects of climate change, changes in population patterns (migration, density, or the makeup of socially vulnerable populations), and changes in land use and development.

As discussed in the hazard profile section, climate change is anticipated to exacerbate this hazard over time. Regarding population patterns, the City is approaching built out conditions. Population projections for the City show very limited growth over the next 25 years. Populations are anticipated to grow by only 7.3% between 2025 and 2050, which equates to an annual growth of 0.29%, thus future population growth should not increase the potential impacts from this hazard on City assets. With respect to population patterns such as those associated with migration, density, or makeup of socially vulnerable populations the data shows that most socially vulnerable populations and disadvantaged communities are concentrated in the western portion of the City. Also, FEMA's National Risk Index for Orange County is rated as Very High. The 1%/0.2% annual chance flood shows limited hazard risk occurring in the western portion of the City. Thus, even if these population patterns continue, it is unlikely that the vulnerability and potential impacts from this hazard to City assets will significantly change.

As described in the land use discussion at the end of Section 4.2.2, a new land use map was developed as part of the General Plan efforts in 2023, which establishes the basic pattern of development in the City for the next 20-25 years, including land uses and densities. Thus, future development within hazard areas generally contributes to some increase of impacts on City assets. However, given that only one future development area in the City falls in the FEMA DFIRM 1% or 0.2% annual chance flood zones. In addition, the City has a development review process which includes the consideration of hazard constraints and updated building codes that should further limit the impacts of these hazards on City assets.

Health Hazards from Flooding

According to FEMA, certain health hazards are also common to flood events. Three general types of health hazards accompany floods. The first comes from the water itself. Floodwaters carry anything that was on the ground that the upstream runoff picked up, including dirt, oil, animal waste, and lawn, farm, and industrial chemicals. Pastures and areas where cattle and other livestock are kept or their wastes are stored can contribute polluted waters to the receiving streams.

Floodwaters also saturate the ground, which leads to infiltration into sanitary sewer lines. When wastewater treatment plants are flooded, there is nowhere for the sewage to flow. Infiltration and lack of treatment can lead to overloaded sewer lines that can back up into low-lying areas and homes. Even when it is diluted by flood waters, raw sewage can be a breeding ground for bacteria such as e. coli and other disease-causing agents.

The second type of health problem arises after most of the water has gone. Stagnant pools can become breeding grounds for mosquitoes, and wet areas of a building that have not been properly cleaned breed mold and mildew. A building that is not thoroughly cleaned becomes a health hazard, especially for small children and the elderly.

Another health hazard occurs when heating ducts in a forced air system are not properly cleaned after inundation. When the furnace or air conditioner is turned on, the sediments left in the ducts are circulated throughout the building and breathed in by the occupants. If a water system loses pressure, a boil order may be issued to protect people and animals from contaminated water.

The third problem is the long-term psychological impact of having been through a flood and seeing one's home damaged and irreplaceable keepsakes destroyed. The cost and labor needed to repair a flood-damaged structure puts a severe strain on people, especially the unprepared and uninsured. There is also a long-term problem for those who know that their homes can be flooded again. The resulting stress on floodplain residents takes its toll in the form of aggravated physical and mental health problems.

Future Development

This section provides an analysis of the flood hazard and proposed future development within the County based on FEMA floodplains and also discusses considerations in evaluating future flooding conditions.

Future Development: General Considerations

Communities that participate in the NFIP adopt regulations and codes that govern development in special flood hazard areas (SFHAs) and enforce those requirements through their local floodplain management ordinances through the issuance of permits. The City of Placentia's floodplain management ordinance provides standards for development, subdivision of land, construction of buildings, and improvements and repairs to buildings that generally meet the minimum requirements of the NFIP.

The International Residential Code (IRC) and International Building Code (IBC), by reference to ASCE 24, include requirements that govern the design and construction of buildings and structures in flood hazard areas. FEMA has determined that the flood provisions of the I-Codes are consistent with the requirements of the NFIP (the I-Code requirements shown either meet or exceed NFIP requirements). ASCE 24, a design standard developed by the American Society of Civil Engineers, expands on the minimum NFIP requirements with more specificity, additional requirements, and some limitations.

With the adoption of the International Codes, communities will be moving towards a more stringent approach to regulatory floodplain management, beyond the minimum requirements of the NFIP. The adoption and enforcement of disaster-resistant building codes is a core community action to promote effective mitigation. When communities ensure that new buildings and infrastructure are designed and

constructed in accordance with national building codes and construction standards, they significantly increase local resilience now and in the future. With continued advancements in building codes, local ordinances should be reviewed and updated to meet and exceed standards as practicable to protect new development from future flood events and to further promote disaster resiliency.

One of the most effective ways to reduce vulnerability to potential flood damage is through careful land use planning that fully considers applicable flood management information and practices. Master planning will also be necessary to assure that open channel flood flow conveyances serving the smaller internal streams and drainage areas are adequately prepared to accommodate the flows. Preservation and maintenance of natural and riparian areas should also be an ongoing priority to realize the flood control benefits of the natural and beneficial functions of these areas.

Future development in the City may be built in the floodplain, in conformance to the standards of the floodplain ordinance. The City enforces the floodplain ordinance on new development in Placentia. Future development areas and their vulnerability to DFIRM flooding is discussed further in the below GIS analysis.

Future Development: GIS Analysis

The City provided 19 future development areas which were used as the basis for the inventory of future development areas for the City. Utilizing the future development area spatial layer, the parcel centroid data was intersected to determine the parcel counts and acreage within each area. Figure 4-73 shows the locations of the future development areas overlayed on the DFIRM flood zones. Table 4-79 shows the parcels and acreages of each future development area in the City by DFIRM flood zones.

Figure 4-73 City of Placentia – Future Development Areas and FEMA DFIRM Flood Zones

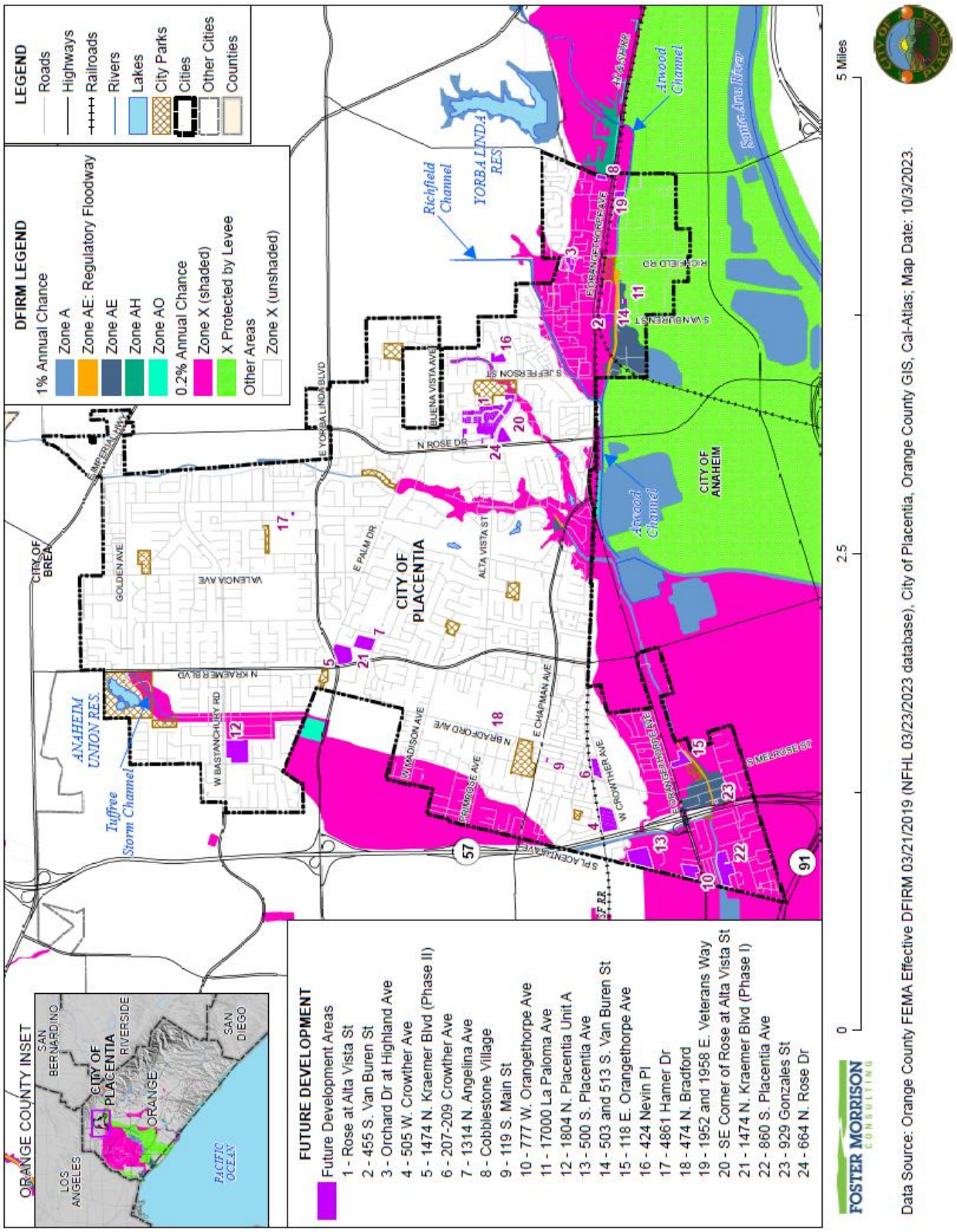


Table 4-79 City of Placentia – Future Development Areas by FEMA DFIRM Flood Zone

Flood Zone	Map #	Future Development Areas	Total Parcel Count	Improved Parcel Count	Total Acres
1% Annual Chance Flood Hazard					
Zone AE	11	17000 La Paloma Ave	1	0	0.26
	23	929 Gonzales St	1	0	0.08
Zone AE Total			**2**	**0**	**0.35**
1% Annual Chance Flood Hazard Total			**2**		**0.35**
0.2% Annual Chance Flood Hazard					
Zone X (shaded)	1	Rose at Alta Vista St	1	0	0.20
	2	455 S. Van Buren St	1	1	0.17
	3	Orchard Dr at Highland Ave	1	0	1.15
	8	Cobblestone Village	1	0	0.59
	10	777 W. Orangethorpe Ave	1	1	2.72
	13	500 S. Placentia Ave	1	1	5.82
	14	503 & 513 S. Van Buren St	2	2	0.38
	15	118 E. Orangethorpe Ave	1	1	2.38
	19	1952 & 1958 E. Veterans Way	1	0	0.78
	22	860 S. Placentia Ave	1	1	6.28
Zone X (shaded) Total			**11**	**7**	**20.47**
0.2% Annual Chance Flood Hazard Total			**11**	**7**	**20.47**
Other Areas					
Zone X (unshaded)	1	Rose at Alta Vista St	64	0	10.66
	4	505 W. Crowther Ave	6	1	5.60
	5	1474 N. Kraemer Blvd (Phase II)	1	1	4.67
	6	207-209 Crowther Ave	4	1	2.09
	7	1314 N. Angelina Ave	1	1	3.84
	9	119 S. Main St	1	1	0.15
	12	1804 N. Placentia Unit A	1	1	8.17
	16	424 Nevin Pl	1	0	1.78
	17	4861 Hamer Dr	1	1	0.17
	18	474 N. Bradford	1	1	0.19

Flood Zone	Map #	Future Development Areas	Total Parcel Count	Improved Parcel Count	Total Acres
	20	SE Corner of Rose at Alta Vista St	1	0	8.25
	21	1474 N. Kraemer Blvd (Phase I)	1	1	4.67
	24	664 N. Rose Dr	1	1	3.88
Zone X (unshaded) Total			**84**	**10**	**54.12**
Other Areas Total			**84**	**10**	**54.12**

Source: FEMA 3/21/2019 DFIRM, City of Placentia GIS

4.3.10. Flood: Localized/Stormwater

Hazard Profile

This hazard profile contains multiple sections that detail how this hazard can affect the City. These sections include a hazard/problem description; description of location and extent; past occurrences of this hazard; and how climate change can affect this hazard.

Hazard/Problem Description

Localized, stormwater flooding occurs throughout the City, primarily during the rainy season from November through April. Prolonged heavy rainfall contributes to a large volume of runoff resulting in high peak flows of moderate duration. Flooding is more severe when previous rainfall has created saturated ground conditions. Storm drain culverts and drainage systems have a finite capacity. When rainfall exceeds this capacity, or the system is clogged, water accumulates in areas until it reaches a level of overland release. This type of flooding may occur when intense storms occur over areas of developed areas.

The City is traversed by several streams and drainage throughout their Planning Area. The development that has occurred during the past forty years has accentuated existing drainage problems and has increased the potential for localized flooding. Continued construction of new buildings increases the area of impermeable surface and thus the amount of storm water that flows through the City's storm drain systems.

Location and Extent

According to the City, numerous locations and roads throughout Placentia both within and outside the FEMA 1% and 0.2% annual chance floodplains are subject to flooding in heavy rains. These are delineated in Table 4-80. In addition to flooding, damage to these areas during heavy storms includes debris areas, erosion, and downed trees. The frequency and type of damage or flooding that occurs varies from year to year, depending on the quantity of precipitation and runoff.

Table 4-80 City of Placentia – Localized Flooding Areas

Road/Area Name	Flooding	Pavement Deterioration	Washouts	High Water/ Creek Crossing	Landslides/ Mudslides	Debris	Downed Trees
Bradford Avenue at Santa Fe Avenue	X					X	
Bedford Avenue at Somerset	X					X	X
Walnut Avenue at Center Street	X					X	X
Kevin Way	X					X	X
Sunset Drive at Placentia Avenue	X					X	X
Primrose Avenue	X					X	X
Naples Avenue at Pinehurst Avenue	X					X	X
Seaview Circle	X					X	X
Bradford Avenue at Tiger Lane	X					X	X
Orangethorpe Avenue east of Jefferson	X					X	X
Delaware Way	X					X	X

Source: City of Placentia

Vulnerable areas include areas where water is conveyed and collected. In the City of Placentia, the HMPC noted that numerous roads and other areas throughout the City are subject to flooding in heavy rains – some flood because the storm drains may be undersized for the areas. There is no established scientific scale or measurement system for localized flooding. Localized flooding is generally measured by depth of flooding, volume of water, runoff velocity, and the area affected. Localized flooding often happens quickly and has a short speed of onset and short duration, with floodwaters receding when the storm drainage system can catch up or when the water is absorbed into the ground.

Past Occurrences

Disaster Declaration History

There have been 20 state and 19 federal disaster declarations due to flooding (and localized flooding, heavy rain and storm events) in Orange County as shown in Table 4-81.

Table 4-81 Orange County Disaster Declarations from Flood 1950-2023

Disaster Type	State Declarations		Federal Declarations	
	Count	Years	Count	Years
Flood (with heavy rain and storms)	21	1950, 1955, 1958 (twice), 1969, 1978, 1980, 1982, 1988, 1992, 1993, 1995 (twice), 1997, 1998, 2005 (twice), 2011, 2017, 2021, 2022	19	1955, 1958, 1969, 1978, 1980, 1982, 1983, 1988, 1992, 1993, 1995 (twice), 1998, 2005 (twice), 2011, 2017, 2023 (twice)

Source: Cal OES, FEMA

NCDC Events

The NCDC does not track localized flooding separately from the heavy rain and flood events. Localized flooding likely also occurred during these flood and heavy rain and storm events. These can be found in Table 4-72.

Hazard Mitigation Planning Committee Events

The HMPC noted past events have occurred, and are discussed in the Past Occurrences discussion in the Section 4.3.9 above.

Probability of Future Occurrences

Highly Likely—Natural drainage systems located throughout the City have a finite capacity to convey water. Likewise, storm drainage systems have a finite capacity generally based on the design criteria. When rainfall exceeds the capacity of natural and storm drainage systems or systems clog, water accumulates until it reaches a level of overland release. Due to aging and often undersized infrastructure, this type of flooding will continue to occur annually during heavy rains.

Climate Change and Localized Flood

Cal Adapt future precipitation projections were shown in Figure 4-35. While average annual rainfall may decrease slightly, the intensity of individual rainfall events is likely to increase during the 21st century, increasing the probability of overwhelming stormwater systems built to historical rainfall averages. This makes localized flooding more likely.

Vulnerability Assessment

Vulnerability—Medium

Flood vulnerability and their impacts vary by location and severity of any given flood event and will likely only affect certain areas of the City during specific times. Based on the risk assessment, it is evident that floods will continue to have potentially significant economic impacts to certain areas of the City. However, while flooding can cause significant impacts depending on the duration and volume of precipitation and the drainage in any given area, many of the floods in the City are minor, localized flood events that are more of a nuisance than a disaster.

Vulnerability of the community is discussed in multiple sections that detail how this hazard can affect the City. These sections include assets at risk, impacts, and how future development can be affected by this hazard.

Assets at Risk from Localized Flooding

In addition to the 1% and 0.2% annual chance flooding described in the previous section, localized flooding also occurs throughout the City at various times throughout the year with several areas of primary concern. Assets at risk from localized flooding include: people and populations; structures; critical facilities and infrastructure, and community lifelines; natural, historic, and cultural resources; and economic assets and community activities of value. These are discussed in the following sections.

People and Populations

People and populations are traditionally not highly vulnerable to localized flooding. Localized flooding may cause transportation issues as streets or street lanes are closed. People in emergency vehicles (fire, police, ambulance) may need to be rerouted, causing increased times of service delivery.

Structures

Structures in areas with localized flooding can be affected if floodwaters intrude into the structure. Once water finds its way into a structure, it tends to continue to do so until the path that brings water into a structure is mitigated. Structures in low lying areas, or those with basements can be at greater risk. Buildings with older foundations that are prone to water intrusion are also at greater risk.

Critical Facilities and Infrastructure, and Community Lifelines

Placentia water and wastewater systems can also be vulnerable to heavy rains and flood events. Rainfall creates a high water table, surging streams and creeks, and saturates soil. Infiltration of stormwater into water and wastewater systems may occur and presents a threat to public health and safety, when the infrastructure is no longer able to meet demands.

Due to the relatively minor nature of localized flooding, community lifelines are unlikely to be overwhelmed. There may be minor vulnerabilities to the following:

- **Safety and Security** – Law Enforcement/Security, Fire Service, and Community Safety officials may be needed to close roads and redirect traffic during localized flood events. These agencies may also experience flooded roads when responding to emergencies.
- **Communications** – Unless directly affected by flooding, communication systems are not likely to be impacted. Warnings and Messaging may be required to reroute traffic away from localized flooding areas.
- **Transportation** – Highways, roads, and bridges may be temporarily blocked until localized floodwaters recede.
- **Water Systems** – Water and wastewater systems can be infiltrated during localized flooding events. Stormwater drainage systems are often undersized and inadequate to convey the volume of flood waters.

Natural, Historic, and Cultural Resources

Natural assets may have some vulnerabilities to localized flood. This can be by design. Many parks and green spaces are designed to take overflow water and release it into the underlying soils. Wetlands areas in the City actually help reduce the risk of flooding, as they can absorb excess rainfall that would have to be drained away from impervious surfaces. Because of their often adverse effects on people and infrastructure, the effects of flooding on the natural environment are often viewed as negative; however, this is not always the case. Flooding can also provide many benefits, including recharging groundwater, increasing fish production, creating wildlife habitat, recharging wetlands, constructing floodplains, and rejuvenating soil fertility. These smaller localized flooding events often provide more benefits to the environment in comparison to negative impacts associated with large flood events. Historic and cultural resources may be at some measure of vulnerability if they are located in areas subject to repeated localized flooding.

Economic Assets and Community Activities of Value

Economic assets are typically sited away from localized flood areas. Given the decentralized location of economic assets in Placentia this is not always true. If the localized flood is large enough to overwhelm the storm drainage systems, economic assets may be vulnerable, at least until flood waters recede. Community activities of value may have minor vulnerabilities if a localized flood event were to occur during the activity. This may cause the activity to be cancelled or rescheduled.

Impacts from Localized Flooding

Interruption of traffic flow, public use of impacted park areas, as well as ongoing infrastructure and property repair costs can impact the City during these heavy rains and localized storm events. Impacts primarily include damages to infrastructure, property, and natural systems. Life safety issues from localized flooding would be more limited.

The amount and type of damage or flooding that occurs varies from year to year and from storm to storm, depending on the quantity of precipitation and runoff. These areas and the types of damage are presented in Table 4-80. Impacts may be exacerbated in the future due to the effects of climate change, changes in population patterns (migration, density, or the makeup of socially vulnerable populations), and changes in land use and development.

As discussed in the hazard profile section, climate change is anticipated to exacerbate this hazard. Regarding population patterns, the City is approaching built out conditions. Population projections for the City show very limited growth over the next 25 years. Populations are anticipated to grow by only 7.3% between 2025 and 2050, which equates to an annual growth of 0.29%, thus future population growth should not increase the potential impacts from this hazard on City assets. With respect to population patterns such as those associated with migration, density, or makeup of socially vulnerable populations the data shows that most socially vulnerable populations and disadvantaged communities are concentrated in the western portion of the City. Also, FEMA's National Risk Index for Orange County is rated as Very High. Localized flooding is a problem that occurs throughout the City and may be more of an issue in older portions of the City with limited or undersized drainage infrastructure. Thus, even if these population

patterns continue, it is unlikely that the vulnerability and potential impacts from this hazard to City assets will significantly change.

As described in the land use discussion at the end of Section 4.2.2, a new land use map was developed as part of the General Plan efforts in 2023, which establishes the basic pattern of development in the City for the next 20-25 years, including land uses and densities. While future development within hazard areas generally contributes to some increase of impacts on City assets, given the limited potential for significant future growth in Placentia and that localized flooding is a Citywide problem, future changes in land use and development are unlikely to contribute to any notable change in the vulnerability of the City to this hazard.

Future Development

The risk of stormwater/localized flooding to future development can be minimized by accurate recordkeeping of repetitive localized storm activity. Mitigating the root causes of the localized stormwater or choosing not to develop in areas that often are subject to localized flooding will reduce future risks of losses due to stormwater/localized flooding. Due to the developed nature of the City, future development should not substantially alter the drainage pattern of the area, and should not substantially increase the rate of surface run-off that will cause flooding on or off site. However, drainage considerations should be addressed for all new development or redevelopment projects.

4.3.11. Hazardous Material Transportation Release

Hazard Profile

This hazard profile contains multiple sections that detail how this hazard can affect the City. These sections include a hazard/problem description; description of location and extent; past occurrences of this hazard; and how climate change can affect this hazard.

Hazard/Problem Description

According to the Environmental Protection Agency (EPA), a hazardous material is any item or agent (biological, chemical, physical) which has the potential to cause harm to humans, animals, or the environment, either by itself or through interaction with other factors. Hazardous materials can be present in any form; gas, solid, or liquid. Environmental or atmospheric conditions can influence hazardous materials if they are uncontained.

The U.S. Occupational Safety and Health Administration's (OSHA) definition of hazardous material includes any substance or chemical which is a "health hazard" or "physical hazard," including: chemicals which are carcinogens, toxic agents, irritants, corrosives, sensitizers; agents which act on the hematopoietic system; agents which damage the lungs, skin, eyes, or mucous membranes; chemicals which are combustible, explosive, flammable, oxidizers, pyrophorics, unstable-reactive or water-reactive; and chemicals which in the course of normal handling, use, or storage may produce or release dusts, gases, fumes, vapors, mists or smoke which may have any of the previously mentioned characteristics.

The EPA incorporates the OSHA definition and adds any item or chemical which can cause harm to people, plants, or animals when released by spilling, leaking, pumping, pouring, emitting, emptying, discharging,

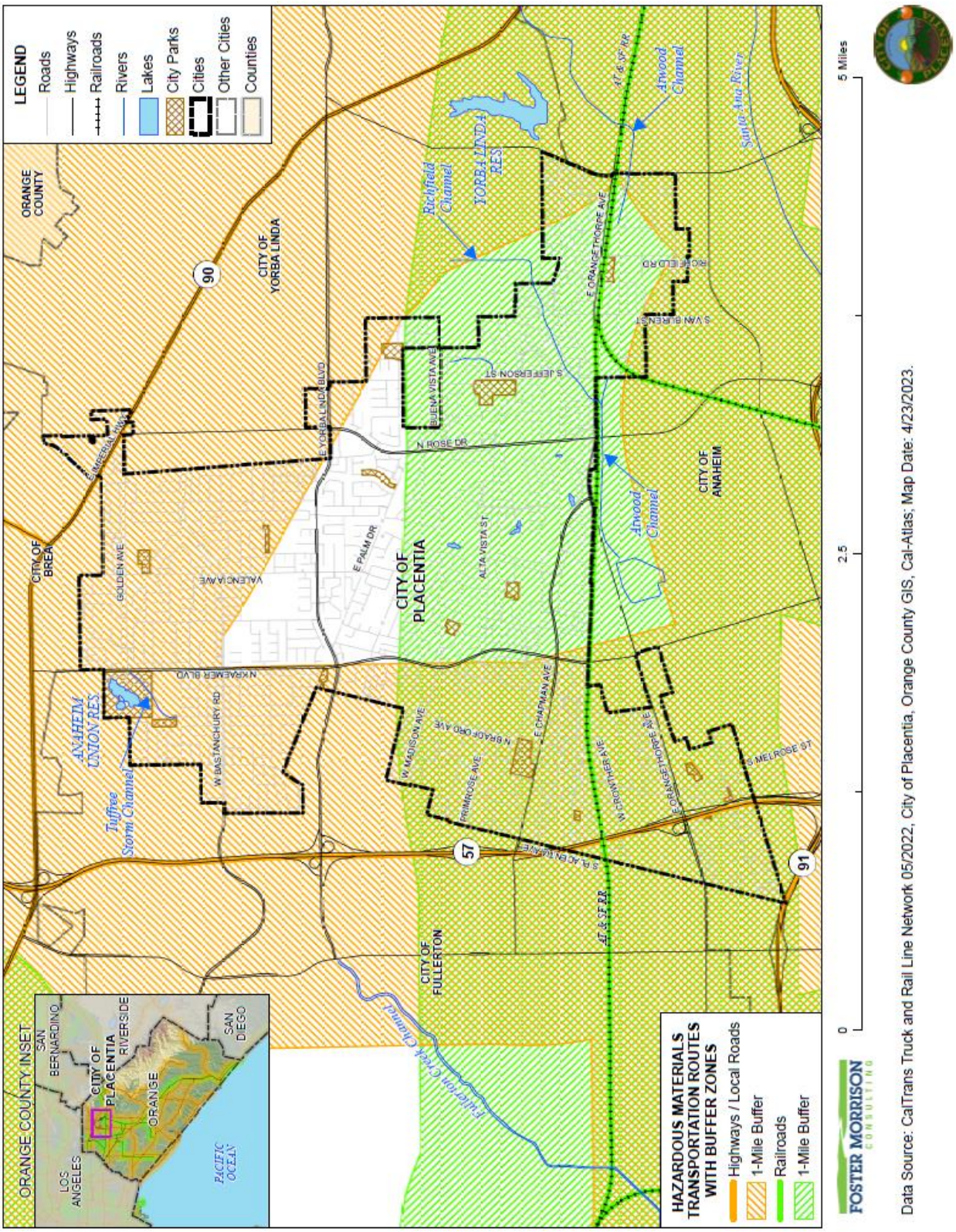
injecting, escaping, leaching, dumping or disposing into the environment. The EPA maintains a list of 366 chemicals that are considered extremely hazardous substances (EHS). This list was developed under the Superfund Amendments and Reauthorization Act. The presence of EHSs in amounts in excess of a threshold planning quantity requires that certain emergency planning activities be conducted.

A release or spill of bulk hazardous materials could result in fire, explosion, toxic cloud or direct contamination of water, people, and property. The effects may involve a local area or many square miles. Health problems may be immediate, such as corrosive effects on skin and lungs, or be gradual, such as the development of cancer from a carcinogen. Damage to property could range from immediate destruction by explosion to permanent contamination by a persistent hazardous material.

Location and Extent

In and near the City of Placentia are multiple hazardous materials transportation routes. State Roads 57, 91, and 55 are all hazardous materials routes. The Atchison, Topeka, and Santa Fe Railway also hauls hazardous materials. Figure 4-74 shows the hazardous materials transportation corridors (for roadways and rail) in the City as well as the one-mile buffer zone (on each side of the corridor for a two-mile total buffer) used for this analysis as detailed further in the methodology below.

Figure 4-74 City of Placentia – Hazardous Materials Transportation Routes and Buffer Zones



In addition, while most routes are known, the City has not quantified the amount of hazardous materials that are transported through it en route to local deliveries or to adjoining counties. Accidents involving the transportation of hazardous materials could be just as catastrophic as accidents involving stored chemicals, possibly more so, since the location of a transportation accident is not predictable. The U.S. Department of Transportation (USDOT) divides hazardous materials into nine major hazard classes. A hazard class is a group of materials that share a common major hazardous property, i.e., radioactivity, flammability, etc. These hazard classes include:

- Class 1—Explosives
- Class 2—Compressed Gases
- Class 3—Flammable Liquids
- Class 4—Flammable Solids; Spontaneously Combustible Materials; Dangers When Wet Materials/Water-Reactive Substances
- Class 5—Oxidizing Substances and Organic Peroxides
- Class 6—Toxic Substances and Infectious Substances
- Class 7—Radioactive Materials
- Class 8—Corrosives
- Class 9—Miscellaneous Hazardous Materials/Products, Substances, or Organisms

The speed of onset of a hazardous materials spill is generally short. The duration is typically short as well, though certain chemicals can pollute earth and groundwater for long periods of time. The actual extent of any given incident will depend on the type of release, location, and nature and extent of any release.

Past Occurrences

Disaster Declaration History

There have been no federal or state disaster declarations for hazardous materials in the City, as shown on Table 4-4.

NCDC Events

The NCDC does not track hazardous materials events.

Pipeline and Hazardous Materials Safety Administration Events

The USDOT Pipeline and Hazardous Materials Safety Administration's (PHMSA) Office of Hazardous Materials Safety performs a range of functions to support the safe transport of hazardous materials. One of these functions is the tracking of hazardous materials incidents in the United States. The database was searched for hazardous materials incidents in the City. A summary of rail and highway incidents since 1970 in the Placentia Planning Area are shown in Table 4-82. Two separate and minor events were contained in the database.

Table 4-82 City of Placentia Hazardous Materials Transportation Incidents Since 1970

Date of Incident	Incident Route	Mode of Transportation	Commodity Short Name	Quantity Released	Amount of Damages
2/8/2005	Between Placentia and Brea	Highway	Radioactive Material, Type A Package Non-Special Form, Non Fissile Or Fissile-Excepted	0.1 Cubic liters	$0
8/29/2011	704 Dunn Way	Highway	Hydrogen Peroxide And Peroxyacetic Acid Mixtures, Stabilized With Acids, Water, And Not More Than 5 Percent Peroxyacetic Acid	20 Gallons	$6,455

Source: PHMSA Database – Search dates 01/01/1970 – 03/01/2023

Hazard Mitigation Planning Committee Events

In addition to what was reported to the PHMSA, the HMPC reported the following transportation event.

Though no hazardous materials spill was reported, a train collision occurred at around 8:10 am. PDT on **April 23, 2002**, when a Burlington Northern Santa Fe freight train and a Metrolink commuter train collided head-on at Control Point Atwood (CP Atwood) in Placentia. Had the train been carrying hazardous materials, this event could have been much worse.

Probability of Future Occurrence

Unlikely – Given that 2 minor hazardous materials incidents have happened in transport through the City in the past 53 years, it is unlikely a hazardous materials incident will occur in the City. It should be noted, however, that small hazardous materials spills happen often and are cleaned up locally and go unreported to national databases. According to Caltrans, most incidences are related to releases during loading and unloading of cargo, and the release of fluids/materials from the transporting vehicles themselves and not the cargo.

Climate Change and Hazardous Materials

Climate change is unlikely to affect hazardous materials transportation incidents.

Vulnerability Assessment

Vulnerability—Medium

It is often quite difficult to quantify the potential losses from human-caused hazards. While the facilities themselves have a tangible dollar value, loss from a human-caused hazard often inflicts an even greater toll on a community, both economically and emotionally. The impact to identified values will vary from event to event and depend on the type, location, and nature of a specific hazardous material incident. The most significant impact from hazardous materials transport is life safety. Given the difficulty in quantifying the losses associated with technological hazards, this section focuses on analyzing key Planning Area values relative to the hazardous materials transportation corridors identified above.

Vulnerability of the community is discussed in multiple sections that detail how this hazard can affect the City. These sections include assets at risk, impacts, and how future development can be affected by this hazard. The methodology used to analyze hazardous materials transportation for the population, structures, and critical facilities is discussed in the section below.

Methodology: Transportation Release and Buffer Zone

An analysis of the potential vulnerability of the Planning Area to a transportation-related hazardous materials release was conducted using GIS within identified transportation corridors. To evaluate the areas most vulnerable, a one-mile buffer was applied to both sides of Highways 55, 57, and 91, as well as the Atchison, Topeka, and Santa Fe Railroad line. The result is a two-mile buffer zone around each transportation corridor that is included in this analysis. The buffer distance was based on guidelines in the USDOT's Emergency Response Guidebook that suggest distances useful to protect people from vapors resulting from spills involving dangerous goods considered toxic if inhaled. The recommended buffer distance referred to in the guide as the "protective action distance" is the area surrounding the incident in which people are at risk of harmful exposure. Actual buffer distances will vary depending on the nature and quantity of the release, whether the release occurred during the night or daytime, and prevailing weather conditions.

Assets at Risk from Hazardous Materials Transportation

Assets at risk from hazardous materials transportation release include: people and populations; structures; critical facilities and infrastructure, and community lifelines; natural, historic, and cultural resources; and economic assets and community activities of value. These are discussed in the following sections.

People and Populations

All populations are at some vulnerability to a hazardous materials transportation release. Certain vulnerable populations are at the greatest risk to the effects of hazardous materials. Vulnerable populations include:

- The unsheltered
- Those with breathing difficulties or other underlying health conditions
- Infants and children under age five and their caregivers
- Elderly (65 and older)
- Individuals with disabilities
- Individuals dependent on medical equipment
- Individuals who work, exercise, or physically train outdoors
- Individuals with impaired mobility

To determine the overall populations at risk from a transportation-related hazardous materials release within identified transportation corridors, an analysis was performed using GIS to determine the residential population that resides within the two-mile buffer zone of the highway and railroad corridors. Using GIS, the buffered corridor was overlaid on the improved residential parcel and structure data and results tabulated for the Planning Area, as found see on Figure 4-75 and in Table 4-83. Those residential parcel centroids that intersect the buffered corridor were counted and multiplied by the 2020 Census Bureau average household factors for the City of Placentia (3.14). According to the analysis, there are 29,899 residents in

the City in the hazardous materials buffer zones associated with the hazardous materials transportation routes and potentially at risk.

Figure 4-75 City of Placentia – Hazardous Materials Transportation Routes with Buffer Zones and Residential Parcels

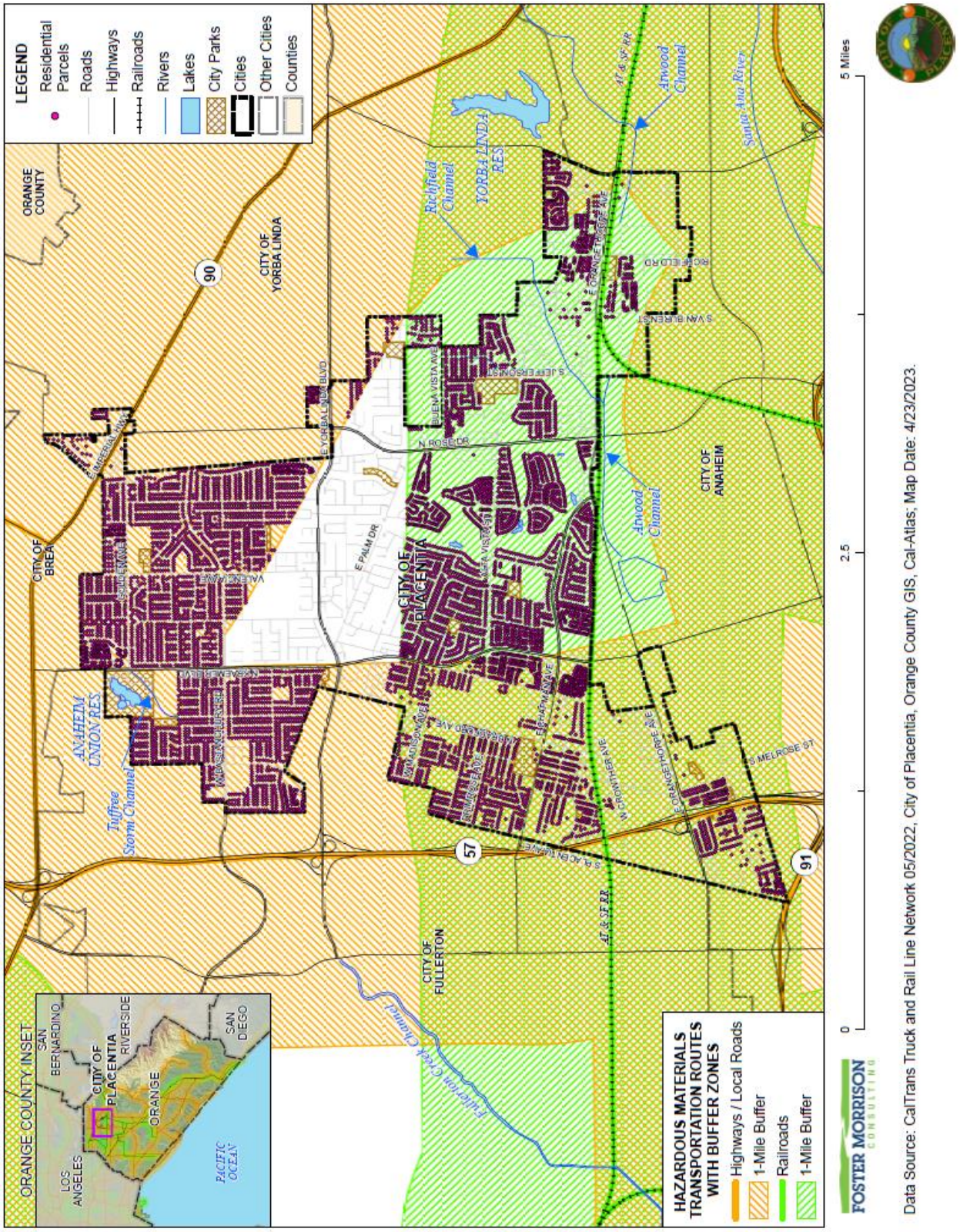


Table 4-83 City of Placentia–Improved Residential Parcels and Populations at Risk in Hazardous Materials Buffer Zones

Jurisdiction	Improved Residential Parcels	Population at Risk
City of Placentia	9,522	29,899

Source: Cal Trans, Orange County 2022 Parcel/Assessor's Data, US Census Bureau 2020 Estimates

Structures

Structures in the City have some measure of risk to hazardous materials which can affect the built environment of the City. During a hazardous materials transportation spill, it is generally the people that are at risk to the effects of the spill. During a spill, buildings, property, and their values are at a lessor risk; however, given the location and breadth of hazardous materials routes in the City, an analysis is performed here. Analysis results for the City are summarized in Table 4-84, which summarizes by total parcel counts, improved parcel (structure) counts, and their improved and land values and the estimated contents replacement values based on the CRV factors detailed in Table 4-7. Table 4-85 shows the specific hazardous materials routes total parcel counts, improved parcel and structure counts, land values and the estimated contents replacement values. Also, it is important to keep in mind that these assessed values may be well below the actual market value of improved parcels located within the hazardous material buffer corridors and buffer zones due primarily to Proposition 13.

Table 4-84 City of Placentia – Count and Value of Parcels (and Structures) in all Hazardous Materials Buffer Zones and for all Transportation Routes by Land Use

Land Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Agricultural	13	0	$1,084,422	$0	$0	$1,084,422
Commercial	213	190	$237,254,372	$187,027,695	$187,027,695	$611,371,682
Industrial	237	216	$334,480,160	$220,089,648	$330,134,472	$897,925,442
Miscellaneous	3	0	$76,908	$0	$0	$76,908
Residential	10,055	9,522	$3,229,202,150	$1,881,418,655	$940,709,371	$6,051,361,529
Tax Exempt	182	41	$64,398,587	$65,204,647	$97,806,969	$227,410,203
Unknown	100	0	$0	$0	$0	$0
Grand Total	**10,803**	**9,969**	**$3,866,496,599**	**$2,353,740,645**	**$1,555,678,507**	**$7,789,230,186**

Source: Cal Trans, Orange County 2022 Parcel/Assessor's Data

Table 4-85 City of Placentia – Count and Value of Parcels (and Structures in Hazardous Materials Buffer Zones by Transportation Route

Transportation Routes	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
AT & SF Railroad	3,844	3,504	$1,236,758,957	$991,381,818	$495,690,931	$2,723,831,706

Transportation Routes	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Hwy 57	744	735	$248,256,731	$99,049,344	$49,524,683	$396,830,758
Hwy 57 and AT & SF Railroad	1,646	1,596	$539,890,494	$269,253,499	$134,626,742	$943,802,088
Hwy 57 and Hwy 90	508	508	$173,458,415	$71,804,330	$35,902,159	$281,164,904
Hwy 57, Hwy 90, and Hwy 142	7	7	$2,430,625	$916,155	$458,078	$3,804,858
Hwy 57, Hwy 91, and AT & SF Railroad	364	349	$107,938,473	$58,813,920	$29,406,971	$196,159,364
Hwy 90	747	706	$222,449,157	$86,304,261	$43,152,132	$351,905,550
Hwy 90 and AT & SF Railroad	202	188	$59,247,972	$36,951,516	$18,475,750	$114,675,238
Hwy 90 and Hwy 142	1,993	1,929	$638,771,326	$266,943,812	$133,471,925	$1,039,187,063
Hwy 90, Hwy 91, and AT & SF Railroad	0	0	$0	$0	$0	$0
Hwy 91 and AT & SF Railroad	0	0	$0	$0	$0	$0

Source: CalTrans, Orange County 2022 Parcel/Assessor's Data

To avoid duplication of parcel count, the parcels located in areas where multiple haz-mat route buffers overlap were assigned the route grouping listed above.

Critical Facilities and Infrastructure, and Community Lifelines

Hazardous materials transport presents a threat to critical facilities, infrastructure, and community lifelines. The following analysis discusses critical facilities and infrastructure, followed by community lifelines.

Critical Facilities and Infrastructure

Hazardous materials transport presents a risk to the critical facilities and infrastructure in the City. To determine the critical facilities at risk from a transportation-related hazardous materials release within identified transportation corridors, an analysis was performed using GIS to determine the facilities located within the two-mile buffer zone of the highway and railroad corridors. Using GIS, the buffered corridor was overlaid on the City critical facilities layer and results tabulated for the Planning Area, as shown on Figure 4-76. Table 4-86 breaks the critical facilities up by route.

Figure 4-76 City of Placentia – Critical Facilities in Hazardous Materials Transportation Routes and Buffer Zones

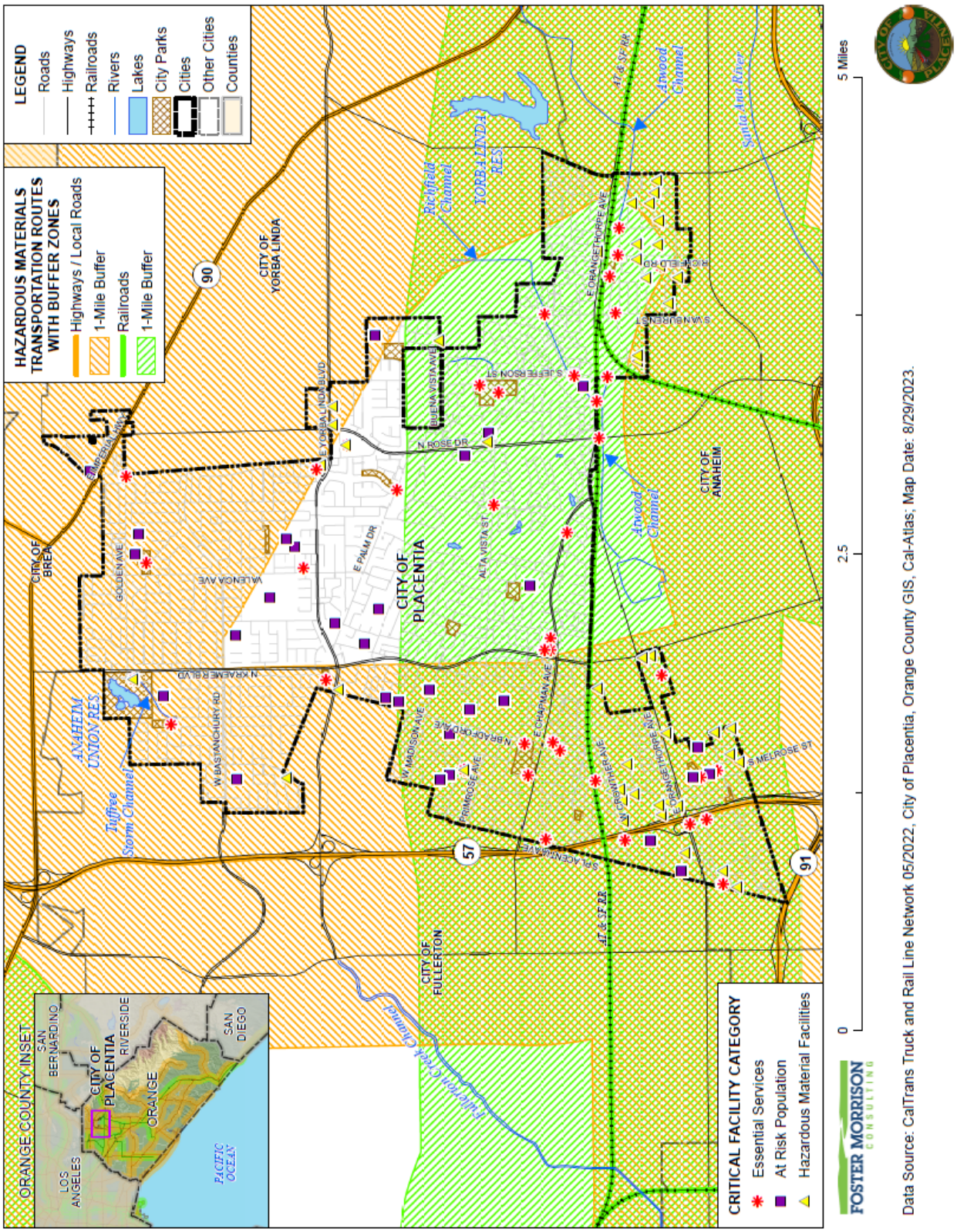


Table 4-86 City of Placentia –Critical Facilities by Category and Type in the Hazardous Materials Buffer Zones by Transportation Route

Hazardous Materials Transportation Routes/ Critical Facility Category	Critical Facility Type	Facility Count
AT & SF Railroad		
Essential Services Facilities	Bridge	10
	City Facility	5
	Police Station	1
	Water Treatment Facilities	1
	Essential Services Facilities Total	**17**
At Risk Population Facilities	Daycare Center	1
	Primary/Secondary School	2
	Senior Apartment	1
	At Risk Population Facilities Total	**4**
Hazardous Material Facilities	Hazardous Material Business	7
	Oil Tank Farm	1
	Water Utilities	1
	Hazardous Material Facilities Total	**9**
AT & SF Railroad Total		**30**
HWY 57		
Essential Services Facilities	City Facility	1
	Essential Services Facilities Total	**1**
At Risk Population Facilities	Primary/Secondary School	1
	Senior Assisted Living	1
	At Risk Population Facilities Total	2
Hazardous Material Facilities	Gas Station	1
	Hazardous Material Business	1
	Hazardous Material Facilities Total	**2**
HWY 57 Total		**5**
HWY 90		
Essential Services Facilities	Bridge	1
	Essential Services Facilities Total	**1**
At Risk Population Facilities	Primary/Secondary School	1
	At Risk Population Facilities Total	**1**
Hazardous Material Facilities	Gas Station	1
	Hazardous Material Business	1
	Hospital	1

Hazardous Materials Transportation Routes/ Critical Facility Category	Critical Facility Type	Facility Count
	Hazardous Material Facilities Total	**3**
HWY 90 Total		**5**
HWY 57 and AT & SF Railroad		
Essential Services Facilities	Bridge	1
	City Facility	4
	Electric Substation	1
	Fire Station	1
	Water Facilities	1
	Essential Services Facilities Total	**8**
At Risk Population Facilities	Daycare Center	3
	Primary/Secondary School	4
	Senior Apartment	1
	At Risk Population Facilities Total	**8**
Hazardous Material Facilities	Hazardous Material Business	7
	Water Utilities	1
	Hazardous Material Facilities Total	**8**
HWY 57 and AT & SF Railroad Total		**24**
HWY 57 and HWY 90		
Essential Services Facilities	City Facility	1
	Essential Services Facilities Total	**1**
At Risk Population Facilities	Primary/Secondary School	1
	At Risk Population Facilities Total	**1**
HWY 57 and HWY 90 Total		**2**
HWY 57, HWY 90, and HWY 142		
Essential Services Facilities	Water Facilities	1
	Essential Services Facilities Total	**1**
Hazardous Material Facilities	Water Utilities	1
	Hazardous Material Facilities Total	**1**
HWY 57, HWY 90, and HWY 142 Total		**2**
HWY 57, HWY 91, and AT & SF Railroad		
Essential Services Facilities	Bridge	4
	City Facility	2
	Essential Services Facilities Total	**6**
At Risk Population Facilities	Daycare Center	2
	Primary/Secondary School	2

Hazardous Materials Transportation Routes/ Critical Facility Category	Critical Facility Type	Facility Count
	Rehabilitation Center	1
	Senior Hospice	1
	At Risk Population Facilities Total	**6**
Hazardous Material Facilities	Gas Station	2
	Hazardous Material Business	12
	Propane Tank Facility	1
	Hazardous Material Facilities Total	**15**
HWY 57, HWY 91, and AT & SF Railroad Total		**27**
HWY 90 and HWY 142		
Essential Services Facilities	Bridge	1
	City Facility	1
	Essential Services Facilities Total	**2**
At Risk Population Facilities	Daycare Center	1
	Primary/Secondary School	2
	At Risk Population Facilities Total	**3**
HWY 90 and HWY 142 Total		**5**
HWY 91 and AT & SF Railroad		
Hazardous Material Facilities	Gas Station	1
	Hazardous Material Business	7
	Hazardous Material Facilities Total	**8**
HWY 91 and AT & SF Railroad Total		**8**
No Hazardous Materials Routes		
Essential Services Facilities	Bridge	1
	Fire Station	1
	Hospital	1
	Essential Services Facilities Total	**3**
At Risk Population Facilities	Daycare Center	2
	Primary/Secondary School	4
	Senior Assisted Living	1
	At Risk Population Facilities Total	**7**
Hazardous Material Facilities	Hospital	1
	Hazardous Material Facilities Total	**1**
No Hazardous Materials Routes Total		**11**
Grand Total		**119**

Source: Cal Trans, City of Placentia GIS

Community Lifelines

A hazardous materials release presents a threat to life and property, including community lifelines in the City. A large-scale release could challenge local response capabilities and require evacuations to save lives. Community lifelines that would be at risk include:

- **Safety and Security** – EMS, police, and fire departments all respond to hazardous materials spills. This puts these individuals at risk and may affect their ability to continue to perform their response duties.
- **Food, Hydration, Shelter** – Temporary shelter, water, and food dispensing areas may need to be set up as residents are displaced due to a hazardous materials release event.
- **Health and Medical** – EMS calls and ER visits may spike due to a hazardous materials release.
- **Transportation** – Highways or bridges may need to be temporarily closed until the release can be resolved.

In the short term, depending on where the hazardous material spill occurs and the nature of the material spilled, health and medical may be temporarily overwhelmed. The City did note that there are no Haz-Mat teams (for response) currently based in the City. Generally in these situations, the City accesses local response teams from nearby jurisdictions. Traditionally the cities of Anaheim and Huntington Beach respond to these types of incidents. The City has no formal mutual aid agreements regarding hazardous materials response.

Natural, Historic, and Cultural Resources

Any natural, historic, or cultural resource that falls in the buffer zone shown on Figure 4-75 has some measure of vulnerability. If a release caused a fire, it could affect historic and cultural resources in the City. Natural resources can be more greatly affected by a hazardous materials spill. Clean up of a spill into a natural resource (such as a creek, stream, or river) may be difficult to complete. Hazardous releases can significantly harm wildlife and habitat areas. The contamination also can make its way up the food chain, affecting the food supply. Open water and wetland environments experience significant exposure to hazardous materials events, which may result in further loss of ecosystem functions.

Economic Assets and Community Activities of Value

Any economic asset that lies in the buffer zone shown on Figure 4-75 would have a measure of vulnerability. Unless the hazardous material spill causes a fire, most hazardous materials spills do not affect structures in the long-term. There may be short term effects until the spill is cleared and cleaned. If one of the activities of value (Heritage Parade, Tamale Festival, etc.) was occurring during the time of the hazardous materials spill, there would be increased vulnerability to those participating and attending those events.

Impacts from Hazardous Materials Transportation

Impacts from hazardous materials transportation incidents vary by location and severity of any given event and will likely only affect certain areas of the City during specific times. Based on the risk assessment, it a hazardous materials transportation release could have potential adverse impacts to affected areas of the

City as described below. However, the majority releases in the City are minor, localized events that are more of a nuisance than a disaster. Impacts that are not quantified, but can be anticipated in large future events, include:

- Injury and loss of life;
- Contaminated water supplies
- Contaminated buildings
- Soil contamination that results in mass die-off of vegetation
- Fire and explosions
- Public health impacts
- Commercial and residential structural and property damage;
- Disruption of and damage to public infrastructure and services;
- Damage to roads/bridges resulting in loss of mobility;
- Business closures and significant economic impact (jobs, sales, tax revenue) to the community;
- Negative impact on commercial and residential property values; and
- Impact on the overall mental health of the community.

These impacts may be exacerbated by the effects of climate change, changes in population patterns (migration, density, or the makeup of socially vulnerable populations), and changes in land use and development.

As discussed in the hazard profile section, it is unlikely that climate change will influence this hazard overtime. The City is approaching built out conditions. Population projections for the City show very limited growth over the next 25 years. Populations are anticipated to grow by only 7.3% between 2025 and 2050, which equates to an annual growth of 0.29%, thus future population growth should not increase the potential impacts from this hazard on City assets. With respect to population patterns such as those associated with migration, density, or makeup of socially vulnerable populations the data shows that most socially vulnerable populations and disadvantaged communities are concentrated in the western portion of the City. Also, FEMA's National Risk Index for Orange County is rated as Very High. Hazardous materials transport will occur in the western portion of the City. If these population patterns continue with respect to vulnerable populations, the vulnerability and potential impacts to City assets will continue to increase in the future.

As described in the land use discussion at the end of Section 4.2.2, a new land use map was developed as part of the General Plan efforts in 2023, which establishes the basic pattern of development in the City for the next 20-25 years, including land uses and densities. Thus, while future development within hazard areas generally contributes to some increase of impacts on City assets, given the limited potential for significant future growth in Placentia and the newly developed land use map, future changes in land use and development are unlikely to contribute to any notable change in the vulnerability of the City to this hazard.

Future Development

Development will continue to happen within hazardous materials transportation corridors due to the large area within the City located within these corridors. Those who choose to develop in these areas should be made aware of the risks associated with living within close proximity to a hazardous materials

transportation route. Future development areas and their vulnerability to hazardous materials transport are discussed further in the below GIS analysis.

GIS Analysis

The City provided 19 future development areas which were used as the basis for the inventory of future development areas for the City. Utilizing the future development area spatial layer, the parcel centroid data was intersected to determine the parcel counts and acreage within each area. Figure 4-77 shows the locations of the future development areas overlayed on the hazardous materials transportation routes and buffer zones. Table 4-87 shows the parcels and acreages of each future development area in the City by hazardous materials transportation route.

Figure 4-77 City of Placentia – Future Development Areas and Hazardous Materials Transportation Routes and Buffer Zones

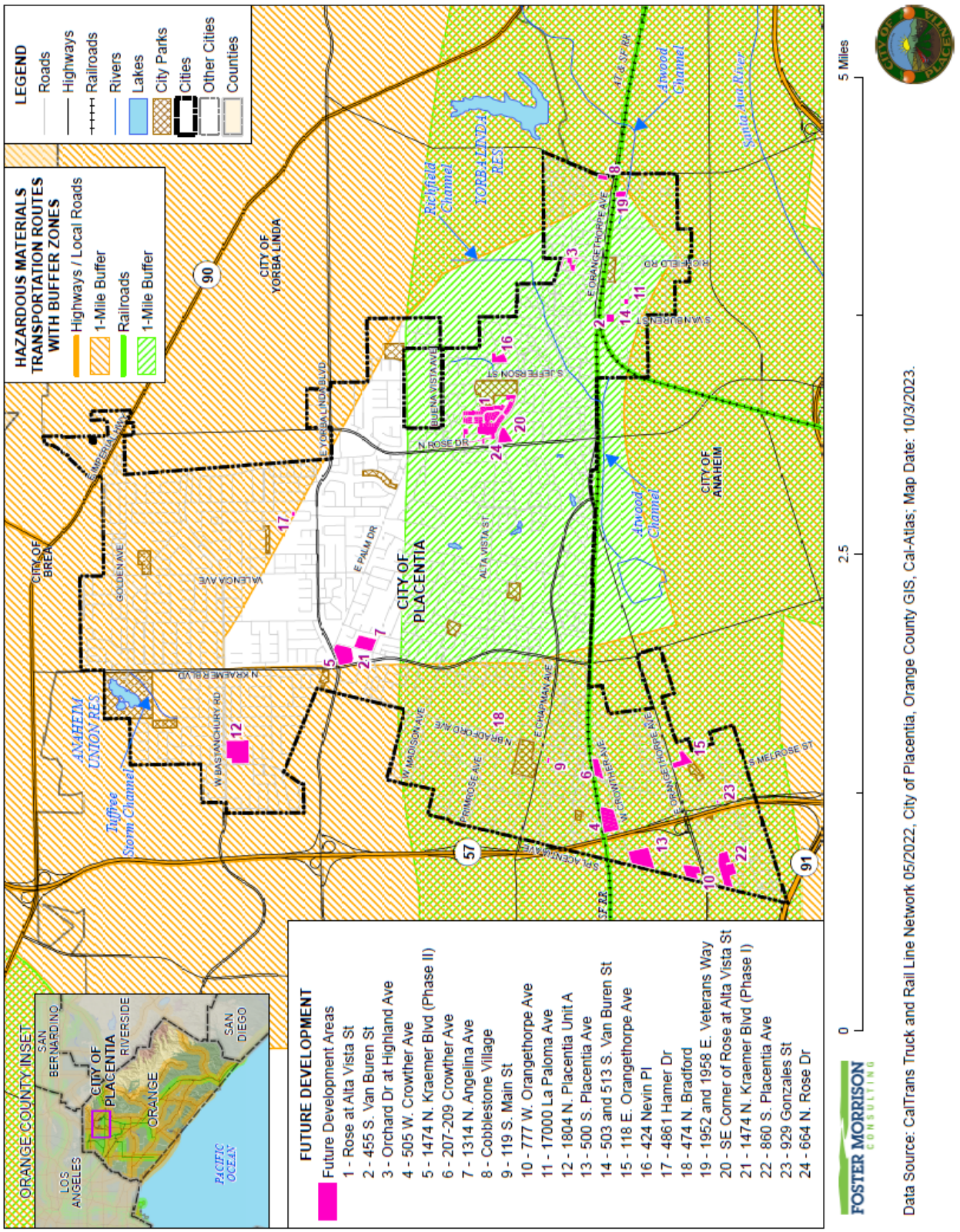


Table 4-87 City of Placentia – Future Development Areas and Hazardous Materials Transportation Routes and Buffer Zones

Hazardous Materials Transportation Routes/Map #	Future Development Areas	Total Parcel Count	Improved Parcel Count	Total Acres
AT & SF Railroad				
1	Rose at Alta Vista St	65	0	10.86
2	455 S. Van Buren St	1	1	0.17
3	Orchard Dr at Highland Ave	1	0	1.15
11	17000 La Paloma Ave	1	0	0.26
14	503 & 513 S. Van Buren St	2	2	0.38
16	424 Nevin Pl	1	0	1.78
19	1952 & 1958 E. Veterans Way	1	0	0.78
20	SE Corner of Rose at Alta Vista St	1	0	8.25
24	664 N. Rose Dr	1	1	3.88
AT & SF Railroad Total		**74**	**4**	**27.52**
HWY 57				
12	1804 N. Placentia Unit A	1	1	8.17
HWY 57 Total		**1**	**1**	**8.17**
HWY 57 and AT & SF Railroad				
4	505 W. Crowther Ave	6	1	5.60
6	207-209 Crowther Ave	4	1	2.09
9	119 S. Main St	1	1	0.15
18	474 N. Bradford	1	1	0.19
HWY 57 and AT & SF Railroad Total		**12**	**4**	**8.03**
HWY 57, HWY 91, and AT & SF Railroad				
10	777 W. Orangethorpe Ave	1	1	2.72
13	500 S. Placentia Ave	1	1	5.82
15	118 E. Orangethorpe Ave	1	1	2.38
22	860 S. Placentia Ave	1	1	6.28
23	929 Gonzales St	1	0	0.08
HWY 57, HWY 91, and AT & SF Railroad Total		**3**	**3**	**10.92**
HWY 90				
17	4861 Hamer Dr	1	1	0.17
HWY 90 Total		**1**	**1**	**0.17**
HWY 90 and AT & SF Railroad				
8	Cobblestone Village	1	0	0.59
HWY 90 and AT & SF Railroad Total		**1**	**0**	**0.59**

Hazardous Materials Transportation Routes/Map #	Future Development Areas	Total Parcel Count	Improved Parcel Count	Total Acres
No Hazardous Materials Routes				
5	1474 N. Kraemer Blvd (Phase II)	1	1	4.67
7	1314 N. Angelina Ave	1	1	3.84
21	1474 N. Kraemer Blvd (Phase I)	1	1	4.67
No Hazardous Materials Routes Total		**3**	**3**	**13.18**

Source: Cal Trans; City of Placentia GIS

4.3.12. Landslide, Mudslide, and Debris Flows

Hazard Profile

This hazard profile contains multiple sections that detail how this hazard can affect the City. These sections include a hazard/problem description; description of location and extent; past occurrences of this hazard; and how climate change can affect this hazard.

Hazard/Problem Description

Like its earthquake-generating faults, California's mountainous terrain is a consequence of dynamic geologic processes in operation as the North American Plate grinds past the Pacific Plate. According to the CGS, a landslide is a general term for a variety of mass-movement processes that generate a down-slope movement of mud, soil, rock, and/or vegetation. Landslides are classified into many different types based on form and type of movement. They range from slow-moving rotational slumps and earth flows, which can slowly distress structures but are less threatening to personal safety, to fast-moving rock avalanches and debris flows that are a serious threat to structures and have been responsible for most fatalities during landslide events. For the purposes of this Plan, the term landslide includes mudslides, debris flows, and rockfalls that tend to occur suddenly; as well as hillside erosion, which is a similar process that tends to occur on smaller scales and more gradually but can exacerbate landslide events.

Landslides, debris flows and mudslides are closely related to flooding, as both processes are related to precipitation, runoff, and the saturation of ground by water. In addition, landslides, mud flows, and debris flows can occur on small, steep stream channels and are often mistaken for floods. However, landslide events may be much more destructive than floods because of their higher densities, high debris loads, and high velocities.

Natural conditions that contribute to landslide, mudslides, debris flows, hillside and streambank erosion, include the following:

- Degree of slope
- Water (heavy rain, river flows, or wave action)
- Unconsolidated soil or soft rock and sediments
- Lack of vegetation (no stabilizing root structure)
- Previous wildfires and other forest disturbances (discussed in Section 4.3.18)

- Road building, excavation, and grading
- Earthquake (earthquake induced landslide is discussed in Section 4.3.8)

The 2023 (Draft) State Hazard Mitigation Plan noted that more than one third of California is mountainous terrain that generally trends parallel to the coast, forming a barrier that captures moisture from offshore storms originating in the Gulf of Alaska and Mexico. Steep topography, weak rocks, heavy winter rains, and occasional earthquakes all lead to slope failures more frequently than would otherwise occur under gravity alone. This is true in the sloped areas bordering the City where the topography is characterized by rolling hills and ridges.

Location and Extent

Landslides can be expected in areas with steep slopes and weak soils. It can also occur in areas where streambank erosion has occurred. Both winter storm and earthquake triggered landslides tend to occur in or near places that have experienced previous landslides. However, landslides may also occur in other locations. The 2019 Placentia Safety Element noted that few local slope instabilities appear in the northwest area of the City, just south side of Anaheim Union Reservoir in Tri City Park.

The 2023 (Draft) State Hazard Mitigation Plan noted that although the area affected by a single landslide is less than that of earthquakes; landslides are pervasive in California's mountainous terrain and occur far more often (though Placentia is not in this mountainous area). Destructive landslides, mudslides, and debris flows usually occur very suddenly with little or no warning time and are short in duration. But sometimes, they can continue over a prolonged period of time.

Figure 4-78 shows the CGS areas at susceptible to deep seated landslides. The legend on Figure 4-78 shows the susceptibility scale (from 0-X with 0 being the least and X being the most susceptible) that the CGS uses to show the susceptibility of landslides. It is a primarily a combination of slope class and rock strength. Figure 4-78 indicates that portions of the City and surrounding area are moderate to high susceptibility areas for landslides. The speed of onset of landslide is often short, especially in post-wildfire burn scar areas, but it can also take years for a slope to fail. Landslide duration is usually short, though digging out and repairing landslide areas can take some time. Geographic landslide extents are summarized in Table 4-88 and detailed by land use in Table 4-89.

According to the 2023 State Hazard Mitigation Plan, the susceptibility classes were further categorized into Very High (susceptibility class X) and High (susceptibility classes VII, VIII, & IX) for exposure analysis. The rest of the classes were not categorized. CGS mapping indicates that the eastern portions of the Planning Area and surrounding area are at high to very high susceptibility areas for landslides. This can be seen in the darker orange and red colors. The speed of onset of landslide is often short, especially in post-wildfire burn scar areas, but it can also take years for a slope to fail. Landslide duration is usually short, though digging out and repairing landslide areas can take some time.

Figure 4-78 Deep-Seated Landslide Susceptibility Areas

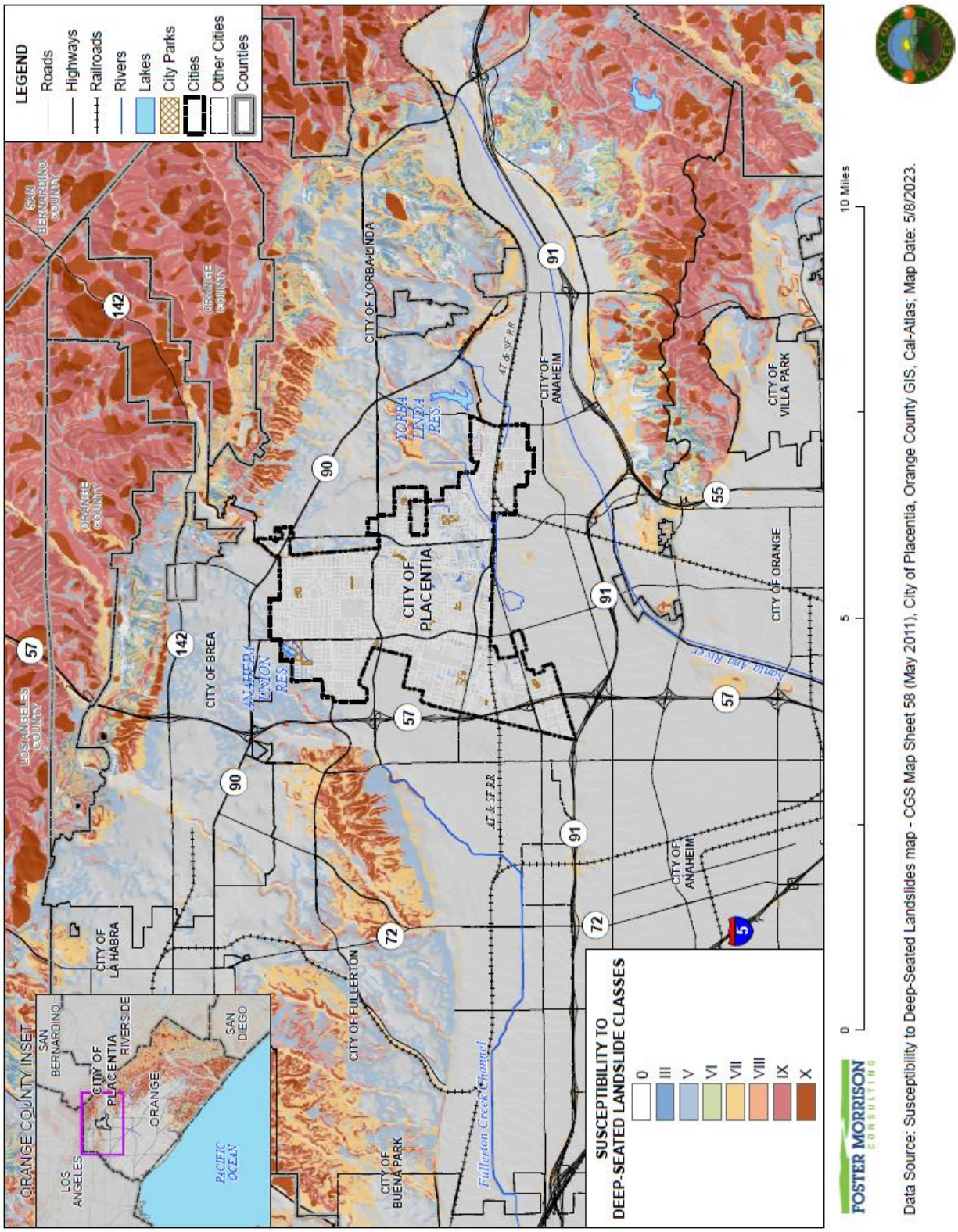


Table 4-88 City of Placentia – Geographical Extent of Deep-Seated Landslide Susceptibility Areas

Susceptibility to Deep-Seated Landslides Class*	Total Acres	% of Total Acres	Improved Acres	% of Total Improved Acres	Unimproved Acres	% of Total Unimproved Acres
0	3,015	88.2%	2,448	90.6%	567	79.3%
V	305	8.9%	5	0.2%	7	1.0%
VII	54	1.6%	204	7.6%	100	14.0%
VIII	28	0.8%	28	1.0%	26	3.6%
IX	12	0.3%	15	0.6%	13	1.8%
X	4	0.1%	2	0.1%	2	0.3%
Grand Total	**3,418**	**100.0%**	**2,703**	**100.0%**	**715**	**100.0%**

Source: CGS

* Classes III, IV, VI not included in tables since these classes are not present within the Placentia boundary.

Table 4-89 City of Placentia – Geographical Extent of Deep-Seated Landslide Susceptibility Areas by Hazard Class and Land Use

Susceptibility to Deep-Seated Landslides Class*/ Land Use	Total Acres	% of Total Acres	Improved Acres	% of Total Improved Acres	Unimproved Acres	% of Total Unimproved Acres
0						
Agricultural	19	0.56%	0	0.02%	19	2.61%
Commercial	327	9.57%	296	10.95%	31	4.34%
Industrial	287	8.41%	265	9.81%	22	3.09%
Miscellaneous	1	0.03%	0	0.0%	1	0.13%
Residential	1,825	53.40%	1,652	61.13%	173	24.20%
Tax Exempt	394	11.54%	234	8.67%	160	22.39%
Unknown	161	4.72%	0	0.0%	161	22.55%
0 Total	**3,015**	**88.22%**	**2,448**	**90.58%**	**567**	**79.30%**
V						
Agricultural	4	0.12%	0	0.0%	4	0.57%
Commercial	55	1.62%	38	1.42%	17	2.36%
Industrial	6	0.18%	6	0.22%	0	0.04%
Miscellaneous	0	0.0%	0	0.0%	0	0.0%
Residential	182	5.33%	146	5.40%	36	5.07%
Tax Exempt	28	0.81%	14	0.53%	13	1.88%
Unknown	29	0.86%	0	0.0%	29	4.12%

Susceptibility to Deep-Seated Landslides Class*/ Land Use	Total Acres	% of Total Acres	Improved Acres	% of Total Improved Acres	Unimproved Acres	% of Total Unimproved Acres
V Total	**305**	**8.92%**	**204**	**7.57%**	**100**	**14.05%**
VII						
Agricultural	1	0.03%	0	0.0%	1	0.13%
Commercial	12	0.34%	6	0.21%	6	0.84%
Industrial	2	0.05%	1	0.04%	1	0.08%
Miscellaneous	0	0.0%	0	0.0%	0	0.0%
Residential	25	0.74%	20	0.72%	6	0.80%
Tax Exempt	10	0.30%	1	0.05%	9	1.25%
Unknown	4	0.11%	0	0.0%	4	0.53%
VII Total	**54**	**1.57%**	**28**	**1.03%**	**26**	**3.63%**
VIII						
Agricultural	0	0.01%	0	0.0%	0	0.05%
Commercial	2	0.06%	2	0.06%	0	0.06%
Industrial	0	0.01%	0	0.02%	0	0.0%
Miscellaneous	0	0.0%	0	0.0%	0	0.0%
Residential	17	0.51%	11	0.40%	6	0.89%
Tax Exempt	3	0.08%	2	0.08%	0	0.05%
Unknown	5	0.15%	0	0.0%	5	0.71%
VIII Total	**28**	**0.81%**	**15**	**0.56%**	**13**	**1.77%**
IX						
Agricultural	1	0.02%	0	0.0%	1	0.10%
Commercial	0	0.01%	0	0.02%	0	0.00%
Industrial	1	0.02%	0	0.01%	0	0.04%
Miscellaneous	0	0.0%	0	0.0%	0	0.0%
Residential	6	0.19%	4	0.15%	2	0.34%
Tax Exempt	1	0.02%	0	0.00%	1	0.10%
Unknown	3	0.08%	0	0.0%	3	0.38%
IX Total	**12**	**0.34%**	**5**	**0.18%**	**7**	**0.96%**
X						
Agricultural	0	0.01%	0	0.0%	0	0.04%
Commercial	0	0.00%	0	0.00%	0	0.0%
Industrial	0	0.01%	0	0.0%	0	0.04%
Miscellaneous	0	0.0%	0	0.0%	0	0.0%

Susceptibility to Deep-Seated Landslides Class*/ Land Use	Total Acres	% of Total Acres	Improved Acres	% of Total Improved Acres	Unimproved Acres	% of Total Unimproved Acres
Residential	3	0.09%	2	0.08%	1	0.12%
Tax Exempt	0	0.01%	0	0.0%	0	0.04%
Unknown	0	0.01%	0	0.0%	0	0.04%
X Total	4	0.13%	2	0.08%	2	0.29%
Grand Total	**3,418**	**100.00%**	**2,703**	**100.00%**	**715**	**100.00%**

Source: CGS

* Classes III, IV, VI not included in tables since these classes are not present within the Placentia boundary.

Past Occurrences

Disaster Declaration History

There have been no disaster declarations associated with landslides in Orange County, as shown in Table 4-4.

NCDC Events

The NCDC contains no records for landslides in Orange County.

Hazard Mitigation Planning Committee Events

The HMPC could not no events of past landslide that caused damages in the City.

Probability of Future Occurrences

Unlikely— There are limited sloped areas within the City with the potential for damaging landslides, mudslides, and debris flows. Due to the topography in and around the City and the lack of past occurrences, future occurrences of landslide, mudslide, and debris flow is considered unlikely.

Climate Change and Landslides

According to the 2021 CAS and Cal-Adapt, increased precipitation may result from climate change. Increased precipitation makes susceptible areas more vulnerable to landslide potential. More information on precipitation increases can be found in Section 4.3.3.

Vulnerability Assessment

Vulnerability—Low

Landslides, debris flows and mudslides are closely related to flooding (see Section 4.3.9), as both processes are related to precipitation, runoff, and the saturation of ground by water. In addition, landslides and mudflows can occur on small, steep stream channels and are often mistaken for floods. However, landslides and mudslides may be much more destructive than floods because of their higher densities, high debris loads, and high velocities. Landslide effects on the City are expected to be limited given the topography of the City.

Vulnerability of the community is discussed in multiple sections that detail how this hazard can affect the City. These sections include assets at risk, impacts, and how future development can be affected by this hazard. For the sections below, the following methodology was used for analysis.

Methodology

The 2011 California Geologic Survey Deep Seated Landslide Susceptibility data was obtained for the City. According to the landslide layer obtained by the CGS there landslide incidence ranges from low to moderate in the County. The Orange County 2022 Parcel/Assessor data was used as the basis for the inventory of all parcels within the City. GIS was used to overlay the landslide hazard layer onto the parcel layer, and where the landslide susceptibility classes intersected a parcel centroid, it was assigned with that hazard class for the entire parcel.

Assets at Risk from Landslide, Mudslide, and Debris Flows

Assets at risk from landslide, mudslide, and debris flow include: people and populations; structures; critical facilities and infrastructure, and community lifelines; natural, historic, and cultural resources; and economic assets and community activities of value. These are discussed in the following sections.

Population at Risk

All populations located within areas of landslide susceptibility, especially in the High to Very High hazard areas (i.e., Classes VII to X) are at some vulnerability to landslide. This includes those people residing in these landslide potential areas as well as those that might reside or work within the landslide run out areas. People residing in these areas may also be cut off from transportation routes if roads and streets providing a means of ingress and egress are impacted. Certain vulnerable populations may be at greater risk due to the often sudden onset of a landslide event and include: the unsheltered, those with limited mobility, and those that lack the resources to leave the area.

City residents that live in the High and Very High landslide susceptibility areas are often the most vulnerable, but those who live in in the landslide run out areas (which are not mapped) are also vulnerable. Not only are the residents at risk, but their homes and contents are all at risk, compounding the impacts associated with significant hazard events. To further evaluate the impact to Placentia's residential population residing within these hazard areas, an analysis was conducted of those who physically reside in the mapped landslide susceptibility areas. The CGS Susceptibility to Deep Seated Landslide maps were

overlayed on the parcel layer and linked to the assessor data. Those residential parcel centroids that intersect the Deep-Seated Landslide areas were counted and multiplied by the 2020 Census Bureau average household factors for the City of Placentia (3.14). Results are shown in Table 4-90. As shown, only a small portion of the population falls in the upper classes, where risk is greater.

Table 4-90 City of Placentia – Improved Residential Parcels and Population by Deep Seated Landslide Susceptibility Area Hazard Class

Susceptibility to Deep-Seated Landslides Class	City of Placentia	
	Improved Residential Parcels	Population
0	10,185	31,981
V	1,014	3,184
VII	100	314
VIII	98	308
IX	29	91
X	3	9
Grand Total	**11,429**	**35,887**

Source: CGS, US Census Bureau, Orange County 2022 Parcel/Assessor's Data

* Classes III, IV, VI not included in tables since these classes are not present within the Placentia boundary.

Structures

Landslides can affect the built environment of the City and those structures located within the High to Very High hazard areas (i.e., Classes VII to X) are especially vulnerable, as are the structures located within the landslide run out areas. The CGS Deep Seated Landslide layer (shown on Figure 4-78 above) was overlaid with the City parcel/assessor layer in GIS to obtain results. Table 4-91 summarizes and Table 4-92 details the total land, improved parcels (structures) and content replacement values in the City from properties in the CGS Deep Seated Landslide areas. As shown, only a small portion of the values fall in the upper classes, where risk is greater. Also, it is important to keep in mind that these assessed values may be well below the actual market value of improved parcels located within the landslide incidence and susceptibility areas due primarily to Proposition 13.

Table 4-91 City of Placentia – Count and Values of Parcels (and Structures) in Deep-Seated Landslide Susceptibility Area by Hazard Class

Susceptibility to Deep-Seated Landslides Class*	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
0	11,389	10,644	$4,119,493,373	$2,355,320,075	$1,583,555,580	$8,079,553,822
V	1,137	1,036	$368,722,336	$281,989,154	$151,227,914	$801,940,064
VII	126	103	$44,162,816	$34,744,343	$23,066,800	$101,973,959
VIII	110	98	$30,894,887	$23,179,172	$11,589,588	$65,663,647

Susceptibility to Deep-Seated Landslides Class*	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
IX	35	29	$7,612,695	$4,919,480	$2,459,742	$14,991,917
X	6	3	$2,017,344	$327,758	$163,880	$2,508,982
Grand Total	**12,803**	**11,913**	**$4,572,903,451**	**$2,700,479,982**	**$1,772,063,504**	**$9,066,632,391**

Source: CGS, Orange County 2022 Parcel/Assessor's Data

* Classes III, IV, VI not included in tables since these classes are not present within the Placentia boundary.

Table 4-92 City of Placentia – Count and Values of Parcels (and Structures) in Deep-Seated Landslide Susceptibility Area by Hazard Class and Land Use

Susceptibility to Deep-Seated Landslides Class*/Land Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
0						
Agricultural	17	2	$1,200,226	$223,742	$223,742	$1,647,710
Commercial	217	198	$269,846,333	$217,780,346	$217,780,346	$713,339,304
Industrial	233	214	$322,646,134	$211,975,039	$317,962,558	$865,804,893
Miscellaneous	3	0	$76,908	$0	$0	$76,908
Residential	10,649	10,185	$3,461,874,360	$1,840,422,546	$920,211,334	$6,222,539,593
Tax Exempt	179	45	$63,849,412	$84,918,402	$127,377,600	$276,145,414
Unknown	91	**0**	$0	$0	$0	$0
0 Total	**11,389**	**10,644**	**$4,119,493,373**	**$2,355,320,075**	**$1,583,555,580**	**$8,079,553,822**
V						
Agricultural	**0**	**0**	$0	$0	$0	$0
Commercial	20	14	$9,745,896	$3,404,846	$3,404,846	$16,556,248
Industrial	3	2	$10,896,211	$8,114,609	$12,171,914	$31,182,734
Miscellaneous	**0**	**0**	$0	$0	$0	$0
Residential	1,094	1,014	$344,062,301	$270,053,383	$135,026,679	$749,142,363
Tax Exempt	12	6	$4,017,928	$416,316	$624,475	$5,058,719
Unknown	8	**0**	$0	$0	$0	$0
V Total	**1,137**	**1,036**	**$368,722,336**	**$281,989,154**	**$151,227,914**	**$801,940,064**
VII						
Agricultural	1	**0**	$6,988	$0	$0	$6,988
Commercial	4	3	$4,807,167	$11,389,257	$11,389,257	$27,585,681
Industrial	0	0	$0	$0	$0	$0
Miscellaneous	0	0	$0	$0	$0	$0
Residential	115	100	$37,352,565	$23,355,086	$11,677,543	$72,385,194

Susceptibility to Deep-Seated Landslides Class*/Land Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Tax Exempt	5	0	$1,996,096	$0	$0	$1,996,096
Unknown	1	0	$0	$0	$0	$0
VII Total	**126**	**103**	**$44,162,816**	**$34,744,343**	**$23,066,800**	**$101,973,959**
VIII						
Agricultural	0	0	$0	$0	$0	$0
Commercial	0	0	$0	$0	$0	$0
Industrial	0	0	$0	$0	$0	$0
Miscellaneous	0	0	$0	$0	$0	$0
Residential	108	98	$30,894,887	$23,179,172	$11,589,588	$65,663,647
Tax Exempt	0	0	$0	$0	$0	$0
Unknown	2	0	$0	$0	$0	$0
VIII Total	**110**	**98**	**$30,894,887**	**$23,179,172**	**$11,589,588**	**$65,663,647**
IX						
Agricultural	1	0	$41,959	$0	$0	$41,959
Commercial	0	0	$0	$0	$0	$0
Industrial	0	0	$0	$0	$0	$0
Miscellaneous	0	0	$0	$0	$0	$0
Residential	34	29	$7,570,736	$4,919,480	$2,459,742	$14,949,958
Tax Exempt	0	0	**$0**	**$0**	**$0**	**$0**
Unknown	0	0	**$0**	**$0**	**$0**	**$0**
IX Total	**35**	**29**	**$7,612,695**	**$4,919,480**	**$2,459,742**	**$14,991,917**
X						
Agricultural	0	0	$0	$0	$0	$0
Commercial	0	0	$0	$0	$0	$0
Industrial	1	0	$937,815	$0	$0	$937,815
Miscellaneous	0	0	$0	$0	$0	$0
Residential	5	3	$1,079,529	$327,758	$163,880	$1,571,167
Tax Exempt	0	0	$0	$0	$0	$0
Unknown	0	0	$0	$0	$0	$0
X Total	**6**	**3**	**$2,017,344**	**$327,758**	**$163,880**	**$2,508,982**
Grand Total	**12,803**	**11,913**	**$4,572,903,451**	**$2,700,479,982**	**$1,772,063,504**	**$9,066,632,391**

Source: CGS, Orange County 2022 Parcel/Assessor's Data

* Classes III, IV, VI not included in tables since these classes are not present within the Placentia boundary.

Critical Facilities and Infrastructure, and Community Lifelines

Landslides present a threat to critical facilities, infrastructure, and community lifelines. The following analysis discusses critical facilities and infrastructure, followed by community lifelines.

Critical Facilities and Infrastructure

Landslide presents a risk to the critical facilities and infrastructure in the City. A separate analysis was performed on the critical facility inventory in the City of Placentia to determine critical facilities in the deep-seated landslide areas. Using GIS, the deep-seated landslide areas were overlayed on the critical facility GIS layer. Figure 4-79 shows critical facilities, as well as the deep-seated landslide classes. Table 4-93 provides information by category of critical facilities in the deep-seated landslide classes. As shown, only a small portion of the critical facilities falls in the upper classes, where risk is greater. Details of critical facility type, name, and address by deep seated landslide class are listed in Appendix F.

Figure 4-79 City of Placentia – Critical Facilities in Deep Seated Landslide Susceptibility Areas by Hazard Class

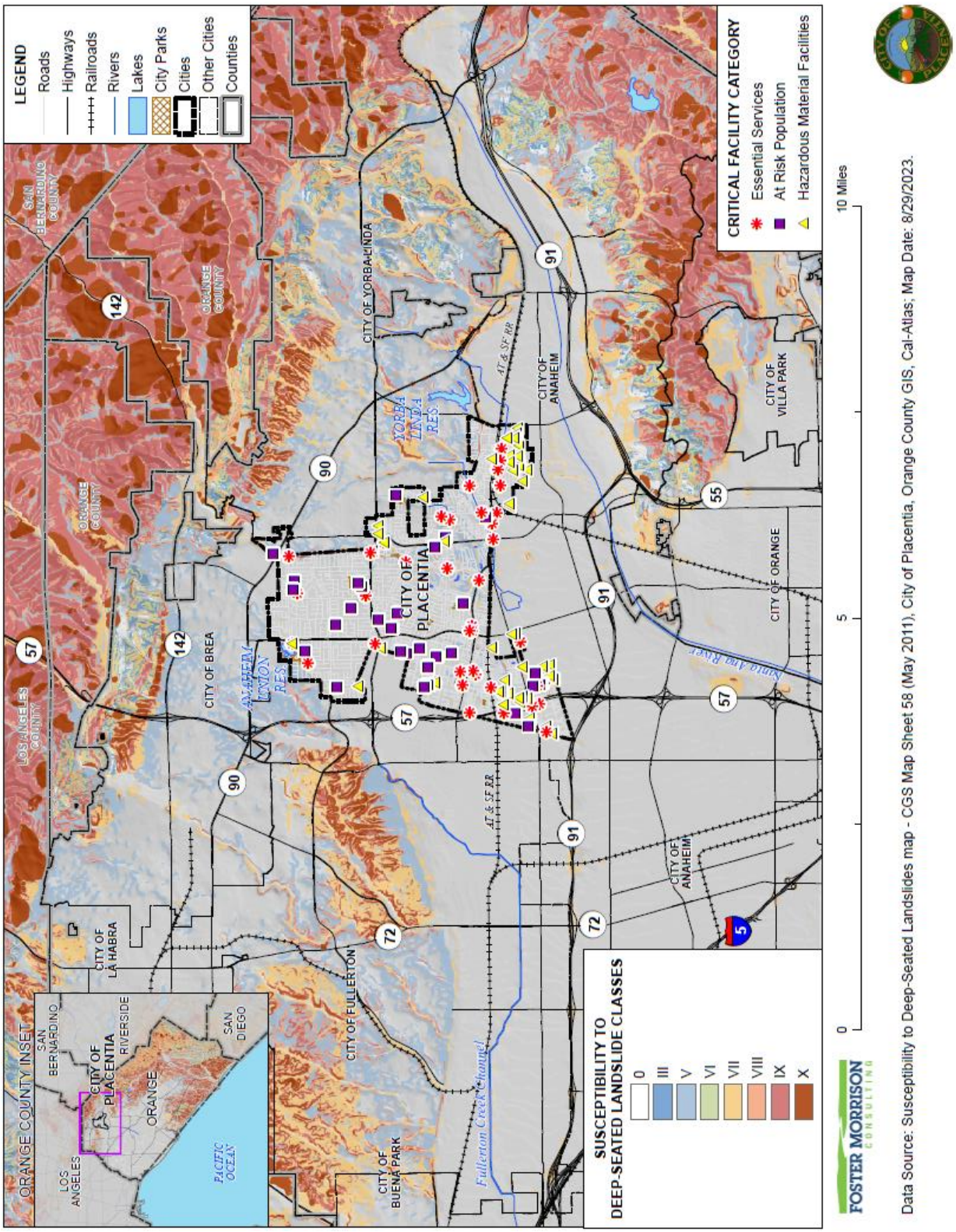


Table 4-93 City of Placentia – Critical Facility Counts in Deep Seated Landslide Susceptibility Area by Hazard Class and Critical Facility Category and Type

Susceptibility to Deep-Seated Landslide Areas/ Critical Facility Category	Critical Facility Type	Facility Count
0		
Essential Services Facilities	Bridge	18
	City Facility	11
	Electric Substation	1
	Fire Station	2
	Hospital	1
	Police Station	1
	Water Facilities	2
	Water Treatment Facilities	1
	Essential Services Facilities Total	**37**
At Risk Population Facilities	Daycare Center	9
	Primary/Secondary School	17
	Rehabilitation Center	1
	Senior Apartment	2
	Senior Assisted Living	1
	Senior Hospice	1
	At Risk Population Facilities Total	**31**
Hazardous Material Facilities	Gas Station	5
	Hazardous Material Business	34
	Hospital	1
	Oil Tank Farm	1
	Propane Tank Facility	1
	Water Utilities	3
	Hazardous Material Facilities Total	**45**
0 **Total**		**113**
V		
Essential Services Facilities	City Facility	2
	Essential Services Facilities Total	**2**
Hazardous Material Facilities	Hazardous Material Business	1
	Hazardous Material Facilities Total	**1**
V Total		**3**
VII		
At Risk Population Facilities	Senior Assisted Living	1

Susceptibility to Deep-Seated Landslide Areas/ Critical Facility Category	Critical Facility Type	Facility Count
	At Risk Population Facilities Total	**1**
Hazardous Material Facilities	Hospital	1
	Hazardous Material Facilities Total	**1**
VII Total		**2**
VIII		
Essential Services Facilities	City Facility	1
	Essential Services Facilities Total	**1**
VIII Total		**1**
Grand Total		**119**

Source: CGS, City of Placentia GIS

Community Lifelines

Community lifelines at risk to landslide include:

- **Safety and Security** – Many City personnel would be involved in response and recovery efforts. This includes police, fire, EMS, public works, and other personnel.
- **Food, Hydration, and Shelter** – As homes are damaged, shelter needs would significantly increase. Temporary housing would be to be established. Water supplies could be offline for an extended period. Residents, visitors, and others caught in a large event would need to find sources of food and water until the Planning Area recovers.
- **Health and Medical** – Injuries and deaths can occur. This causes EMS calls and ER visits to spike. Transporting patients to medical facilities may be difficult. Depending on the extent of injuries and deaths the capacity of medical facilities could be strained and eventually overwhelmed.
- **Energy** – The power grid may be damaged from landslide. Fuel transportation may need to be delayed or rerouted, causing temporary shortages.
- **Communications** – Communications systems may be damaged during landslide events. Messaging boards and alerts need to be then put into place to ensure public safety and order.
- **Transportation** – Major damage can occur to roads and bridges in the City. Damage can also occur to rail lines and airports in and near the Planning Area. Roads may be closed due to damage, or to debris on the roads from earthquake events. These closures could be place for an extended period while debris clearing efforts are undertaken to allow repairs to be made.
- **Hazardous Material** – Hazardous materials facilities can be compromised during times of landslide events causing releases of contaminants into the environment. Natural gas pipelines can be affected by earthquakes. This can affect not only residents, but those who are charged with responding to or resolving the spill/rupture.
- **Water Systems** – Water, drainage, and wastewater systems can be damaged.

As shown on Figure 4-92 the City has limited areas of landslide vulnerability (those in classes VII to X). As such, lifelines in the City are unlikely to have anything more than minimal vulnerabilities to landslides. Community lifelines would likely not be overwhelmed by a landslide event.

Natural, Historic, and Cultural Resources

A landslide event could have an impact on the City. Landslides can affect natural, historic, and cultural resources that lie in the landslide area or the landslide run out zone. Landslides can wipe out large tracts of forest, destroy wildlife habitat, and remove productive soils and vegetation from slopes. It can also fill in waterways and potentially affect flooding potential. Any of these that fall in the red zones shown on Figure 4-92 would be vulnerable. As shown on the map, this would be a small area of the City.

Economic Assets and Community Activities of Value

A landslide event could have an impact on the City. Landslides can affect economic assets if they fall into the runout area, or if they are cut off from the major arterial routes in the City. Any of these that fall in the red zones shown on Figure 4-92 would be vulnerable. As shown on the map, this would be a small area of the City. Given the limited areas of landslide in the City, economic assets and community activities of value are unlikely to be vulnerable to landslide.

Impacts From Landslide, Mudslide, and Debris Flow

In the City, a few local slope areas and instabilities appear in the northwest area of the City, just south side of Anaheim Union Reservoir in Tri City Park. Any type of landslide may result in damages or complete destruction of buildings in their path, as well as deaths and injuries. Landslides can cause road blockages by depositing debris on road surfaces or road damage if the road surface itself slides downhill. Utility lines and pipes are also prone to breakage in slide areas.

Landslides can collapse into water bodies, causing tsunamis or seiches. In 1958, a magnitude 8 earthquake collapsed a hillside into Lituya Bay, Alaska, causing a water splash wave that reached 1,720 feet up a mountain slope, stripping all vegetation. A massive landslide into the Vaoint Reservoir in Italy in 1963 caused a water splash wave that swept 800 feet over the top of a dam, causing a major flood that killed an estimated 2,600 people below. Landslides can relocate river channels, as occurred during the Oso mudslide in Washington State in March 2014. Landslides and debris flows can impact water quality and the storage capacity of surface water reservoirs used to store potable water.

Landslides, debris flows, and mud flow impacts vary by location and severity of any given event and will likely only affect certain areas of the City during specific times. Based on the risk assessment, there is limited potential for significant landslides to occur in the City. Most of the historic landslides in the Planning Area have been minor, localized events that are more of a nuisance than a disaster. Only a small portion of the City falls in the upper classes of landslide risk.

These impacts may be exacerbated by the effects of climate change, changes in population patterns (migration, density, or the makeup of socially vulnerable populations), and changes in land use and development.

As discussed in the hazard profile section, climate change is anticipated to exacerbate this hazard over time. Regarding population patterns, the City is approaching built out conditions. Population projections for the City show very limited growth over the next 25 years. Populations are anticipated to grow by only 7.3% between 2025 and 2050, which equates to an annual growth of 0.29%, thus future population growth should

not increase the potential impacts from this hazard on City assets. With respect to population patterns such as those associated with migration, density, or makeup of socially vulnerable populations the data shows that most socially vulnerable populations and disadvantaged communities are concentrated in the western portion of the City. Also, FEMA's National Risk Index for Orange County is rated as Very High. Landslide maps show limited hazard risk occurring in the western portion of the City. Thus, even if these population patterns continue, it is unlikely that the vulnerability and potential impacts from this hazard to City assets will significantly change.

As described in the land use discussion at the end of Section 4.2.2, a new land use map was developed as part of the General Plan efforts in 2023, which establishes the basic pattern of development in the City for the next 20-25 years, including land uses and densities. The future development in Table 4-94 below shows only one future development property in a moderate or higher deep seated landslide class. Thus, while future development within hazard areas generally contributes to some increase of impacts on City assets, given the limited potential for significant future growth in Placentia, future changes in land use and development are unlikely to contribute to any notable change in the vulnerability of the City to this hazard. In addition, the City has a development review process which includes the consideration of hazard constraints and updated building codes that should further limit the impacts of these hazards on City assets.

Future Development

Although new growth and development corridors could fall in the area affected by moderate or higher risk of landslide (shown as classes VII to X on the maps above), given the small chance of a major landslide and the building codes and erosion ordinance in effect regarding the siting and construction of structures in identified hazard areas, development in the landslide potential areas is unlikely to affect the City in the future. Future development areas and their vulnerability to landslide are discussed further in the below GIS analysis.

Future Development GIS Analysis

The City provided 19 future development areas which were used as the basis for the inventory of future development areas for the City. Utilizing the future development area spatial layer, the parcel centroid data was intersected with the deep-seated landslide areas to determine the parcel counts and acreage within each hazard class. Figure 4-80 shows the locations of the future development areas overlayed on the deep-seated landslide areas. Table 4-94 shows the parcels and acreages of each future development area in the City by deep-seated landslide areas.

Figure 4-80 City of Placentia – Future Development Areas and Deep-Seated Landslide Areas

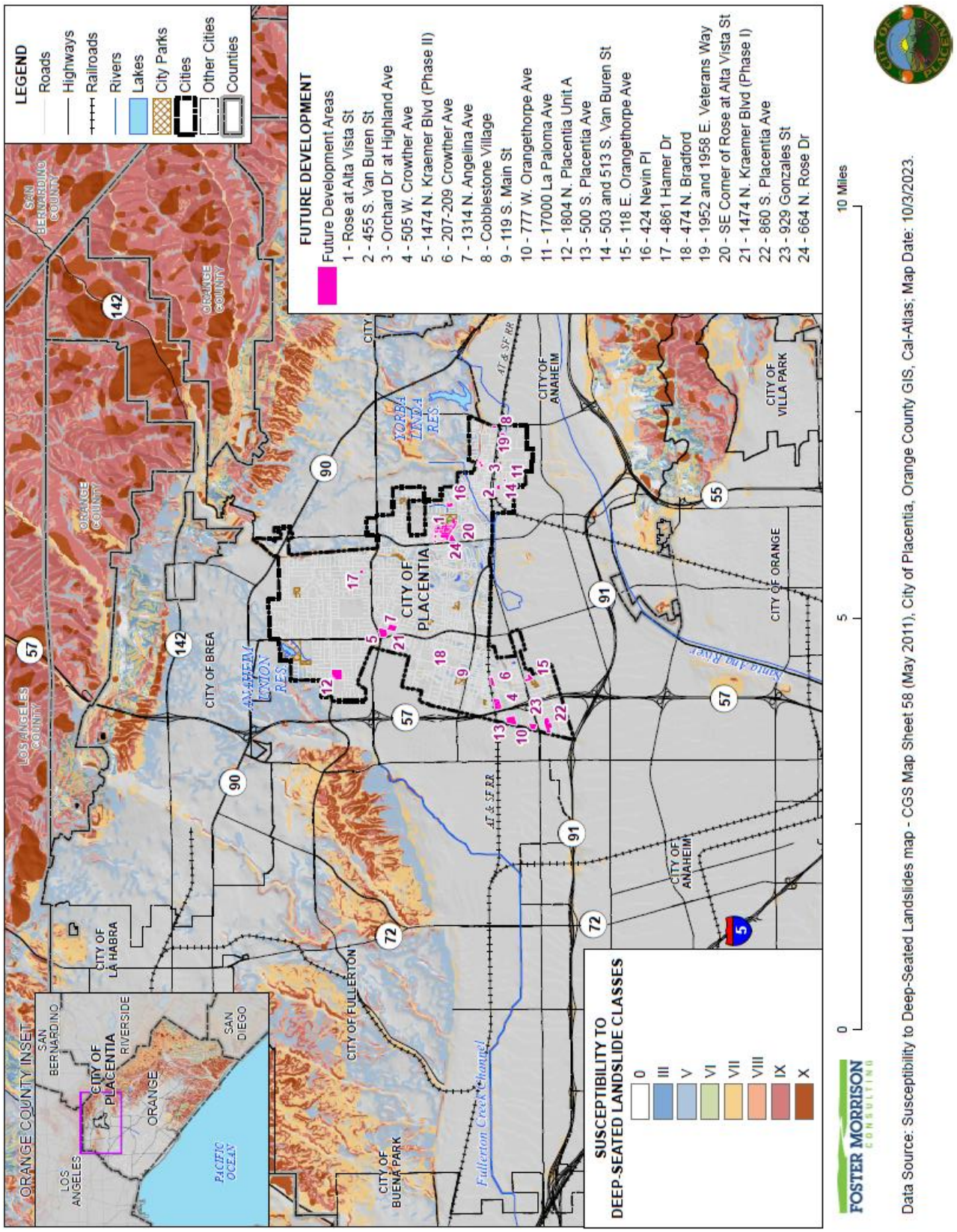


Table 4-94 City of Placentia – Future Development Areas and Deep-Seated Landslide Areas

Susceptibility to Deep-Seated Landslide Areas/ Map #	Future Development Areas	Total Parcel Count	Improved Parcel Count	Total Acres
0				
1	Rose at Alta Vista St	45	0	7.03
2	455 S. Van Buren St	1	1	0.17
3	Orchard Dr at Highland Ave	1	0	1.15
4	505 W. Crowther Ave	6	1	5.60
5	1474 N. Kraemer Blvd (Phase II)	1	1	4.67
6	207-209 Crowther Ave	4	1	2.09
7	1314 N. Angelina Ave	1	1	3.84
8	Cobblestone Village	1	0	0.59
10	777 W. Orangethorpe Ave	1	1	2.72
11	17000 La Paloma Ave	1	0	0.26
12	1804 N. Placentia Unit A	1	1	8.17
13	500 S. Placentia Ave	1	1	5.82
14	503 & 513 S. Van Buren St	2	2	0.38
15	118 E. Orangethorpe Ave	1	1	2.38
16	424 Nevin Pl	1	0	1.78
17	4861 Hamer Dr	1	1	0.17
18	474 N. Bradford	1	1	0.19
19	1952 & 1958 E. Veterans Way	1	0	0.78
20	SE Corner of Rose at Alta Vista St	1	0	8.25
21	1474 N. Kraemer Blvd (Phase I)	1	1	4.67
22	860 S. Placentia Ave	1	1	6.28
23	929 Gonzales St	1	0	0.08
24	664 N. Rose Dr	1	1	3.88
0 Total		**76**	**16**	**70.95**
V				
1	Rose at Alta Vista St	19	0	3.63
9	119 S. Main St	1	1	0.15
V Total		**20**	**1**	**3.78**
VII				
1	Rose at Alta Vista St	1	0	0.20
VII Total		**1**	**0**	**0.20**

Source: CGS, City of Placentia GIS

4.3.13. Levee Failure

Hazard Profile

This hazard profile contains multiple sections that detail how this hazard can affect the City. These sections include a hazard/problem description; description of location and extent; past occurrences of this hazard; and how climate change can affect this hazard.

Hazard/Problem Description

A levee is a raised area that runs along the banks of a stream or canal. Levees reinforce the banks and help prevent flooding by containing higher flow events to the main stream channel. By confining the flow to a narrower steam channel, levees can also increase the speed of the water. Levees can be natural or man-made. A natural levee is formed when sediment settles on the stream bank, raising the level of the land around the stream. Man-made levees are formed by the construction of structures often utilizing rock, soil and sometimes concrete in order to protect the area behind the levee.

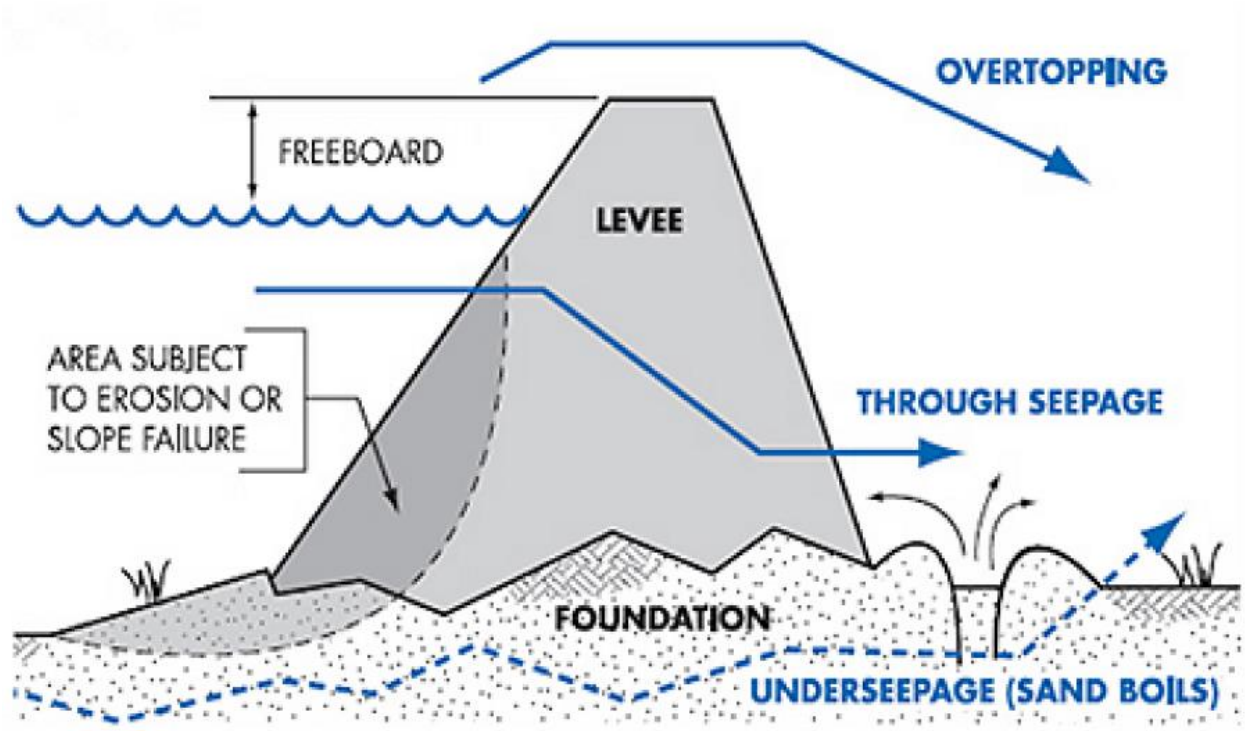
Levees can provide strong flood protection, but they are not failsafe. Levees are often designed to protect against a specific flood level and could be overtopped during severe weather events or a dam failure. FEMA reviews levees for level of flood protection. For levees to be recognized by FEMA, evidence that adequate design and operation and maintenance systems are in place to provide reasonable assurance that protection from the base flood exists must be provided. The Santa Ana levee system that protects the City of Placentia is certified by FEMA as providing protection against the 1% annual chance flood.

Levees reduce, but do not eliminate, the risk to individuals and structures located behind them. A levee system failure or overtopping can create severe flooding and high-water velocities. It's important to remember that no levee provides protection from events for which it was not designed, and proper operation and maintenance are necessary to reduce the probability of failure.

Under-seepage refers to water flowing under the levee through the levee foundation materials, often emanating from the bottom of the landside slope and ground surface and extending landward from the landside toe of the levee. Through-seepage refers to water flowing through the levee prism directly, often emanating from the landside slope of the levee. Both conditions can lead to failure by several mechanisms, including excessive water pressures causing foundation heave and slope instabilities, slow progressing internal erosion, and piping leading to levee slumping.

Rodents burrowing into and compromising the levee system can also contribute to a levee failure as can erosion of the leveed area. Levee failure can also be caused by high winds creating wave action and high tides, especially combined with storm events. Figure 4-81 depicts the causes of levee failure.

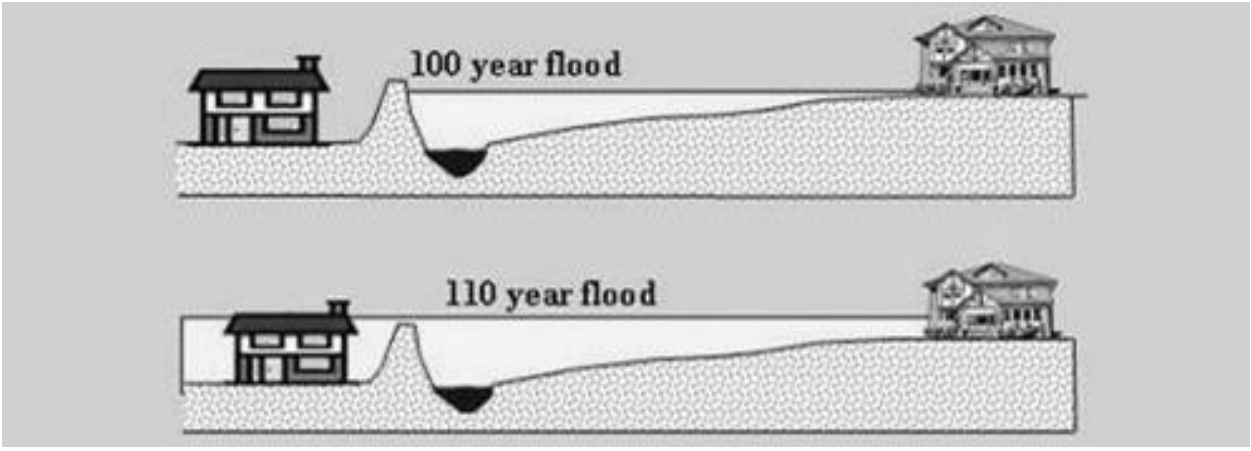
Figure 4-81 Potential Causes of Levee Failure



Source: USACE

Overtopping failure occurs when the flood water level rises above the crest of a levee. As shown in Figure 4-82, overtopping of levees can cause greater damage than a traditional flood due to the often lower topography behind the levee.

Figure 4-82 Flooding from Levee Overtopping

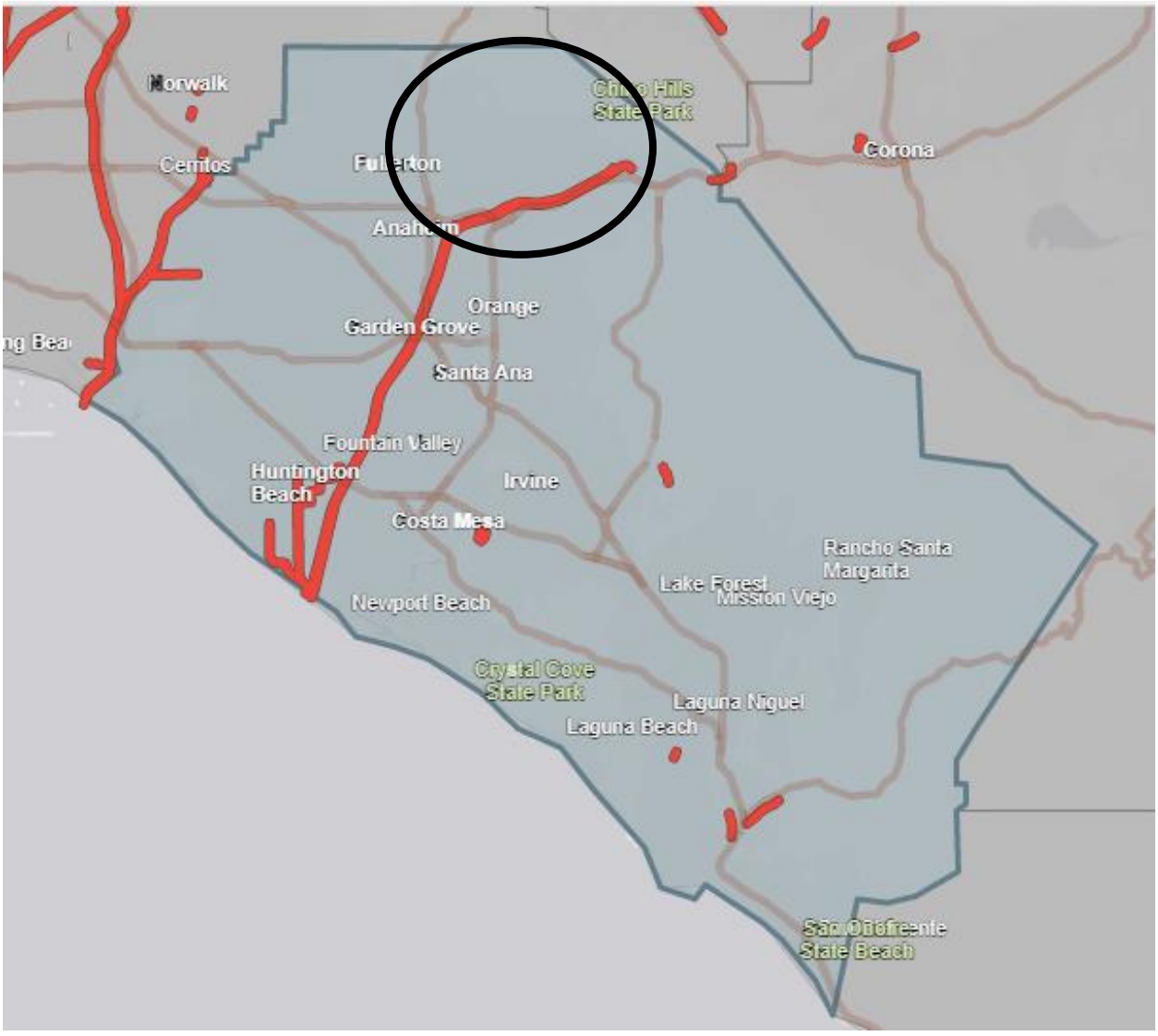


Source: Levees in History: The Levee Challenge. Dr. Gerald E. Galloway, Jr., P.E., Ph.D., Water Policy Collaborative, University of Maryland, Visiting Scholar, USACE, IWR.

Location and Extent

The National Levee Database and the Orange County FIS were searched for levee locations in and near the City. According to the National Levee Database, there are 21 levees in the County. This can be seen in Figure 4-83. The red lines indicate the levee segments. The City is bordered to the south by the Santa Ana River Levee System (located just outside the City) which is certified as providing protection against the 1% annual chance flood. No other levee system intersect or protect properties within the City.

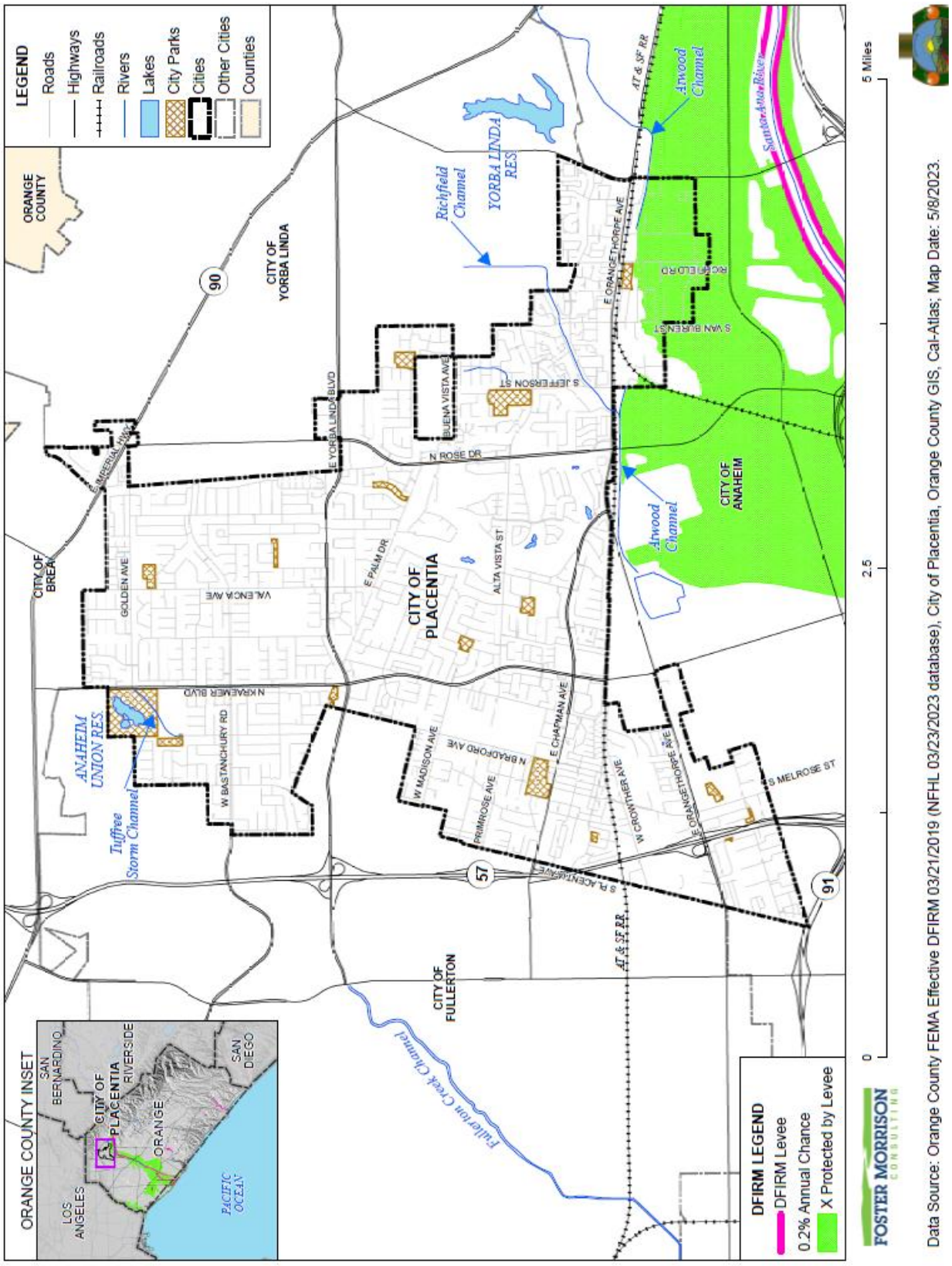
Figure 4-83 City of Placentia – Levees in Orange County



Source: National Levee Database. Map 5/1/2023

Some of these levees shown above are certified as protecting against the 1% annual chance flood event. FEMA DFIRMs show these areas. These are known as X Protected by Levee Flood Zones. These are zones that would normally be mapped into the 1% annual chance floodplain, but due to levee protection are mapped into the 0.2% annual chance floodplain. These are shown on Figure 4-84 for the City of Placentia.

Figure 4-84 City of Placentia – FEMA DFIRM X Protected by Levee Flood Zone



There is not a scientific scale or measurement system in place for levee failure. It is usually measured in area covered and depth of flooding. Maps showing specific inundation depths due to a levee failure in the City were not available. The speed of onset is slow as the river rises, but if a levee fails the warning times are short for those in the inundation area. The duration of levee failure risk times can be hours to weeks, depending on the river flows that the levee holds back.

Of interest is the aerial extent of flooding (i.e. the land area affected by the X Protected by Levee flood zones). Using the same flooded acres methodology as in Section 4.3.9 above, Table 4-95 provides X Protected by Levee geographical extent results for the City by land use.

Table 4-95 City of Placentia – Geographical Extent DFIRM X Protected by Levee Flood Zone and Land Use

Flood Zone	Total Acres	% of Total Acres	Improved Acres	% of Total Improved Acres	Unimproved Acres	% of Total Unimproved Acres
X Protected by Levee						
Agricultural	0.0	0.0%	0.0	0.0%	0.0	0.0%
Commercial	0.1	0.003%	0.1	0.004%	0.0	0.0%
Industrial	99.2	2.902%	96.8	3.580%	2.4	0.341%
Miscellaneous	0.0	0.0%	0.0	0.0%	0.0	0.0%
Residential	8.3	0.243%	8.0	0.296%	0.3	0.043%
Tax Exempt	8.3	0.242%	0.0	0.0%	8.3	1.155%
Unknown	11.1	0.326%	0.0	0.0%	11.1	1.556%
X Protected by Levee Total	**127.0**	**3.716%**	**104.9**	**3.880%**	**22.1**	**3.095%**

Source: FEMA 3/21/2019 DFIRM

*This acre count only includes those acres in the 0.2% annual chance floodplain, exclusive of the 1% annual chance floodplain. The 0.2% annual chance flood, in actuality, also includes all acres in the 1% annual chance floodplain.

Past Occurrences

Disaster Declaration History

There have been no disaster declarations for levee failure in Orange County, as shown on Table 4-4.

NCDC Events

The NCDC does not track levee failure events.

Hazard Mitigation Planning Committee Events

The HMPC noted no past levee failures.

Probability of Future Occurrences

Unlikely – The HMPC determined the probability of levee failure is unlikely. This rating was in part determined due to lack of past levee failure affecting the City. The levees are constantly inspected and maintained to improve levee conditions. It was noted that other hazards like earthquakes, floods, and heavy rains could increase the probability of future occurrence of a levee failure.

Climate Change and Levee Failure

In general, increased flood frequency in California is a predicted consequence of climate change. Mechanisms whereby climate change leads to an elevated flood risk include more extreme precipitation events and shifts in the seasonal timing of river flows. This threat may be particularly significant because recent estimates indicate the additional force exerted upon the levees is equivalent to the square of the water level rise. These extremes are most likely to occur during storm events, leading to more severe damage from waves and floods.

Vulnerability Assessment

Vulnerability—Medium

The probability of levee failure is increasing over time due to increased storms and flooding potential from global climate change. Levee failure flooding can occur as the result of partial or complete collapse of an impoundment, and often results from prolonged rainfall and flooding. A levee failure can range from a small uncontrolled release to a catastrophic failure. The primary danger associated with levee failure is the high velocity flooding of those properties downstream of the breach. Vulnerability to levee failures is generally confined to the areas subject to inundation downstream of the levee.

The leveed areas along the Santa Ana River are at risk during large storm events. While the levee itself is located in the City of Anaheim, failure of the Santa Ana River Levee System, as also seen in Figure 4-83 could cause damage to areas within the City of Placentia. A levee failure and resulting flooding can affect City properties, infrastructure, and critical facilities. Streets, roads, and highways can be overtopped, washed out, or covered with debris causing the temporary cessation of traffic flow. Natural resources, including can also be damaged or lost. Significant levee failure events can also be a life safety issue affecting both residents and City staff.

Vulnerability of the community is discussed in multiple sections that detail how this hazard can affect the City. These sections include assets at risk, impacts, and how future development can be affected by this hazard. Using the same methodology as discussed in the flood analysis above in Section 4.3.9, an analysis of the FEMA DFIRM X Protected by Levee flood zone was completed for the City. This flood zone is part of the 0.2% annual chance floodplain, as the levee is certified by FEMA as protecting against the 1% annual chance flood.

Note: the analysis of Placentia's vulnerability to levee failure in this section is primarily based on the X protected by Levee flood zone based on availability of data. The X Protected by Levee flood zone is part of the 0.2% annual chance floodplain, as the levee is certified by FEMA as protecting against the 1% annual chance flood. Other levees within the Planning Area were not analyzed due to the lack of available data.

However, while not certified, these other levees provide some level of flood protection to surrounding areas and are also subject to failure during heavy storm and rain events.

Assets at Risk from Levee Failure

Assets at risk from levee failure include: people and populations; structures; critical facilities and infrastructure, and community lifelines; natural, historic, and cultural resources; and economic assets and community activities of value. These are discussed in the following sections.

People and Populations

Populations in the floodplains are at risk to flooding, including the X Protected by Levee flood zone. Certain vulnerable populations may be at greater risk to the effects of levee failure flooding. Certain vulnerable populations may be at a greater risk of a sudden levee failure, including the unsheltered, those with limited mobility and those that lack the resources to leave the area.

Planning Area residents that live in the X Protected by Levee flood zones are often the most vulnerable to certified levees Not only are the residents at risk, but their homes and contents are all at risk, compounding the impacts associated with significant hazard events. To evaluate the population of residents of the Planning Area that live within the X Protected by Levee flood zone, the DFIRM flood zones were overlayed on the parcel layer, and linked to the Assessor data. Those residential parcel centroids that intersect the X Protected by Levee flood zone were counted and multiplied by the 2020 Census Bureau average household factors for the City of Placentia (3.14). According to this analysis, there is a total population of 220 residents in Placentia in X Protected by Levee flood zone. This is shown in Table 4-73.

Table 4-96 City of Placentia – Improved Residential Parcels and Population by DFIRM X-Protected by Levee Flood Zone

Jurisdiction	Improved Residential Parcels	Population at Risk
City of Placentia	70	220

Source: FEMA 3/21/2019 DFIRM, US Census Bureau, Orange County 2022 Parcel/Assessor's Data

Structures

A levee failure can affect the built environment of the City, with some structures in Placentia at risk to a levee failure event. GIS was used to determine the possible impacts of levee failure flooding from X Protected by Levee flood zones within the Planning Area. The X Protected by Levee flood zone for the City are shown on Figure 4-84. Table 4-97 and Table 4-98 contain flood analysis results for the Placentia Planning Area. These tables show the total number of parcels and values at risk to levee failure for the City of Placentia. Table 4-97 shows a summary of the value of improved parcels (i.e., those with structures) for the X Protected by Levee flood zone. Table 4-98 shows details of the improved parcels and structures by land use category in the X Protected by Levee flood zone for the City. Also, it is important to keep in mind that these assessed values may be well below the actual market value of improved parcels located within the X Protected by Levee flood zone due primarily to Proposition 13.

Table 4-97 City of Placentia – Count and Values of Parcels (and Structures) in FEMA DFIRM X Protected by Levee Flood Zone

Flood Zone	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
0.2% Annual Chance Flood						
X Protected by Levee	180	165	$137,221,988	$97,180,850	$140,167,040	$387,526,085

Source: FEMA DFIRM 3/21/2019, Orange County 2022 Parcel/Assessor's Data

Table 4-98 City of Placentia – Count and Values of Parcels (and Structures) in FEMA DFIRM X Protected by Levee Flood Zone and Land Use

Flood Zone / Land Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
0.2% Annual Chance Flood						
X Protected by Levee						
Agricultural	0	0	$0	$0	$0	$0
Commercial	1	1	$294,330	$73,581	$73,581	$441,492
Industrial	99	94	$123,208,680	$91,539,825	$137,309,733	$365,014,445
Miscellaneous	0	0	$0	$0	$0	$0
Residential	72	70	$13,330,336	$5,567,444	$2,783,726	$21,681,506
Tax Exempt	3	0	$388,642	$0	$0	$388,642
Unknown	5	0	$0	$0	$0	$0
X Protected by Levee Total	**180**	**165**	**$137,221,988**	**$97,180,850**	**$140,167,040**	**$387,526,085**

Source: FEMA DFIRM 3/21/2019, Orange County 2022 Parcel/Assessor's Data

Critical Facilities and Infrastructure, and Community Lifelines

Levee failure flooding presents a threat to critical facilities and infrastructure, and community lifelines. Critical infrastructure failures such as loss of power, impacts to potable and wastewater treatment systems, and road and bridge failures can all be caused by levee failure events, depending on the magnitude of the resulting flood. The following analysis discusses critical facilities and infrastructure at risk to levee failure flooding, followed by a discussion on vulnerability of community lifelines.

Critical Facilities and Infrastructure

Levee failure flooding presents a risk to the critical facilities and infrastructure in the City. A separate analysis was performed on the critical facility inventory in the City of Placentia to determine critical facilities in the DFIRM X Protected by Levee flood zone. Using GIS, the DFIRM X Protected by Levee flood zone was overlayed on the critical facility GIS layer. Figure 4-85 shows critical facilities, as well as the DFIRM X Protected by Levee flood zone. Table 4-99 provides summary information of critical

facilities in the DFIRM X Protected by Levee flood zone. Details of critical facility category, type, name, and address by FEMA DFIRM flood zone are listed in Appendix F.

Figure 4-85 City of Placentia – Critical Facilities in DFIRM X Protected by Levee Flood Zone

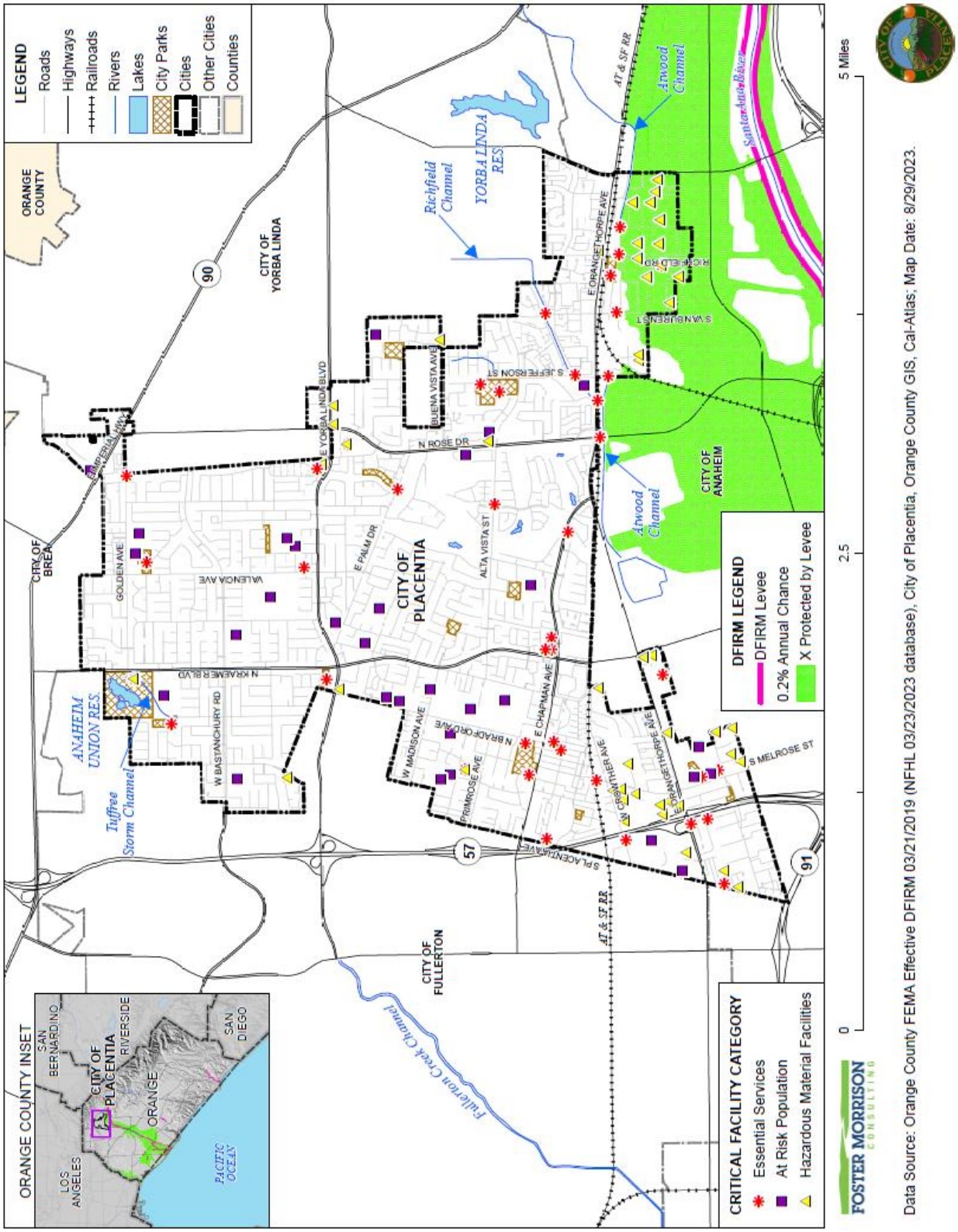


Table 4-99 City of Placentia – Critical Facility Counts by DFIRM X Protected by Levee Flood Zone and Critical Facility Category and Type

Critical Facility Category / Flood Zone	Critical Facility Type	Facility Count
Essential Services Facilities	Water Treatment Facilities	1
	Essential Services Facilities Total	**1**
Hazardous Material Facilities	Gas Station	1
	Hazardous Material Business	10
	Water Utilities	1
	Hazardous Material Facilities Total	**12**
X Protected by Levee Total		**13**

Source: Placentia GIS, FEMA DFIRM 3/21/2019

Community Lifelines

Levee failure flooding presents a threat to life and property, including community lifelines in the City. Lifelines that would be vulnerable to flooding include:

- **Safety and Security** – Search and rescue and swiftwater teams may be called on to perform riskier duties during times of levee failure and flooding. Police, Fire, EMS, and Public Works personnel are often called on to respond during flood emergencies which at times may stretch their capacity.
- **Food, Hydration, Shelter –** Floodwater is often contaminated with sewage and other contaminants, which can lead to illness and affect clean drinking water. These life safety and public health issues can tax the ability of the health and medical systems to provide necessary services, even if only temporarily.
- **Health, and Medical** – Loss of life and injuries can occur during significant levee failure events. Flooding may complicate the ability to transport the injured possibly requiring rerouting of injured to other facilities. Public health can also be at risk from flooding.
- **Energy** – Levee failure flooding could affect power distribution locations in the Planning Area. Power outages may occur. Fuel supplies may be temporarily cut off until levees are repaired (allowing for transport of fuel to resume).
- **Communications** – Communication infrastructure can be inundated by a levee failure event causing damage and an interruption in service. As well, an influx of service calls to dispatch centers for reporting of flooding, power outages, or other issues can occur. Messaging systems may need to be deployed during these times to let the public know about road and lane closures, washouts, and debris or flooding on roads.
- **Transportation** – Highways and local roads may experience levee failure flooding. This can cause lane or road closures, bridge closures and significantly limit mobility in the Planning Area. These closures can affect response personnel (EMS, Fire, Police) as well as cause additional traffic issues for residents and impact evacuation routes.
- **Hazardous Material** – Hazardous material facilities can be affected by levee failure flooding. Hazardous materials releases can occur if waters that overtop levees rupture storage tanks and other containment structures and cause them to spill into streams, rivers or drainage systems. Releases during these times can be comingled with flood waters, contaminate drinking water, as well as create additional exposures to the environment.

- **Water Systems** – Floods from levee failures can affect the ability for water and wastewater systems to operate, since many are located near leveed areas.

Given the small amount of area that falls in the Protected by Levee flood zones shown on Figure 4-69, these community lifelines are unlikely to be overwhelmed.

Natural, Historic, and Cultural Resources

Large levee failure events can affect natural, historic, and cultural resources. There are a number of ways levee failures and associated floodwaters can impact natural resources and the environment: Wildlife habitats can be destroyed. Contaminated floodwater can pollute rivers and habitats. Silt and sediment can destroy natural areas. Riverbanks and natural levées can be eliminated as rivers reach bankfull capacity. Rivers can be widened, and deposition can increase downstream. Trees can be uprooted by high-velocity water flow. Plants that survive the initial flood may die due to being inundated with water. Historic and cultural resources may also be affected. Generally, the impacts are associated with damage to structures within the areas protected by levees, but other cultural resources such as those associated with Native Americans and old tribal areas can also be disturbed, damaged and lost during extreme levee failure events. Any of these that fall in the X Protected by Levee flood zones shown on Figure 4-69 would be vulnerable.

Economic Assets and Community Activities of Value

Major levee failure flooding events could affect any economic asset that lies in the areas protected by levees. These events can also affect those economic assets outside of the areas protected by levees, at least in the short term until floodwaters have receded and the City has sufficiently recovered. As shown on Figure 4-69, levee failure flooding could affect any economic asset that lies in the floodplain. There are most likely some areas of economic assets in the levee failure zone, but given the small area of the City affected, economic impacts would be low. The HMPC felt that very levee failure would have little bearing on community activities of value.

Impacts from Levee Failures

Floods and their impacts vary by location, including the added impacts associated with a levee failure flood event and will only affect certain areas of the City that are in areas protected by the Santa Ana Levee System. Based on the levee analysis, it is evident that levee failure floods could potentially have significant impacts to areas of the City protected by levees, depending on the severity of the event. Impacts that are not quantified, but could be anticipated in large future levee failure events, include:

- Injury and loss of life
- Commercial and residential structural and property damage
- Disruption of and damage to public infrastructure and services
- Health hazards associated with mold and mildew, contamination of drinking water, etc.
- Damage to roads/bridges resulting in loss of mobility

In addition, levee failure can cause stream bank erosion, which can have effects worse than those of flooding itself. Hazardous materials spills can occur if waters that overtop levees rupture storage tanks and cause them to spill into streams, rivers or drainage sewers. Critical infrastructure failures such as loss of power,

potable and wastewater treatment and road and bridge failure can be caused by levee failure events, depending on the magnitude of the resulting flood.

These impacts may be exacerbated by the effects of climate change, changes in population patterns (migration, density, or the makeup of socially vulnerable populations), and changes in land use and development.

As discussed in the hazard profile section, climate change is anticipated to exacerbate this hazard over time. Regarding population patterns, the City is approaching built out conditions. Population projections for the City show very limited growth over the next 25 years. Populations are anticipated to grow by only 7.3% between 2025 and 2050, which equates to an annual growth of 0.29%, thus future population growth should not increase the potential impacts from this hazard on City assets. With respect to population patterns such as those associated with migration, density, or makeup of socially vulnerable populations the data shows that most socially vulnerable populations and disadvantaged communities are concentrated in the western portion of the City. Also, FEMA's National Risk Index for Orange County is rated as Very High. Levee failure maps show limited hazard risk occurring in the western portion of the City. Thus, even if these population patterns continue, it is unlikely that the vulnerability and potential impacts from this hazard to City assets will significantly change.

As described in the land use discussion at the end of Section 4.2.2, a new land use map was developed as part of the General Plan efforts in 2023, which establishes the basic pattern of development in the City for the next 20-25 years, including land uses and densities. Further all planned future development areas in the City fall outside the X Protected by Levee areas. While future development within hazard areas generally contributes to some increase of impacts on City assets, given the limited potential for significant future growth in Placentia, including the new future development areas, future changes in land use and development are unlikely to contribute to any notable change in the vulnerability of the City to this hazard. In addition, the City has a development review process which includes the consideration of hazard constraints and updated building codes that should further limit the impacts of these hazards on City assets.

Future Development

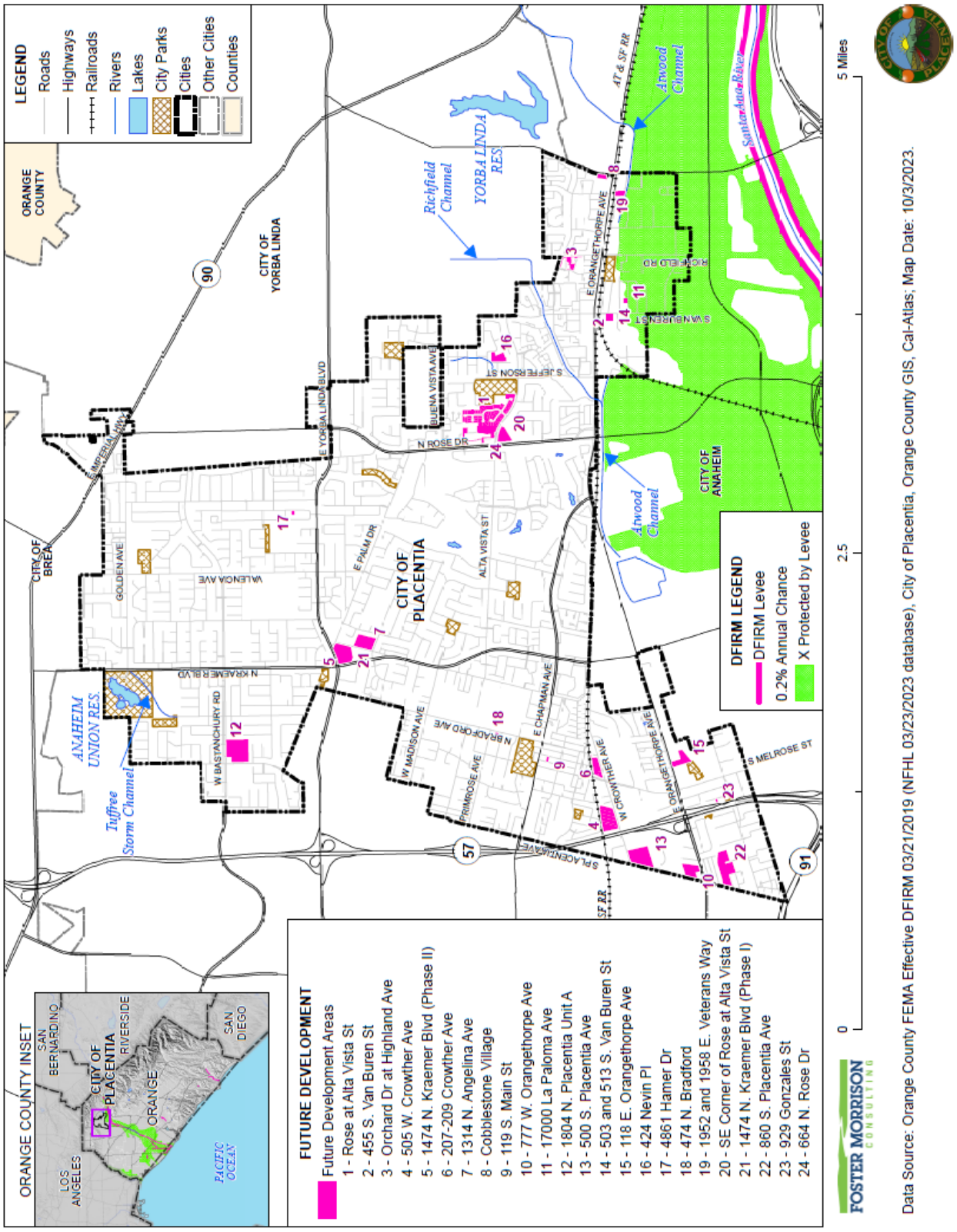
Future development in the City will be done to the standards of the City floodplain ordinance, which takes levee flood zones into account when siting new development.

Future development areas and their vulnerability to levee failure are discussed further in the below GIS analysis.

Future Development GIS Analysis

The City provided 19 future development areas which were used as the basis for the inventory of future development areas for the City. Utilizing the future development area spatial layer, the parcel centroid data was intersected to determine the parcel counts and acreage within each area. Figure 4-86 shows the locations of the future development areas overlayed on the DFIRM X Protected by Levee flood zone. As shown, there are no future development areas that fall in the DFIRM X Protected by Levee flood zone. As such, not tabular analysis is shown.

Figure 4-86 City of Placentia – Future Development and FEMA DFIRM X Protected by Levee Flood Zones



4.3.14. Natural Gas Pipeline

Hazard Profile

This hazard profile contains multiple sections that detail how this hazard can affect the City. These sections include a hazard/problem description; description of location and extent; past occurrences of this hazard; and how climate change can affect this hazard.

Hazard/Problem Description

The United States is heavily dependent on transmission pipelines to distribute energy and fuel sources. Virtually all natural gas, which accounts for about 29 percent of energy consumed annually, is transported by transmission pipelines, according to the U.S. Energy Information Administration. Energy demand in the United States continues to increase. The 2023 (Draft) State Hazard Mitigation Plan noted that although California is a leader in exploring and implementing alternative energy sources such as wind and solar, the expansion of traditional energy sources, such as natural gas, continues.

Most natural gas is transported by transmission pipelines, either buried or above ground. In California, urbanization is resulting in more people living and working closer to gas transmission pipelines that often were placed prior to land use and other pipeline safety regulations. Risk related to natural gas pipelines also comes from the deterioration of pipelines due to natural causes. Significant failure, including pipe breaks and explosions, can result in loss of life, injury, property damage, and environmental impacts. Causes of and contributors to pipeline failures include construction errors, material defects, internal and external corrosion, operational errors, control system malfunctions, outside force damage, subsidence, and seismicity.

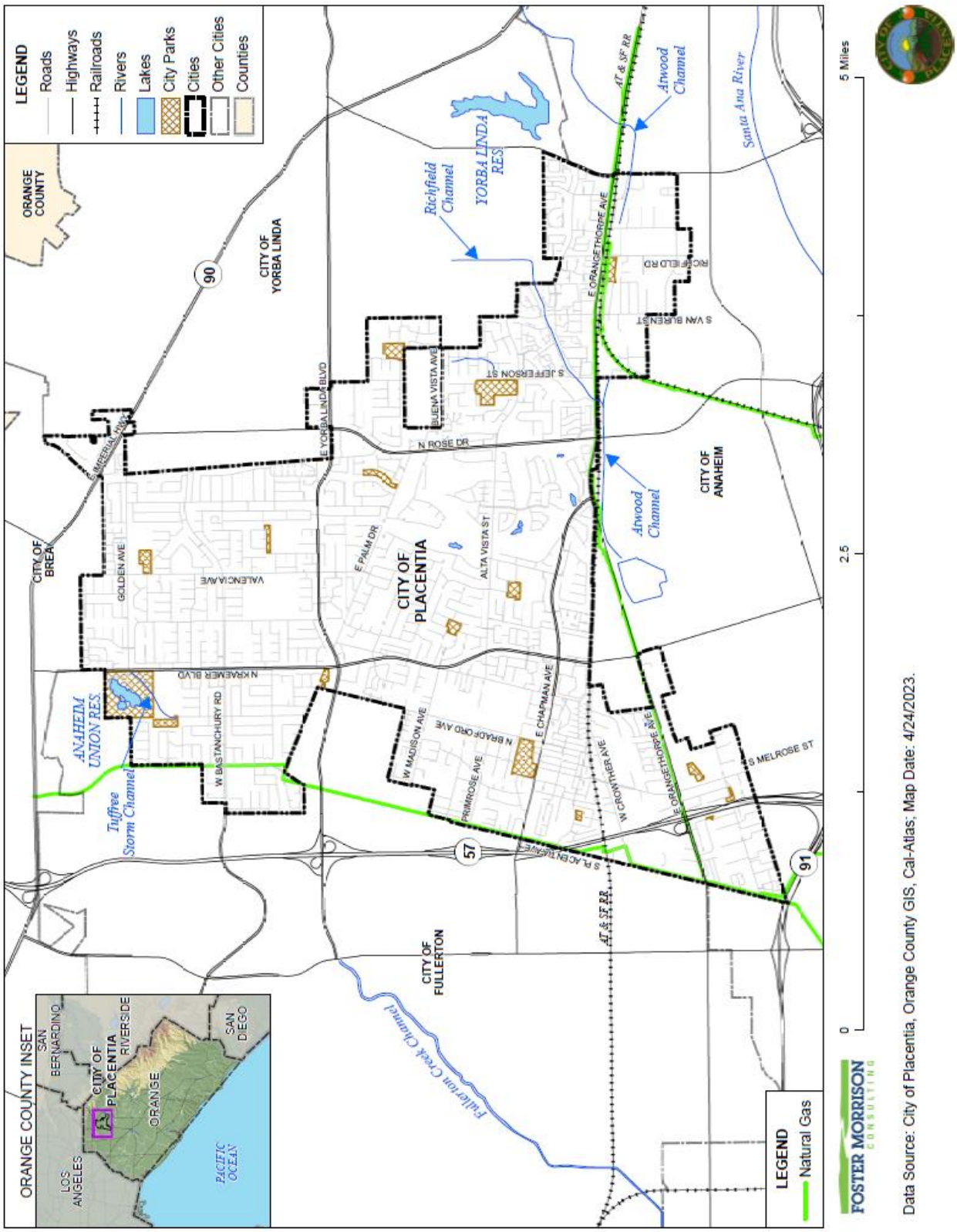
Location and Extent

The 2020 Emergency Response Guidebook, a hazardous materials resource produced by the U.S. Department of Transportation, identifies the extent of hazard for several types of natural gas pipelines.

- **Natural Gas Transmission Pipelines**—Large-diameter, steel pipelines transport flammable natural gas at very high pressures, ranging from 200 to 1,500 pounds per square inch (psi). Leaks may not be recognizable by people because natural gas in transmission pipelines is generally not odorized.
- **Natural Gas Distribution Pipelines**—Natural gas is delivered directly to customers via distribution pipelines. These pipelines are typically smaller-diameter, lower pressure pipelines constructed of steel, plastic, or cast iron. Natural gas in distribution pipelines is odorized with mercaptan to be readily detectable by people.
- **Natural Gas-Gathering and Natural Gas Well Production Pipelines**—Natural gas-gathering/well production pipelines collect raw natural gas from wellheads and transport it to gas-processing plants. These gathering pipelines carry natural gas mixed with some quantity of natural gas liquids, water, and, in some areas, contaminants such as toxic hydrogen sulfide. Natural gas in these pipelines is not odorized with mercaptan, but it will have an odor if it contains hydrogen sulfide.

The City of Placentia has natural gas transmission pipelines running through the City. The location of these facilities is represented in Figure 4-87.

Figure 4-87 City of Placentia – Natural Gas Pipeline Locations



The 2023 (Draft) State Hazard Mitigation Plan noted that explosions or fires associated with natural gas pipeline incidents can occur instantly and escalate quickly. Generally, the following could be indications warning of a pipeline leak or rupture:

- Hissing, roaring, or explosive sound
- Flames appearing from the ground or water (perhaps very large flames)
- Vapor cloud/fog/mist
- Dirt/debris/water blowing out of the ground
- Liquids bubbling up from the ground or bubbling in water
- Distinctive, unusually strong odor of rotten eggs, mercaptan (an odorant in some natural gas pipelines), skunk, or petroleum
- Discolored/dead vegetation or discolored snow above a pipeline right-of-way
- Oil slick or sheen on flowing/standing water
- An area of frozen ground in the summer

Past Occurrences

Disaster Declaration History

There have been no past federal or state disaster declarations due to a natural gas pipeline events as detailed in Table 4-4.

NCDC Events

The NCDC data does not track pipeline events.

Hazard Mitigation Planning Committee Events

The HMPC noted no past occurrences of natural gas pipeline leak events.

Probability of Future Occurrences

Unlikely – Due to the lack of past occurrences, it is thought that the probability of future occurrence is unlikely. However, growth in population, urbanization, and land development near transmission pipelines, together with addition of new facilities to meet new demands, may increase the likelihood of pipeline damage due to human activity and the exposure of people and property to pipeline failures.

Climate Change and Natural Gas Pipelines

Climate change is not thought to affect natural gas pipeline rupture events. Climate change impacts to other hazards like extreme heat, and severe weather hazards could exacerbate conditions that make pipelines more susceptible to pipeline failures.

Vulnerability Assessment

Vulnerability—High

Virtually all natural gas is transported by transmission pipelines, either buried or above ground. In California, urbanization is resulting in more people living and working closer to gas transmission pipelines that were placed prior to land use and in some instances before pipeline safety regulations. Compounding the potential risk is the age and gradual deterioration of the gas transmission system due to natural causes. There are two serious types of pipeline incidents: leaks and ruptures. Leaks are more common and can sometimes be repaired before too much damage is done. Ruptures are much more concerning. If a sudden rupture occurs, the effects can be catastrophic. Explosions caused by natural gas can cause immense fires, and huge amounts of destruction to surrounding communities. Natural gas pipelines can be damaged by a variety of things. Natural causes include age, corrosion, or natural force damage, which can be caused by other hazard events such as earthquakes and other land movements. However, shoddy workmanship, mismanagement, improper materials, equipment failure, excavation damage, and lax care can also cause pipelines to leak or rupture. Regular inspections and maintenance can help prevent these types of leaks or ruptures.

Vulnerability of the community is discussed in multiple sections that detail how this hazard can affect the City. These sections include assets at risk, impacts, and how future development can be affected by this hazard.

Assets at Risk from Natural Gas Pipeline

Assets at risk from natural gas pipelines include: people and populations; structures; critical facilities and infrastructure, and community lifelines; natural, historic, and cultural resources; and economic assets and community activities of value. These are discussed in the following sections.

People and Populations

All people living near a pipeline carry some measure of risk. Though pipelines rarely affect people and populations, if a natural gas pipeline leak were to occur, all people living near the gas pipeline would be at risk if the leak became more significant and an explosion occurred. Natural gas pipelines, if they leak, can also affect the safety of residents by threatening the cleanliness of their drinking water, the air, and the soil. Certain populations could be at greater risk if they were in proximity to the problem area, including:

- The unsheltered
- Those who would work on repairing the natural gas pipeline
- Infants and children under age five and their caregivers
- Elderly (65 and older)
- Individuals with disabilities
- Individuals dependent on medical equipment
- Individuals with impaired mobility

The ability to evacuate the area quickly helps reduce risk. For those listed above, evacuations may take more time or these populations may need additional help to evacuate. The 2023 (Draft) State Plan noted

that Natural gas pipelines across the United States tend to be concentrated in areas of high social vulnerability. Negative impacts associated with pipelines fall disproportionately on communities with limited capacity to deal with the impacts, exacerbating other issues of inequality.

Structures

Pipelines can leak, spill, rupture, and explode. Should a natural gas pipeline rupture and ignite, all structures in that area would be at risk of catching fire. Evacuations of buildings would likely be ordered by local authorities.

Critical Facilities and Infrastructure, and Community Lifelines

Should a natural gas pipeline rupture and ignite, all critical facilities in that area would be at risk of being evacuated or catching fire. Affected critical facilities could be offline for an extended period of time until repairs are made.

Community lifelines likely to have risk from natural gas pipeline rupture include:

- **Safety and Security** – During a natural gas pipeline rupture, multiple groups are tasked with response. This includes police and fire in the City, as well as the company who owns the natural gas pipeline. The large pipeline in the City would require a substantial response and recovery effort. These efforts can tax the ability of local responders.
- **Food, Hydration, Shelter** – Those displaced by a large natural gas pipeline rupture would need temporary food, shelter, and water. Food and drinking water may also be contaminated requiring other sources to be brought in.
- **Health and Medical** – EMS calls and ER visits could spike from a natural gas pipeline event. EMS routes would most likely need to be changed to stay away from the pipeline rupture area. Depending on the magnitude of the event, hospitals and medical facilities resources could be stretched.
- **Energy** – The loss of a large transmission line would cause issues inside the City, and for the greater region as a whole. It can cause reduction in supply and costs for alternative sources to surge.
- **Communications** – Alert and messaging boards would be necessary to inform the public about the natural gas pipeline and what the public needs to do to stay safe. If communication facilities are directly affected, work arounds will need to be established until repairs can be completed.
- **Transportation** – Pipeline rupture could cause damages to roads and other infrastructure networks. Transportation routes would be affected as well.
- **Water Systems** – Water pipelines adjacent to natural gas pipelines may be damaged during a natural gas pipeline event.

Depending on the nature, extent, and magnitude of a pipeline event, there is the potential for some of the critical community lifelines to be overwhelmed, if only temporarily.

Natural, Historic, and Cultural Resources

Should a natural gas pipeline rupture and ignite, all natural, historic, and cultural facilities in that area could be at risk of being evacuated or catching fire. Natural gas pipeline failures can cause irreparable harm to the environment. Pipelines that cross rivers and streams are more vulnerable to breaks when heavy rain and floods occur. Leaks, emissions, and other damage from pipelines can destroy vegetation, harm local

wildlife, and add to local water and air pollution levels. Oil sticks to everything, killing wildlife that wander through it or ingest it, poisoning the ground and polluting local water supplies. A significant failure can lead to decreased biodiversity in the affected areas. Crude oil can even linger in the environment for years after it's been effectively cleaned up. Wetland areas also can be affected. Oil slicks or sheens can appear on standing water areas. Pipeline failures can also damage or destroy historic and cultural buildings and can threaten sites of cultural importance.

Economic Assets and Community Activities of Value

Should a natural gas pipeline rupture and ignite, all economic assets in that area would be at risk of being evacuated or catching fire. Local gas prices would likely surge for a period of time. Additionally, it may take significant time to repair or replace damaged lines, keeping areas of economic activity shut down for longer periods of time. If local businesses are closed, sales tax revenue in the City may be affected. Additionally, any activity of value in the surrounding areas would be vulnerable. However, using pipelines for natural gas distribution can have indirect economic benefits to communities by keeping prices down to consumers.

Impacts from Natural Gas Pipelines

As discussed in detail above, a gas pipeline incident will have numerous adverse impacts to the affected community. A pipeline explosion or other incident resulting in property damage may displace residents or businesses for a prolonged period of time. This could create a need for long-term emergency housing or financial support for impacted small businesses. An incident with a natural gas pipeline can result in complete devastation. Buildings and infrastructures located in areas that contain natural pipeline systems are more at risk if an incident were to occur. There could be public health consequences for pipeline failures. There could be significant environmental impacts both long and short term. There are no standard generic formulas for estimating associated losses.

The 2019 Safety Element noted that pipelines represent a hazard due to the contents of the pipelines. Potential impacts in the City include the potential for them to rupture, causing chemical leaks, explosions or fires.

Compounding the potential risk is the age and gradual deterioration of the gas transmission system due to natural causes. Impacts may be exacerbated by the effects of climate change, changes in population patterns (migration, density, or the makeup of socially vulnerable populations), and changes in land use and development.

As discussed in the hazard profile section, it is unlikely that climate change will influence this hazard overtime. The City is approaching built out conditions. Population projections for the City show very limited growth over the next 25 years. Populations are anticipated to grow by only 7.3% between 2025 and 2050, which equates to an annual growth of 0.29%, thus future population growth should not increase the potential impacts from this hazard on City assets. With respect to population patterns such as those associated with migration, density, or makeup of socially vulnerable populations the data shows that most socially vulnerable populations and disadvantaged communities are concentrated in the western portion of the City. Also, FEMA's National Risk Index for Orange County is rated as Very High. The natural gas

pipeline in the City does pass through or adjacent to some of these vulnerable populations in the western portion of the City. If these population patterns continue with respect to vulnerable populations, the vulnerability and potential impacts to these City assets may increase in the future.

As described in the land use discussion at the end of Section 4.2.2, a new land use map was developed as part of the General Plan efforts in 2023, which establishes the basic pattern of development in the City for the next 20-25 years, including land uses and densities. While future development within hazard areas generally contributes to some increase in impacts on City assets, given the limited potential for significant future growth in Placentia, future changes in land use and development are unlikely to contribute to any notable change in the vulnerability of the City to this hazard.

Future Development

Growth in population, urbanization, and land development near transmission pipelines, together with addition of new facilities to meet new demands, may increase the probability of pipeline damage due to human activity and the exposure of people and property to pipeline failures. Staff from SCE noted that their standard maintenance, inspections, and safety protocols limit the potential for a catastrophic failure to occur.

However, future development in the City is unlikely to be affected by natural gas pipelines. Placentia's Municipal Code dictates where these facilities can be located, required maintenance, required fencing, procedures for how to abandon, and the requirement for additional safety measures and performance standards. Adherence to these requirements reduce the risks associated with the natural gas pipelines.

4.3.15. Pandemic

Hazard Profile

This hazard profile contains multiple sections that detail how this hazard can affect the City. These sections include a hazard/problem description; description of location and extent; past occurrences of this hazard; and how climate change can affect this hazard.

Hazard/Problem Description

According to the World Health Organization (WHO), a disease epidemic occurs when there are more cases of that disease than normal. A pandemic is a worldwide epidemic of a disease. A pandemic may occur when a new virus appears against which the human population has little to no immunity and for which there is no vaccine.

A pandemic spreads easily person-to-person, causes serious illness, and can sweep across the country and around the world in a very short time. The U.S. Centers for Disease Control and Prevention (CDC) has been working closely with other countries and the WHO to strengthen systems to detect outbreaks of that might cause a pandemic and to assist with pandemic planning, preparation, and response. An especially severe pandemic could lead to high levels of illness, death, social disruption, and economic loss.

Location and Extent

During a pandemic, the whole of the City is at risk, as pandemic is a regional, national, and international event. The speed of onset of a pandemic is usually short, while the duration is variable, but can last for more than a year as shown in the 1918/1919 Spanish Flu and the more recent Covid-19 pandemic. There is no scientific scale to measure the magnitude of pandemic. Pandemics are usually measured in numbers affected by the pandemic, and by the numbers who die.

Past Occurrences

Disaster Declaration History

There have been two state and federal disaster declarations due to pandemic, as shown in Table 4-100. Specific disaster numbers for these state and federal disasters are shown in Table 4-4 above.

Table 4-100 City of Placentia – State and Federal Pandemic Disaster Declarations 1950-2021

Disaster Type	Federal Declarations		State Declarations	
	Count	Years	Count	Years
Pandemic	2	2020	2	2020

Source: Cal OES, FEMA

NCDC Events

The NCDC does not track pandemic.

WHO Events

The 20th century saw three outbreaks of pandemic flu.

- The **1918-1919 Influenza Pandemic (H1N1),** (aka the Spanish Flu**),** is the catastrophe against which all modern pandemics are measured. It is estimated that approximately 20 to 40 percent of the worldwide population became ill and that over 50 million people died. Approximately 675,000 deaths from the flu occurred in the U.S. alone.
- The **February 1957-1958 Influenza Pandemic (H2N2)** (aka the Asian Flu) was first identified in the Far East. Immunity to this strain was rare in people less than 65 years of age, and a pandemic was predicted. In preparation, vaccine production began in late May 1957, and health officials increased surveillance for flu outbreaks. Unlike the virus that caused the 1918 pandemic, the 1957 pandemic virus was quickly identified, due to advances in scientific technology. Vaccine was available in limited supply by August 1957. The virus came to the U.S. quietly, with a series of small outbreaks over the summer of 1957. When U.S. children went back to school in the fall, they spread the disease in classrooms and brought it home to their families. Infection rates were highest among school children, young adults, and pregnant women in October 1957. Most influenza-and pneumonia-related deaths occurred between September 1957 and March 1958. The elderly had the highest rates of death. By December 1957, the worst seemed to be over. However, during January and February 1958, there was another wave of illness among the elderly. This is an example of the potential "second wave" of infections that can develop during a pandemic. The disease infects one group of people first, infections

appear to decrease and then infections increase in a different part of the population. Although the Asian flu pandemic was not as devastating as the 1918-1919 flu, about 69,800 people in the U.S. died.

- The **1968 Influenza Pandemic (H3N2)** was first detected in Hong Kong (aka the Hong Kong Flu). The first cases in the U.S. were detected as early as September of that year, but illness did not become widespread in the U.S. until December. Deaths from this virus peaked in December 1968 and January 1969. Those over the age of 65 were most likely to die. The same virus returned in 1970 and 1972. The number of deaths between September 1968 and March 1969 for this pandemic was 33,800, making it the mildest pandemic in the 20th century.

To date, the 21st century has seen two acknowledged pandemics.

- **2009 Swine Flu (H1N1)**— 2009 H1N1 (sometimes called "swine flu") was a new influenza virus causing illness in people. This virus was originally referred to as "swine flu" because laboratory testing showed that many of the genes in this new virus were very similar to influenza viruses that normally occur in pigs (swine) in North America. But further study showed that this virus was very different from what normally circulates in North American pigs. It had two genes from flu viruses that normally circulate in pigs in Europe and Asia and bird (avian) genes and human genes. Scientists call this a "quadruple reassortant" virus. This virus spread from person-to-person worldwide, probably in much the same way that regular seasonal influenza viruses spread. On June 11, 2009, the WHO) signaled that a pandemic of 2009 H1N1 flu was underway. It was first detected in the United States in early 2009 and spread to the world later that year. About 70 percent of people who were hospitalized with this 2009 H1N1 virus had one or more medical conditions previously recognized as placing people at "high risk" of serious seasonal flu-related complications. This included pregnancy, diabetes, heart disease, asthma, and kidney disease. Young children were also at high risk of serious complications from 2009 H1N1, just as they are from seasonal flu. And while people 65 and older were the least likely to be infected with 2009 H1N1 flu, if they got sick, they were also at "high risk" of developing serious complications from their illness. Some studies estimated that 11 to 21 percent of the global population at the time—or around 700 million to 1.4 billion people (of a total 6.8 billion)—contracted the illness. This was more than the number of people infected by the Spanish flu pandemic, but only resulted in about 150,000 to 575,000 fatalities for the 2009 pandemic. A follow-up study done in September 2010 showed that the risk of serious illness resulting from the 2009 H1N1 flu was no higher than that of the yearly seasonal flu. For comparison, the WHO estimates that 250,000 to 500,000 people die of seasonal flu annually.
- **2019/2020** COVID 19 – During the creation of this LHMP Update, the world was under various forms of lockdown due to COVID-19 (known also as coronavirus). Coronaviruses are a large family of viruses which may cause illness in animals or humans. In humans, several coronaviruses are known to cause respiratory infections ranging from the common cold to more severe diseases such as Middle East Respiratory Syndrome (MERS) and Severe Acute Respiratory Syndrome (SARS). The most recently discovered coronavirus causes coronavirus disease COVID-19. COVID-19 is the infectious disease caused by the most recently discovered coronavirus. This new virus and disease were unknown before the outbreak began in Wuhan, China, in December 2019. The most common symptoms of COVID-19 are fever, tiredness, and dry cough. Some patients may have aches and pains, nasal congestion, runny nose, sore throat, or diarrhea. These symptoms are usually mild and begin gradually. Some people become infected but don't develop any symptoms and don't feel unwell. Most people (about 80%) recover from the disease without needing special treatment. Around 1 out of every 6 people who get COVID-19 becomes seriously ill and develops difficulty breathing. Older people, and

those with underlying medical problems like high blood pressure, heart problems or diabetes, are more likely to develop serious illness. People with fever, cough and difficulty breathing should seek medical attention. The City of Placentia's population experienced 13,279 confirmed COVID-19 cases as recorded by the County of Orange. Of those cases, 2,235 were reported to affect children. A total of 133 deaths in Placentia were attributed to the COVID-19 Pandemic.

Hazard Mitigation Planning Committee Events

The HMPC noted that Placentia was affected by the recent pandemic, but less so than cities surrounding them. Placentia was one of only 3 cities in Orange County that remained open. The City was able to do this by making alternative work schedules and by following health restrictions. The biggest impact was loss of City staff due to resignations. The City did declare a local emergency.

The City of Placentia's EOC was activated for a period of 6 months in 2020 to support the COVID-19 Worldwide Pandemic. The City of Placentia initiated protective actions to preserve and safeguard employees and the public from the spread of illness. All City staff were put onto one of two shifts which allowed a half week's work from the office and two days' work from home. The two separate shifts alternated days in office to separate the work groups and prevent potential spread of COVID-19. City staff participated with the County of Orange Point of Dispensing operations upon initial deployment of vaccines for medical and public safety personnel. Community Services and Placentia Fire and Life Safety sent staff to the OCFA headquarters, Disneyland POD, and the Anaheim Convention Center POD in support of the initial vaccine series.

Mitigation actions of the City of Placentia included placing protective shields for all front counter workspaces in which interaction with the public was performed. Social distancing signs were placed throughout the Placentia workplace and instructional information was distributed throughout the workplace reinforcing handwashing, mask wearing, social distancing, and what to do if illness occurs.

The City of Placentia Community Services department began delivering meals to vulnerable elderly population from Senior Center during this period to support the community.

Probability of Future Occurrence

Likely – The calculation for future occurrence of pandemic must first be considered in light of circumstances. The diseases are naturally occurring in the populations that reside in the City. In addition, this Plan is not examining the pandemic potential of these diseases, but instead examines when these diseases manifest in severe injury or fatalities among humans. Given these assumptions and the five outbreaks since 1900, the probability of future occurrence is considered likely.

Climate Change and Pandemic

According to the WHO, there are three categories of research into the linkages between climatic conditions and infectious disease transmission. The first examines evidence from the recent past of associations between climate variability and infectious disease occurrence. The second looks at early indicators of already-emerging infectious disease impacts of long-term climate change. The third uses the above

evidence to create predictive models to estimate the future burden of infectious disease under projected climate change scenarios.

Early Impacts of Climate Change on Pandemic

There is much evidence of associations between climatic conditions and infectious diseases. These include several infectious diseases, health impacts of temperature extremes and impacts of extreme climatic and weather events. Changes in infectious disease transmission patterns are a likely major consequence of climate change. More needs to be learned about the underlying complex causal relationships, and apply this information to the prediction of future impacts, using more complete, better validated, integrated, models.

Vulnerability Assessment

Vulnerability—Medium

Pandemics affect all aspects of society. A pandemic is a social and an economic crisis just as much as it is a health one. A pandemic can negatively affect multiple aspects of the lives of infected individuals, families, and communities, including the severe economic consequences of the pandemic-related recession and the mental health toll from the disruption in relationships and social networks.

Vulnerability of the community is discussed in multiple sections that detail how this hazard can affect the City. These sections include assets at risk, impacts, and how future development can be affected by this hazard.

Assets at Risk from Pandemic

Assets at risk from pandemic include: people and populations; structures; critical facilities and infrastructure, and community lifelines; natural, historic, and cultural resources; and economic assets and community activities of value. These are discussed in the following sections.

People and Populations

The entirety of the population is at risk to pandemics. Depending on the pandemic, different populations may be at greater risk. In general, this includes:

- The unsheltered
- Infants and children under age five and their caregivers
- Non-English speakers
- Elderly (65 and older)
- Individuals with disabilities
- Individuals who cannot work remotely
- Individuals dependent on medical equipment
- Individuals with pre-existing conditions
- Individuals with higher body mass indexes
- Individuals with impaired mobility

This can vary by pandemic disease. For example, the 1918 influenza outbreak was deadly to the very old and the very young. Covid 19 had very limited morbidity for the young, while it had a much higher morbidity rate for the elderly.

Additionally, the 2023 (Draft) State Hazard Mitigation Plan noted that due to concerns about COVID-19, an estimated 41 percent of U.S. adults delayed or avoided medical care, including urgent or emergency care (12 percent) and routine care (32 percent). Avoidance of urgent or emergency care was more prevalent among unpaid caregivers for adults, persons with underlying medical conditions, Black adults, Hispanic adults, young adults, and persons with disabilities. Food insecurity can impact those who lose employment during a pandemic, who are not eligible for Supplemental Nutrition Assistance Program benefits due to immigration status, or who may not be able to access food at stores because of supply chain issues or lack of stock. Food banks may be the only option for these families. A survey conducted at the beginning of the COVID-19 pandemic in 2020 indicated that 33 percent of households with children were food insecure. In the months following the outbreak of COVID-19, food bank demand in California increased 73 percent.

Structures

Pandemics do not directly affect structures. Structures may be closed during a pandemic, but the structure itself is not damaged.

Critical Facilities and Infrastructure, and Community Lifelines

Critical facilities may be vulnerable during a pandemic. This is especially true of schools, elder care facilities, clinics, and medical facilities and hospitals. As shown during the Covid-19 pandemic and ensuing lockdowns, multiple community lifelines were vulnerable. This includes:

- **Safety and Security** – Police, fire, EMS, and other organizations can be affected as mandated stay at home orders are put in place. In addition, the first responders in this type of event can be strained over time.
- **Food, Hydration, Shelter** – Supply chain issues can cause food prices to rise, or for certain foods to be unavailable.
- **Health and Medical** – ER facilities and hospitals can be overrun with patients. Nursing home facilities may need to put lockdowns into place. Maintaining the workforce can also be a challenge.
- **Energy** – Fuel prices can rise from supply chain issues.
- **Transportation** – Restrictions (like masking) may be put in place on mass transit systems.

While not all of these were overwhelmed during the Covid-19 pandemic, many were. Hospitals and medical facilities can be temporarily overwhelmed when cases surge and there is not enough beds or equipment to effectively meet everyone's needs. The loss of workers and impacts to first responders can significantly impact a region. Those community lifelines not overwhelmed were, at the very least, impacted. Additionally, supply chains were impacted for most of the lifelines listed above.

Natural, Historic, and Cultural Resources

Pandemics do not directly affect natural, historic, or cultural resources. Historic and cultural structures may be closed during a pandemic, but the structure itself is not damaged. Interestingly, the 2023 (Draft) State

Hazard Mitigation Plan noted that air pollution dropped suddenly during the COVID-19 lockdown between March 19 and May 7, 2020. Ground-based observations around California showed a 38 percent drop in concentrations of nitrogen dioxide, a 49 percent drop in concentrations of carbon monoxide, and a 31 percent drop in particulate matter during that time. Overall improvement of air and water quality, reduction of noise, and restoration of ecology were all noted during the pandemic.

Economic Assets and Community Activities of Value

As shown in the Covid-19 pandemic, all economic assets can be affected, especially if lockdowns are issued by the local authorities. From 2020-2022 many businesses were closed or forced to limit capacity. This reduced income to those businesses, their suppliers, and to the City's sales tax base. Additional costs were borne by businesses who had to install barriers and signage in their locations. Supply chain issues drove up prices for many items for both wholesale and retail customers.

As shown in the Covid-19 pandemic, all community activities of value are vulnerable to cancellation. Lockdowns affected many activities in the community in 2020, 2021, and 2022. In California, almost all community activities of value were put on hold during the Covid-19 pandemic.

Impacts from Pandemic

Pandemics can have varying levels of impact to the citizens of the City, depending on the nature of the pandemic. In addition to direct impacts of those getting sick and dying, the social and economic costs of a pandemic are many and varied. Impacts could range from school and business closings, lost jobs, to the interruption of basic services such as public transportation, health care, and the delivery of food and essential medicines. Hospitalizations and deaths can occur, especially to the elderly or those with pre-existing underlying conditions. As seen with Covid-19, multiple businesses were forced to close temporarily (some permanently), and unemployment rose significantly. Supply chains for food can be interrupted. During Covid, vulnerable populations such as those who were immunocompromised were the most affected. Impacts may be exacerbated by the effects of climate change, changes in population patterns (migration, density, or the makeup of socially vulnerable populations), and changes in land use and development in the City of Placentia.

As discussed in the hazard profile section, it is unlikely that climate change will influence this hazard overtime. Population projections for the City show very limited growth over the next 25 years. Populations are anticipated to grow by only 7.3% between 2025 and 2050, which equates to an annual growth of 0.29%, thus future population growth should not increase the potential impacts from this hazard on City assets. With respect to population patterns such as those associated with migration, density, or makeup of socially vulnerable populations the data shows that most socially vulnerable populations and disadvantaged communities are concentrated in the western portion of the City. Also, FEMA's National Risk Index for Orange County is rated as Very High. Since pandemic can affect the whole of the City, if these population patterns continue to show an increase in vulnerable populations, the vulnerability and potential impacts to City residents may continue to increase in the future.

As described in the land use discussion at the end of Section 4.2.2, a new land use map was developed as part of the General Plan efforts in 2023, which establishes the basic pattern of development in the City for

the next 20-25 years, including land uses and densities. Given the fact that pandemic has little to no effect on structures, coupled with the limited potential for significant future growth in Placentia, future changes in land use and development are unlikely to contribute to any notable change in the vulnerability of the City to this hazard.

Future Development

Future development is not expected to be significantly impacted by this hazard, though population growth in the City could increase exposure to a pandemic and increase the ability of each disease to be transmitted among the population of the City. If the median age of City residents continues to increase, vulnerability to pandemic diseases may increase, due to the fact that these diseases are often more deadly to senior citizens. During 2020, it was reported that one in five adults moved due to COVID-19 or know someone who did according to Pew Research. Many college aged students moved back home, which increased populations in the areas in which they returned. Also, many area residents moved from crowded urban areas to more suburban or rural areas, especially given the challenges of staying and working at home.

4.3.16. Subsidence

This hazard profile contains multiple sections that detail how this hazard can affect the City. These sections include a hazard/problem description; description of location and extent; past occurrences of this hazard; and how climate change can affect this hazard.

Hazard Profile

Hazard/Problem Description

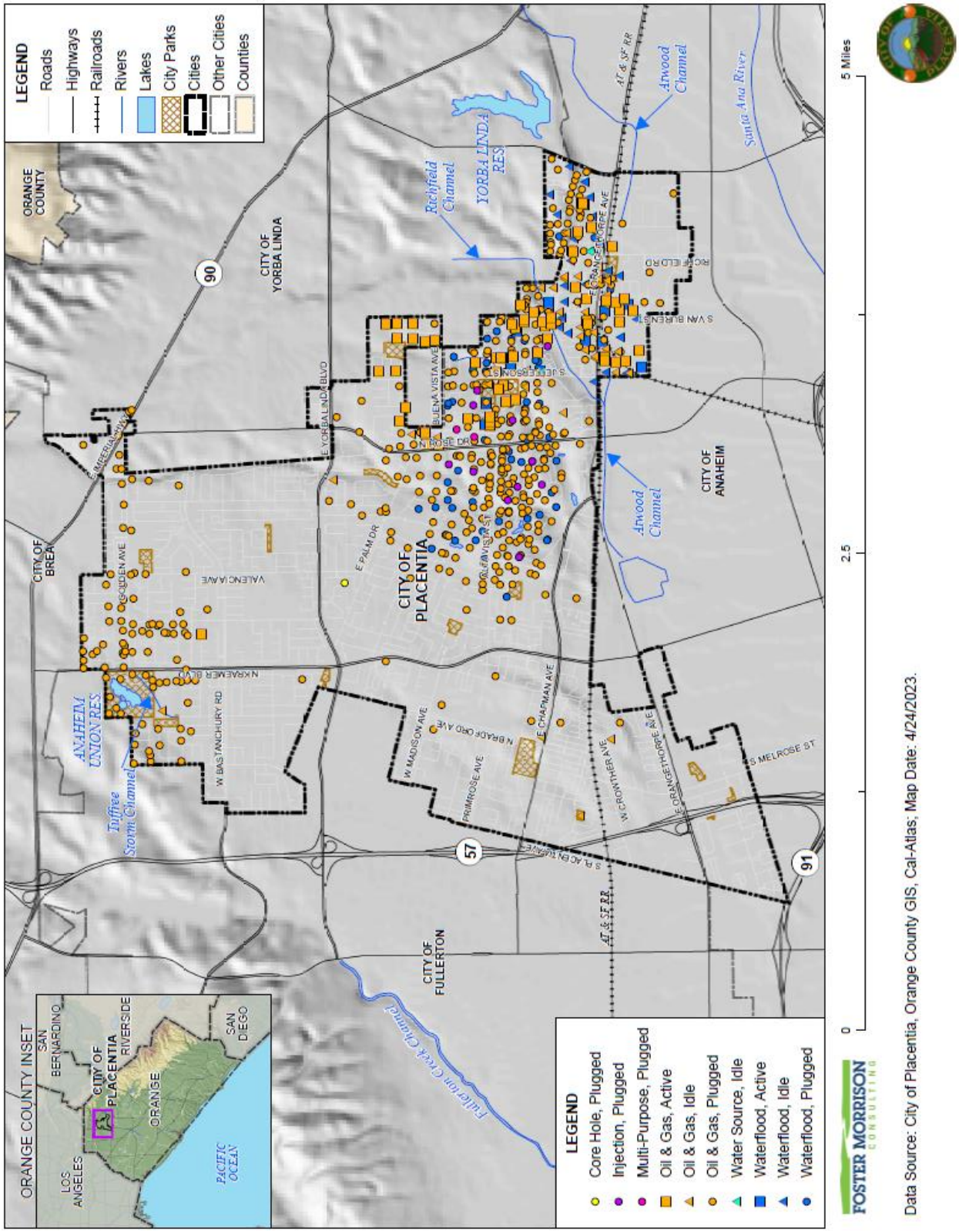
Land subsidence, as defined by the California Geological Survey, is the sinking of the land over man-made or natural underground voids. Subsidence can result in serious structural damage to buildings, roads, irrigation ditches, underground utilities, and pipelines. It can disrupt and alter the flow of surface or underground water. Weight, including surface developments such as roads, reservoirs, and buildings and manmade vibrations from such activities as blasting or heavy truck or train traffic can accelerate the natural processes of subsidence. Fluctuations in the level of underground water caused by pumping or by injecting fluids into the earth can initiate sinking to fill the empty space previously occupied by water or soluble minerals. The consequences of improper use of land (subject to ground subsidence) can be excessive economic losses, including the high costs of repair and maintenance for buildings, irrigation works, highways, utilities, and other structures. This results in direct economic losses to citizens as well as indirect economic losses through increased taxes and decreased property values.

Location and Extent

There is no scientific scale for measuring subsidence. It is traditionally measured in historical changes in land elevations. The speed of onset may be gradual or sudden. The 2023 (Draft) State Hazard Mitigation Plan noted that subsidence happens either due to natural processes or as a result of human activities. Historically, petroleum exploration activities have resulted in the creation of wells in the City of Placentia. This pumping can create voids in the earth's crust. In some cases, pits and wells may have been abandoned

and backfilled with undocumented fill materials. Existing pits and wells backfilled with undocumented materials may be subject to differential settlement, which causes structures to shift, and often become damaged, due to the uneven lowering of the earth. Differential settlement is closely related to subsidence, which is the sudden sinking or gradual downward settling of the earth's surface with little or no horizontal movement. Subsidence can be caused by natural geologic processes or by human activity such as subsurface mining or pumping of oil or groundwater. In the 2019 City of Placentia General Plan Safety Element it was noted that the City of Placentia has numerous oil wells and pipelines (oil recovery operations) operating within the City. These can be seen on Figure 4-88.

Figure 4-88 City of Placentia – Oil Well Locations



Past Occurrences

Disaster Declaration History

There have been no past federal or state disaster declarations due to subsidence, as detailed in Table 4-4.

NCDC Events

The NCDC data does not track subsidence events.

Hazard Mitigation Planning Committee Events

The HMPC could not recall events of subsidence in the City that caused damages.

Probability of Future Occurrences

Occasional—Soil subsidence (or sinkholes) due to oil extraction activity has historically been seen as an outcome of the extensive oil production activity that was the mainstay of the early economy of the City. Given the number of wells in the City, there does exist the possibility of future subsidence. Subsidence due to water drawdown may also occur in the Planning Area.

Climate Change and Subsidence

Climate change is unlikely to change the effects of subsidence from manmade wells in the City. However, data is showing that the groundwater table is lowering causing subsidence in California which can be caused by the changes in precipitation and periods of drought.

Vulnerability Assessment

Vulnerability—Low

Subsidence is a potential concern in the City primarily due to past oil production activities. The City has a long history of oil production. Oil wells dotted the landscape of Placentia in years past. Most have been capped and taken down. Only a few working oil wells remain. Subsidence can occur in any of these once active oil well locations, as well as in other areas of the City. Subsidence can result in serious structural damage to buildings, roads, irrigation ditches, underground utilities, and pipelines (discussed in more detail in Section 4.3.14). While subsidence was noted as a concern by the City, the lack of past subsidence events and issues occurring in the City resulted in the vulnerability being considered low.

Vulnerability of the community is discussed in multiple sections that detail how this hazard can affect the City. These sections include assets at risk, impacts, and how future development can be affected by this hazard.

Assets at Risk from Subsidence

Assets at risk from subsidence include: people and populations; structures; critical facilities and infrastructure, and community lifelines; natural, historic, and cultural resources; and economic assets and community activities of value. These are discussed in the following sections.

People and Populations

Vulnerable populations from subsidence are those whose homes or businesses are near subsidence areas. In the City, these areas include those areas near current and past oil production wells. Often these types of oil production activities are conducted in areas where underserved and vulnerable populations reside making these groups more vulnerable to subsidence occurring as a result of these activities.

Structures

There are structures in the City at greater risk to subsidence. Those areas near producing or previously producing oil wells have some increased measure of vulnerability. Subsidence could cause damages as building footings become unstable. Structures are at risk of damage or collapse from subsidence.

Critical Facilities and Infrastructure, and Community Lifelines

Critical facilities and infrastructure located near producing or previously producing oil wells have some measure of vulnerability. Facilities can collapse and utilities can be compromised, especially underground piping and utility lines. This can cause leaking from damaged pipes and impact the delivery of key services such as water, power, sewage, communications, and services associated with other key infrastructure resources.

Due to the small area affected by subsidence in the City, no community system is likely to be overwhelmed by subsidence. The 2023 (Draft) State Hazard Mitigation Plan noted that loss of groundwater aquifers and damage to aquatic ecosystems could occur in the State, but it is unlikely to occur in Placentia.

Natural, Historic, and Cultural Resources

Natural resources can be adversely impacted; although, impacts are generally isolated to the affected area. Subsidence can cause permanent inundation of land, increase flooding, change the topography of land, reduce the capacity of aqueducts to store water, and cause impacts to the ecosystem. Historic and cultural resources in the subsidence areas could also be vulnerable and subject to damage. Due to the limited areas affected by subsidence and the lack of past subsidence issues in the City, long term impacts to natural and historic and cultural resources is unlikely in Placentia.

Economic Assets and Community Activities of Value

Any economic asset in the subsidence areas could be vulnerable. In Placentia, the remaining oil wells could be vulnerable to some level of subsidence. There is also a remote chance that depending on the area affected, a larger subsidence event could have farther reaching economic impacts to a community if

businesses were damaged, shut down, or temporarily closed. Given the small area affected in the City, community activities of value are unlikely to be vulnerable to subsidence.

Impacts from Subsidence

Effects of land subsidence in the City can include sinkholes, damage to buildings, infrastructure, underground utilities, loss of groundwater aquifers, and damage to aquatic ecosystems. The City's past oil production causes the City to be at risk from impacts to subsidence. Many of the oil production areas in the City are known, but others may still remain unknown and untracked. As the land sinks, it can experience increased flooding and adverse impacts on sewer lines and stormwater drainage.

These impacts can be exacerbated by the effects of climate change, changes in population patterns (migration, density, or the makeup of socially vulnerable populations), and changes in land use and development.

As discussed in the hazard profile section, it is unlikely that climate change will influence this hazard overtime. The City is approaching built out conditions. Population projections for the City show very limited growth over the next 25 years. Populations are anticipated to grow by only 7.3% between 2025 and 2050, which equates to an annual growth of 0.29%, thus future population growth should not increase the potential impacts from this hazard on City assets. With respect to population patterns such as those associated with migration, density, or makeup of socially vulnerable populations the data shows that most socially vulnerable populations and disadvantaged communities are concentrated in the western portion of the City. Also, FEMA's National Risk Index for Orange County is rated as Very High. Subsidence maps show limited hazard risk occurring in the western portion of the City. Thus, even if these population patterns continue, it is unlikely that the vulnerability and potential impacts from this hazard to these City assets will significantly change.

As described in the land use discussion at the end of Section 4.2.2, a new land use map was developed as part of the General Plan efforts in 2023, which establishes the basic pattern of development in the City for the next 20-25 years, including land uses and densities. While future development within hazard areas generally contributes to some increase of impacts on City assets, given the limited risk to subsidence coupled with the limited potential for significant future growth in Placentia, future changes in land use and development are unlikely to contribute to any notable change in the vulnerability of the City to this hazard. In addition, the City has a development review process which includes the consideration of hazard constraints and updated building codes that should further limit the impacts of these hazards on City assets.

Future Development

The risk of subsidence to future development can be minimized by accurate recordkeeping and tracking of oil wells. Knowing these locations and choosing not to develop in those areas or mitigating against future issues will reduce future risks of losses due to subsidence. Placentia's Municipal Code dictates where oil production facilities can be located, required maintenance, required fencing, procedures for how to abandon, and the requirement for additional safety measures and performance standards. Adherence to these requirements reduce the risks associated with the wells and pipelines and the potential for subsidence.

The Division of Oil and Gas Geothermal Resources (DOGGR) also regulates active oil facilities and provides standards for their abandonment.

4.3.17. Urban Fire

Hazard Profile

This hazard profile contains multiple sections that detail how this hazard can affect the City. These sections include a hazard/problem description; description of location and extent; past occurrences of this hazard; and how climate change can affect this hazard.

Hazard/Problem Description

Urban structural fires are defined as fire in an urban area originating in and burning any part or all of any building, shelter, or other structure, which may include residential, commercial, or industrial buildings. "Urban" in this definition refers to all higher density developed areas, including both cities (like Placentia) and suburbs. The 2023 (Draft) State Hazard Mitigation Plan noted that major urban structural fires such as the following represent a broader community hazard:

- Urban conflagration—A large disastrous and destructive fire that spreads beyond natural or artificial barriers (National Fire Sprinkler Association 2020). Urban conflagrations may be started by wildfires or civil unrest.
- Industrial fire—A conflagration in an industrial setting.
- Construction fire—A fire at a construction or renovation site, often caused by cooking equipment, electrical distribution, or lighting equipment.
- Fire following earthquake—Widespread fires caused when an earthquake's shaking results in the release of flammable gases, liquids, or other combustible materials that come into contact with open flames or electrical arcing from damaged infrastructure.
- Explosion-caused fire—A large fire at industrial or construction sites where combustible materials and ignition sources cause an explosion, leading to fire.

Urban fires can be started by a wide range of natural and human causes: lightning strikes, wildfires, earthquakes, buildings not being built to code, buildings under construction, gas leaks, chemical explosions, arson, civil unrest, or ignition sources in a home such as a pot on the stove or unattended candles.

Urban fires are different from wildfires in the areas they occur in and the fuels for the fire: a wildfire is primarily fueled by vegetation and the structures the fire encounters, while an urban fire is fueled by human-built structures and often the vegetation that surrounds these structures. The 2019 City of Placentia General Plan Safety Element noted that, in general, a majority of large fires occur in areas classified as Wildland or Wildland-Urban Interface (WUI); however, fires can, and historically have occurred in vastly urban environments throughout the nation. Oftentimes, urban fires have involved unpopulated areas within the urban area that may contain brush or grasslands, and some historical fires have included structures in close proximity to these unpopulated areas. This is juxtaposed against the fact that in California, many urban or urbanizing areas are also at risk to wildfire from fires starting within wildland or WUI areas. This has, in some instances, resulted in a conflagration where large wildfires move in to developed areas causing significant damage and destruction.

As of 2019, the City of Placentia is approaching "build-out" conditions with approximately 98 percent of developable land developed or in the process of developing. Approximately 54.5 acres, or 1.3 percent, of the City's total acreage is vacant. Placentia is surrounded by other build-out cities and is indirectly adjacent to wildland areas; therefore, the risk of Wildland-Urban Interface fires is relatively low. Placentia's remaining vacant parcels of land are primarily in the southern portion of the City and are zoned for industrial and/or commercial uses. As a result of buildout, the City must continue to address the growing need to defend both life and property from urban fires.

Location and Extent

Urban fire can occur anywhere in the City. Urban fire has no scientific scale to measure extent. The only measurement is the number of fire companies who are called to respond (i.e., two alarm fire calls two companies, a three alarm fire calls three fire companies, etc.). Speed of onset is short. Duration is usually short as well, as long as firefighters are able to put out the fire in standard times.

Past Occurrences

Disaster Declaration History

There are no federal or state disasters due to urban fire, as shown on Table 4-4.

NCDC Events

There are no urban fire events in the NCDC database.

Hazard Mitigation Planning Committee Events

The HMPC noted that the 2019 General Plan Safety Element showed that the City does not have a significant history of fire – either structural or wildland. The last multi-alarm fire in Placentia was in April 2013, and this involved a house and adjacent restaurant in the Old Town area of the City where construction is older, and the structures are closer together.

The City provided data on fires between 2020 and 2022. These can be seen on Figure 4-89.

Figure 4-89 City of Placentia – Urban Fires from 2020 to 2022

Call volume

Summary	2022	2021	2020
Fire - NFIRS Series 100	117	108	70
Overpressure Rupture, Explosion, Overheat (No Fire) - NFIRS Series 200	2	6	7
Rescue & Emergency Medical Service Incident - NFIRS Series 300	3765	3294	1558
Hazardous Condition (No Fire) - NFIRS Series 400	2	1	0
Service Call - NFIRS Series 500	354	346	107
Good Intent Call - NFIRS Series 600	0	0	0
False Alarm & Falls Call - NFIRS Series 700	323	291	138
Severe Weather & Natural Disaster - NFIRS Series 800	1	2	0
Special Incident Type - NFIRS Series 900	183	202	114
Total	4747	4250	1994

Fire

How many responses per year per category?	2022	2021	2020
"Structure Fire" (Of the NFIRS Series 100 calls, NFIRS Codes 111-120)	40	33	18
"Vehicle Fire" (Of the NFIRS Series 100 calls, NFIRS Codes 130-138)	17	16	11
"Vegetation Fire" (Of the NFIRS Series 100 calls, NFIRS Codes 140-143)	9	7	9

How many responses per year per category?	2022	2021	2020
Total	66	56	38

Total acreage per year	2022	2021	2020
Total acreage of all vegetation fires	4	6	2

Source: City of Placentia Fire (via SAM.gov)

Probability of Future Occurrences

Highly Likely – Due to the high numbers of built structures in the City, urban fires will occur every year. This is confirmed by data in Figure 4-89 above.

Climate Change and Urban Fires

Urban fires are not assumed to be affected by climate change.

Vulnerability Assessment

Vulnerability—High

Vulnerability to and Impacts from Urban Fire

Urban fire can affect people's life safety, cause property loss, and threaten public safety. Urban fires are often caused by fire accidents and impacts can be compounded by the dense, built out urban area. Depending on what is affected and the fire spread, economic activities and the environment can also be adversely affected. Urban fire risk in Placentia is their primary fire concern. It causes damage to urban buildings and infrastructure and poses a major hazard to inhabitants' lives and property. The cost of fire damage is disproportionately high in large cities and highly inhabited areas. Given the right conditions, a small urban fire can become an out of control fire resulting in a conflagration which could be devasting to a smaller community such as Placentia. Neighborhoods with low socioeconomic and environmental conditions and the city center and other areas with older buildings and limited or older fire prevention and fire fighting infrastructure are areas where the level of risk and vulnerability is more significant.

Vulnerability of the community is discussed in multiple sections that detail how this hazard can affect the City. These sections include assets at risk, impacts, and how future development can be affected by this hazard.

Assets at Risk from Urban Fire

Assets at risk from urban include: people and populations; structures; critical facilities and infrastructure, and community lifelines; natural, historic, and cultural resources; and economic assets and community activities of value. These are discussed in the following sections.

People and Populations

During an urban fire, all populations in and near the urban fire are at risk. There are categories of people at increased risk during an urban fire:

- Infants and children under age five and their caregivers
- Elderly (65 and older)
- Individuals with disabilities
- Individuals dependent on medical equipment
- Individuals with impaired mobility

During a fire, it is important to be able evacuate people quickly. Those populations above would take additional time to evacuate. Marginalized populations are generally more affected by hazards, including urban fire, than other groups. In addition, populations and communities with economic or other socially

vulnerable conditions are especially vulnerable to an urban fire event. These communities often lack fire protection infrastructure which can result in greater fire intensity and spread, with greater consequences.

Structures

Structures are vulnerable to urban fires. Urban fires can conflagrate, causing fires to spread to adjacent properties and structures. All structures in the City have some vulnerability to urban fire. Again, those communities and older areas of the City, such as the city center, generally lack fire protection infrastructure which can result in greater fire intensity and spread, with greater consequences, including more significant and widespread damage to nearby structures.

Critical Facilities and Infrastructure, and Community Lifelines

All critical facilities and infrastructure have some measure of vulnerability to urban fires. Risk varies depending on the nature of the urban fire, as well as the use of ignition resistant construction techniques used during the construction of critical facilities as well as the ability of first responders to reach and access the fire quickly. The City indicated that vulnerability would be high if an urban fire were to strike a school, hospital, hazardous materials facility, or long-term care facility. Essential services facilities and infrastructure could also be significantly damaged by an urban fire. This can result in critical services such as water, sewage, communication and other systems being offline. Should water resources for firefighting be affected, the results could be catastrophic.

Urban fires can affect systems and community lifelines in the City to a certain extent. Because the City can respond to a fire quickly, system vulnerabilities are considered to be low. These lifelines are unlikely to be overwhelmed due to the capability of the fire services in the City.

Natural, Historic, and Cultural Resources

Urban fires in the area can affect natural, historic, and cultural resources. Similar to wildfires, urban fires can have significant impacts to the natural environment. These include air contamination from the fire plume, contamination from water runoff containing toxic products, and other environmental discharges or releases from burned materials. Fire smoke is a mixture of hazardous air pollutants, such PM2.5, NO2, ozone, aromatic hydrocarbons, or lead. In addition to contaminating the air with toxic pollutants, wildfires also impact the climate by releasing large quantities of carbon dioxide and other greenhouse gases into the atmosphere. Urban fires can also impact habitat areas and remove vegetation that can lead to erosion and silt and debris being carried to waterways further impacting the environment. Historic and cultural resources can be affected and are often more vulnerable due to their older age, construction type, and lack of fire prevention infrastructure such as sprinklers.

Economic Assets and Community Activities of Value

Economic assets in the City would be vulnerable to an urban fire. If a fire were to hit one of the primary economic sectors, major employers, or commercial centers, it would be difficult to recover from. Businesses could be lost or temporarily closed affecting sales tax revenues. Income generated through tourism could also be significantly affected for an extended period of time. Any community activity in the vicinity of an

urban fire would be vulnerable to being cancelled or rescheduled resulting in lost revenues associated with these events.

Impacts from Urban Fire

There are many impacts to the City from Urban Fire. The greatest risk is to the residents of the City as people may be injured or killed. Houses may burn down, or a conflagration may occur damaging businesses and critical facilities and infrastructure. Trees and vegetation may burn as well. Smoke and air quality could be impacted (depending on the size of the fire). Roads can temporarily shut down. Affected structures may be unusable and temporarily shut down which may have economic impacts.

In urban areas, where the protection of structures is the principal goal, the effectiveness of the City's fire response efforts is based upon several factors, including the age of structures, type of structures, efficiency of circulation routes that correlate with response times, and availability of water resources to combat fires. The principal fire hazard in Placentia is from structures. In addition, there are several oil pipelines throughout the City which are owned and operated by private industry.

Urban fire may be exacerbated by the effects of climate change, changes in population patterns (migration, density, or the makeup of socially vulnerable populations), and changes in land use and development. As discussed in the hazard profile section, it is unlikely that climate change will influence this hazard over time. The City is approaching built out conditions. Population projections for the City show very limited growth over the next 25 years. Populations are anticipated to grow by only 7.3% between 2025 and 2050, which equates to an annual growth of 0.29%, thus future population growth should not increase the potential impacts from this hazard on City assets. With respect to population patterns such as those associated with migration, density, or makeup of socially vulnerable populations the data shows that most socially vulnerable populations and disadvantaged communities are concentrated in the western portion of the City. Also, FEMA's National Risk Index for Orange County is rated as Very High. Since urban fire can occur anywhere in the City, if these population patterns continue to show an increase in vulnerable populations, the vulnerability and potential impacts to City assets from urban fire will continue to increase in the future.

As described in the land use discussion at the end of Section 4.2.2, a new land use map was developed as part of the General Plan efforts in 2023, which establishes the basic pattern of development in the City for the next 20-25 years, including land uses and densities. While future development within hazard areas generally contributes to some increase of impacts on City assets, given the limited potential for significant future growth in Placentia, future changes in land use and development are unlikely to contribute to any notable change in the vulnerability of the City to this hazard. In addition, the City has a development review process which includes the consideration of hazard constraints and updated building codes that should further limit the impacts of these hazards on City assets.

Future Development

Urban fires will continue to occur in the future. The City enforces building codes that include fire resistant construction. To enhance the fire and life safety protections of the community, the Placentia Fire and Life Safety Department (PFLSD) has implemented a robust Community Risk Reduction Program that conducts regular fire inspections of public and private structures and events in Placentia pursuant to state and local

law. The PFLSD works in collaboration with multiple internal and external partners to complete plan reviews on proposed construction, enhance fire protection systems, and ensure the structures are designed to reduce the risk of fire before the projects are even built.

4.3.18. Wildfire

Hazard Profile

This hazard profile contains multiple sections that detail how this hazard can affect the City. These sections include a hazard/problem description; description of location and extent; past occurrences of this hazard; and how climate change can affect this hazard.

Hazard/Problem Description

California is recognized as one of the most fire-prone and consequently fire-adapted landscapes in the world. The combination of complex terrain, Mediterranean climate, and productive natural plant communities, along with ample natural and aboriginal ignition sources, has created conditions for extensive wildfires. Generally, the fire season extends from early spring through late fall of each year during the hotter, dryer months. However, in recent years, wildfire season is more of a year around event. Fire conditions arise from a combination of high temperatures, low moisture content in the air and fuel, an accumulation of vegetation, and high winds.

Potential losses from wildfire include human life, structures and other improvements, natural and cultural resources, quality and quantity of water supplies, cropland, timber, and recreational opportunities. Economic losses could also result. Smoke and air pollution from wildfires can be a severe health hazard. In addition, catastrophic wildfire can create favorable conditions for other hazards such as flooding, landslides and mudflows, and erosion during the rainy season. The City noted that additional losses could occur if SCE initiates a power shutdown during extreme fire weather conditions. This is discussed in greater detail at the end of Section 4.3.1.

Location and Extent

Wildfire is part of California's natural ecology. However, its danger and cost have increased as fire-prone areas across the State have been increasing as well. Wildland fires affect grass, forest, and brushlands, as well as any structures located within them. Where there is human access to wildland areas the risk of fire increases due to a greater chance for human carelessness and historical fire management practices. Generally, there are four major factors that sustain wildfires and allow for predictions of a given area's potential to burn. These factors include fuel, topography, weather, and human actions.

- **Fuel** – Fuel is the material that feeds a fire and is a key factor in wildfire behavior. Fuel is generally classified by type and by volume. Fuel sources are diverse and include everything from dead tree leaves, twigs, and branches to dead standing trees, live trees, brush, and cured grasses. Also to be considered as a fuel source are manmade structures, such as homes and other associated combustibles. The type of prevalent fuel directly influences the behavior of wildfire. Fuel is a primary factor that is under human control. As of 2019, the City of Placentia General Plan Safety Element noted that the City is approaching "build-out" conditions with approximately 98 percent of developable land

developed or in the process of developing. As such, there is sparing fuel for wildfires in and around the City. However, based on data from Cal Fire, there is a small area in the northeast corner of the City that has more wildland fuel sources than most of the City Planning Area resulting in an increase in wildfire risk to that area. There are also significant fuel sources and wildland fire risk in neighboring jurisdictions than can cause fires in these other areas to spread within City limits.

- **Topography** – An area's terrain and land slopes affect its susceptibility to wildfire spread. Both fire intensity and rate of spread increase as slope increases due to the tendency of heat from a fire to rise via convection. The arrangement of vegetation throughout a hillside can also contribute to increased fire activity on slopes. Topography in the City is generally flat, with a minimum elevation of 187 ft above mean sea level (msl) to 988 ft above msl.
- **Weather –** Weather components such as temperature, relative humidity, wind, and lightning also affect the potential for wildfire. High temperatures and low relative humidity dry out fuels that feed wildfires, creating a situation where fuel will ignite more readily and burn more intensely. Thus, during periods of drought, the threat of wildfire increases. Wind is the most treacherous weather factor. The greater a wind, the faster a fire will spread and the more intense it will be. In addition to wind speed, wind shifts can occur suddenly due to temperature changes or the interaction of wind with topographical features such as slopes or steep hillsides. The 2019 General Plan Safety Element noted that Santa Ana winds pose a significant fire hazard to the City each year, and typically occur from September to the first significant rain in December. The combination of dry air, low humidity, and heavy winds contributes to what is ultimately referred to as "fire weather" due to the limited amount of moisture in the air and increased dry, dead vegetation.
- **Human Actions** – Most wildfires are ignited by human action, the result of direct acts of arson, carelessness, or accidents. Many fires originate in populated areas along roads and around homes, and are often the result of arson or careless acts such as the disposal of cigarettes, use of equipment or debris burning. Recreation areas that are located in high fire hazard areas also result in increased human activity that can increase the potential for wildfires to occur.

Fires can have a quick speed of onset, especially during periods of drought. Fires can burn for a short period of time, or may have durations lasting for a week or more. Wildfire can affect any area of the City; however, CAL FIRE has mapped areas in California that are at greater or lesser risk to wildfire. Methodologies for this analysis and maps showing the various Fire Hazard Severity Zones (FHSZs) which range from Urban Unzoned to High in the City, and Fire Threat Classes which range from Low to High in the City can be found in the Vulnerability Assessment below. Geographic extents of wildfire can be seen on Figure 4-90 and in Table 4-101 for the FHSZs, and on Figure 4-91 and in Table 4-102 for the Fire Threat Classes.

Figure 4-90 City of Placentia – Fire Hazard Severity Zones

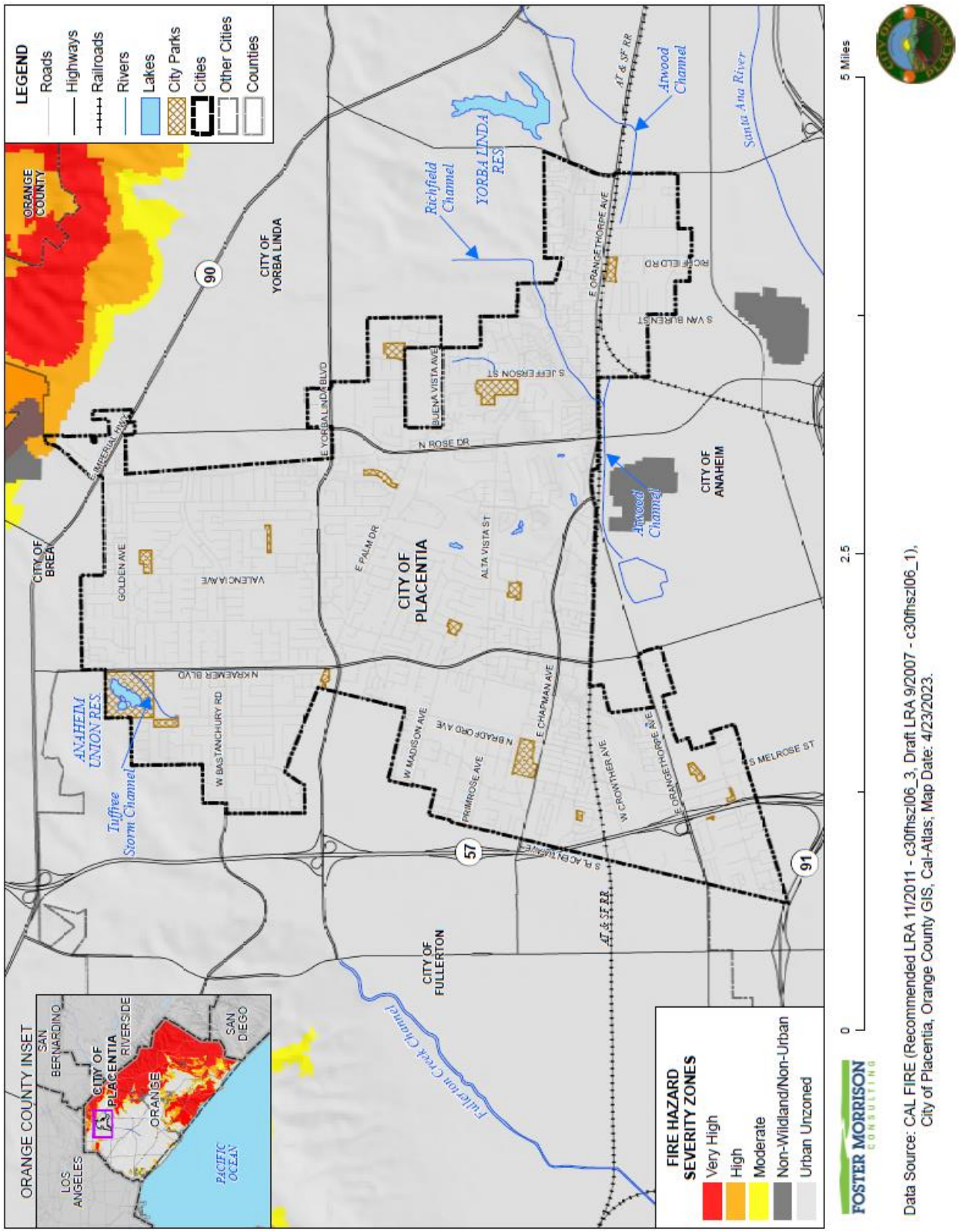


Table 4-101 City of Placentia – Geographical Extents of CAL FIRE FHSZs

Fire Hazard Severity Zone	Total Acres	% of Total Acres	Improved Acres	% of Total Improved Acres	Unimproved Acres	% of Total Unimproved Acres
Very High	0.0	0.0%	0.0	0.0%	0.0	0.0%
High	1	0.04%	1	0.05%	0	0.00%
Moderate	0.0	0.0%	0.0	0.0%	0.0	0.0%
Non-Wildland/Non-Urban	0.0	0.0%	0.0	0.0%	0.0	0.0%
Urban Unzoned	3,417	99.96%	2,702	99.95%	715	100.00%
Total	**3,418**	**100.00%**	**2,703**	**100.00%**	**715**	**100.00%**

Source: CAL FIRE

Figure 4-91 City of Placentia – Fire Threat Classes

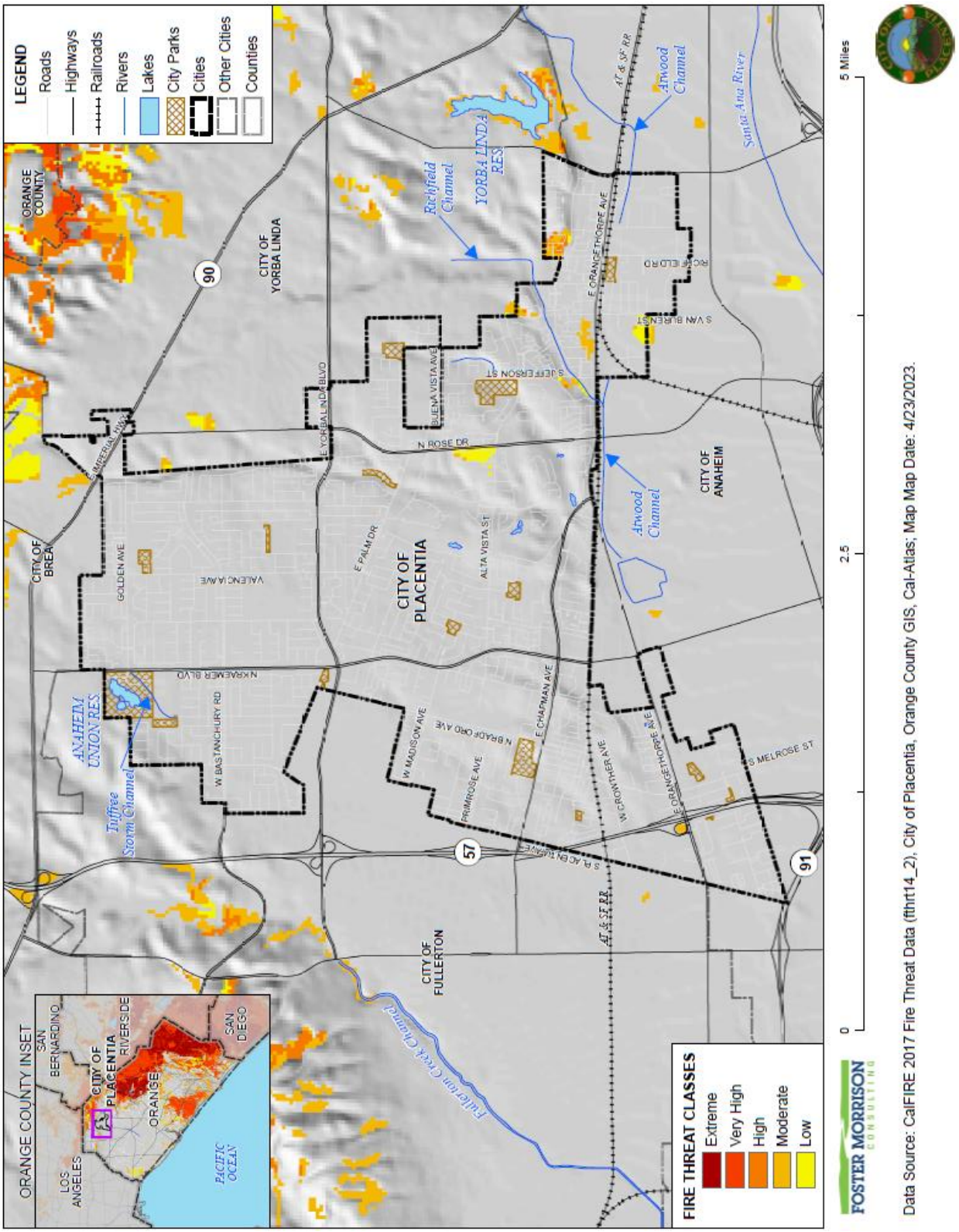


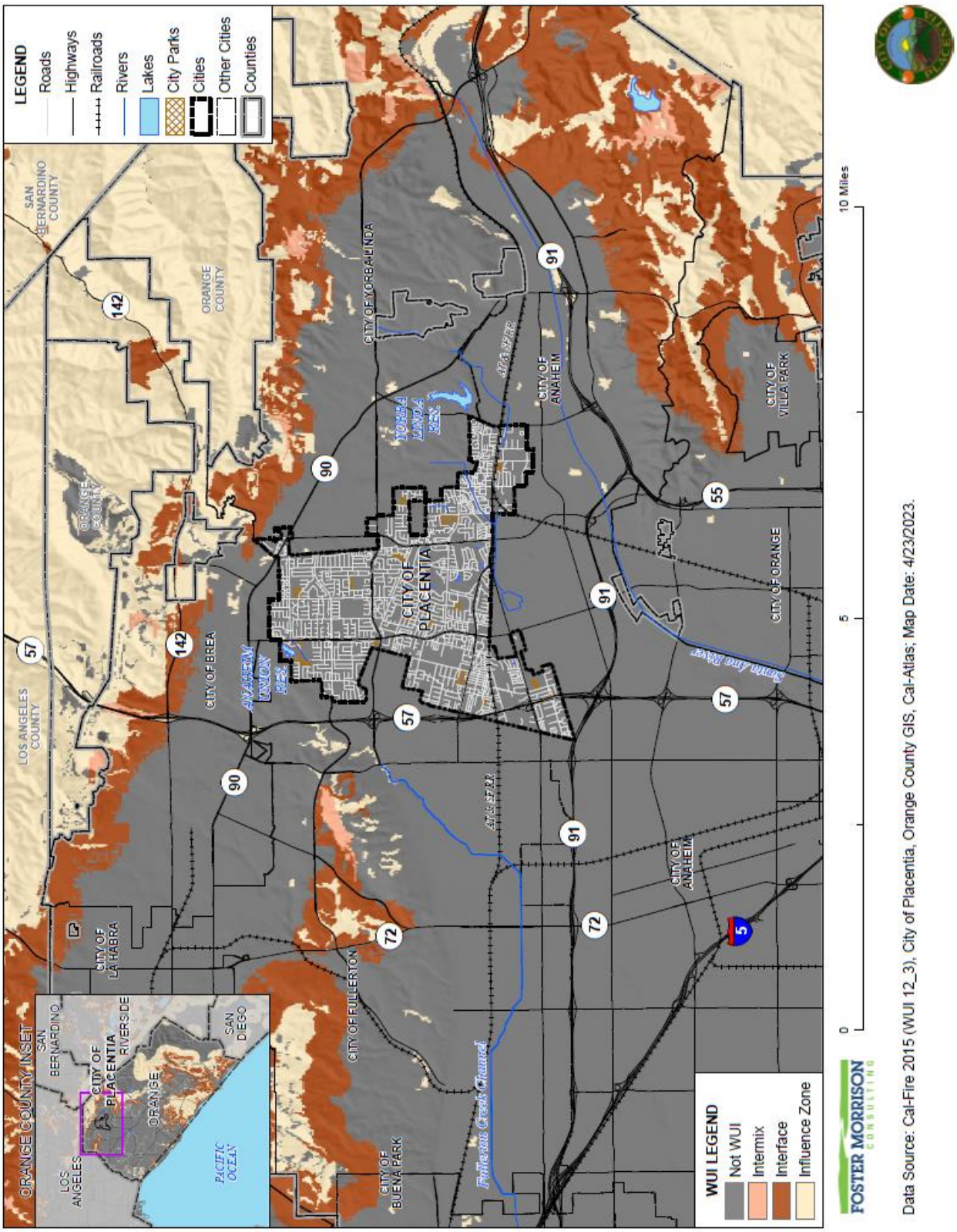
Table 4-102 City of Placentia – Geographical Extents of Fire Threat Classes

Fire Threat Class	Total Acres	% of Total Acres	Improved Acres	% of Total Improved Acres	Unimproved Acres	% of Total Unimproved Acres
High	4	12.6%	0	1.2%	4	28.3%
Moderate	15	46.5%	7	35.8%	8	61.3%
Low	13	40.9%	12	63.0%	1	10.4%
Grand Total	**33**	**100.0%**	**19**	**100.0%**	**14**	**100.0%**

Source: CAL FIRE

In addition to the CAL FIRE wildfire zones, CAL FIRE provides wildland-urban interface (WUI) maps for jurisdictions in the State of California. This is shown on Figure 4-92 for the City of Placentia. As shown, there are very little WUI areas (only the northeast tip of the City) inside the City limits.

Figure 4-92 City of Placentia – Wildland Urban Interface



Past Occurrences

Disaster Declaration History

There have been 6 federal and 18 state disaster declarations due to wildfire in Orange County. This can be seen in Table 4-103. Specific disaster numbers for these state and federal disasters are shown in Table 4-4 above.

Table 4-103 Orange County Wildfire Disaster Declarations 1950-2023

Disaster Type	Federal Declarations		State Declarations	
	Count	Years	Count	Years
Fire	6	1967, 1980, 1982 (twice), 1996, 2017	18	1980, 1982, 1996, 2002, 2006, 2007 (four times), 2008 (twice), 2009, 2017 (three times), 2020 (twice), 2022

Source: Cal OES, FEMA

NCDC Events

The NCDC has tracked wildfire events in the County dating back to 1993. This is shown in Table 4-104.

*Table 4-104 Orange County NCDC Storm Events 1/1/1950-10/31/2022**

Event Type	Number of Events	Deaths	Deaths (indirect)	Injuries	Injuries (indirect)	Property Damage	Crop Damage
Wildfire	38	0	0	30	3	$91,635,000	$100,000

Source: NCDC

*Note: Losses reflect totals for all impacted areas, some of which fell outside of the City and outside of Orange County.

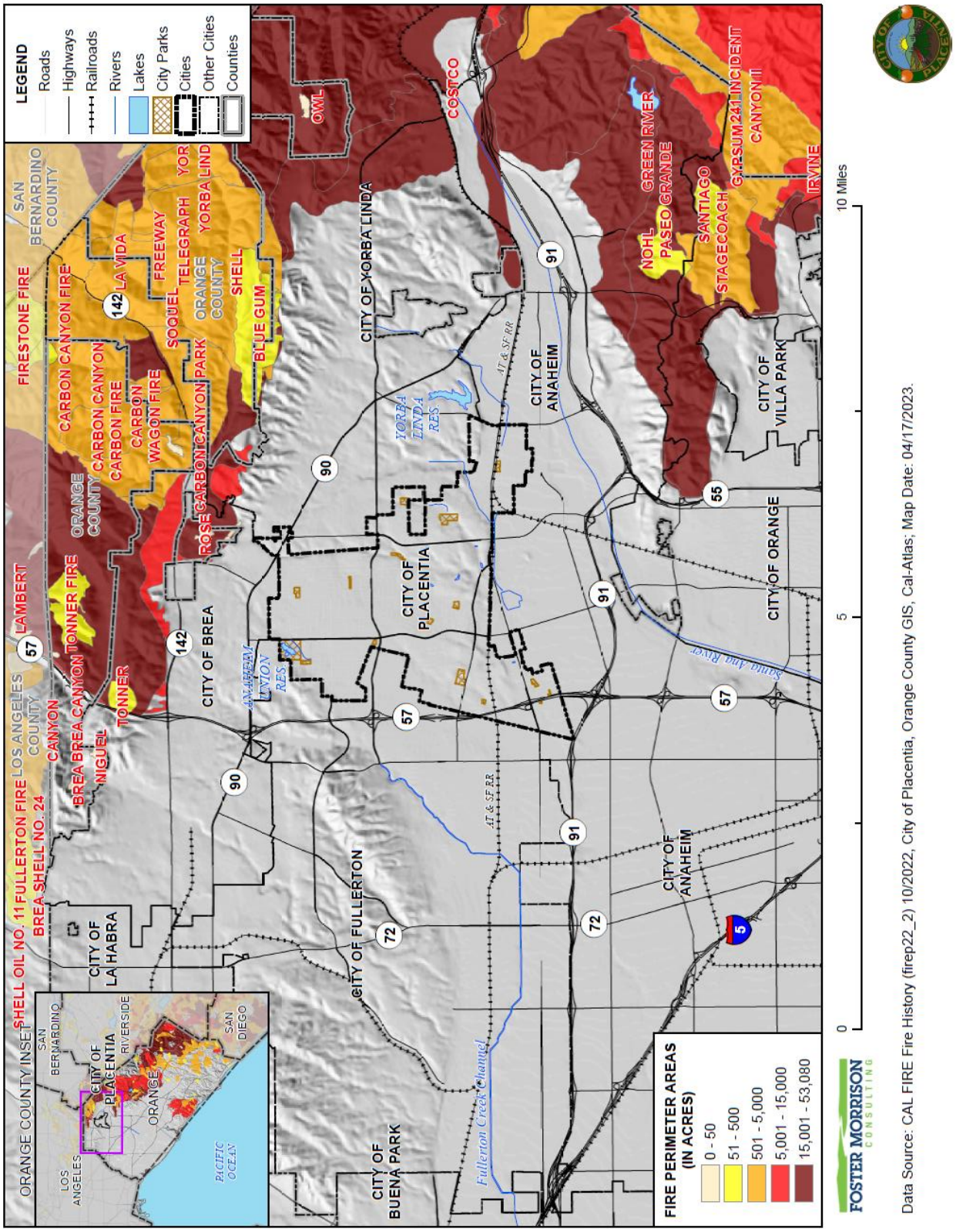
CAL FIRE Events

CAL FIRE, USDA Forest Service Region 5, Bureau of Land Management (BLM), the National Park Service (NPS), Contract Counties and other agencies jointly maintain a comprehensive fire perimeter GIS layer for public and private lands throughout the state. The data covers fires going back to 1878. For the National Park Service, Bureau of Land Management, and US Forest Service, fires of 10 acres and greater are reported. For CAL FIRE, timber fires greater than 10 acres, brush fires greater than 50 acres, grass fires greater than 300 acres, and fires that destroy three or more residential dwellings or commercial structures are reported. CAL FIRE recognizes the various federal, state, and local agencies that have contributed to this dataset, including USDA Forest Service Region 5, BLM, National Park Service, and numerous local agencies.

Fires may be missing altogether or have missing or incorrect attribute data. Some fires may be missing because historical records were lost or damaged, fires were too small for the minimum cutoffs, documentation was inadequate, or fire perimeters have not yet been incorporated into the database. Also, agencies are at different stages of participation. For these reasons, the data should not be used for statistical or analytical purposes.

The data provides a reasonable view of the spatial distribution of past large fires in California Figure 4-93 shows fire history for the area surrounding the City, colored by the size of the acreage burned. This map contains fires from 1950 to 2022. Each of them was tracked by CAL FIRE. As shown, based on the CAL FIRE database, they have no records of fires of more than 50 acres that have occurred in the City.

Figure 4-93 City of Placentia – Wildfire History 1950 to 2022



Hazard Mitigation Planning Committee Events

The HMPC noted no wildfires events that occurred in the City. However, it was noted that wildfires in the region around the City have caused wildfire smoke and air quality issues in the past. The South Coast Air Quality Management District worked with the City to review those past events. Two events since 2018 have affected the City's air quality:

- **June 2018** saw wildfire smoke affect the City from the Aliso Fire. The fire burned over 200 acres in Orange County near Aliso Viejo and Laguna Beach. Light onshore winds brought smoke into the City and the rest of southern Orange County.
- **July 2018** – A wildfire, named the Valley Fire, burned in San Bernardino County within the San Bernardino National Forest near Forest Falls. Smoke from these fires was carried by winds into the City of Placentia causing air quality issues for a few days until the winds shifted.
- **June 2020** – 3 alarm fire at an apartment building
- **Sept 2020 -** 2 alarm commercial fire from and illegal honey fire.
- **April 2023** – multi alarm fire at a public storage facility that was intentionally set.

Probability of Future Occurrences

Highly Likely — Conventional thought states that from May to October of each year, the City faces a wildland fire threat. Recently, it is as though the fire threat is almost year around. However, with the City approaching build-out and given the limited areas of wildland fuels within the City, there is only a very small High FHSZ located within the City of Placentia. Although there is minimal undeveloped, open space located within the City, Placentia does border outside jurisdictions to the north and east which have vast Wildland-Urban Interfaces (WUIs), and these WUIs may pose an indirect threat to the City. Smoke and air quality risk to the City do still exist from these fires outside of City boundaries, and it is possible that fires originating in neighboring jurisdictions could move into areas of Placentia.

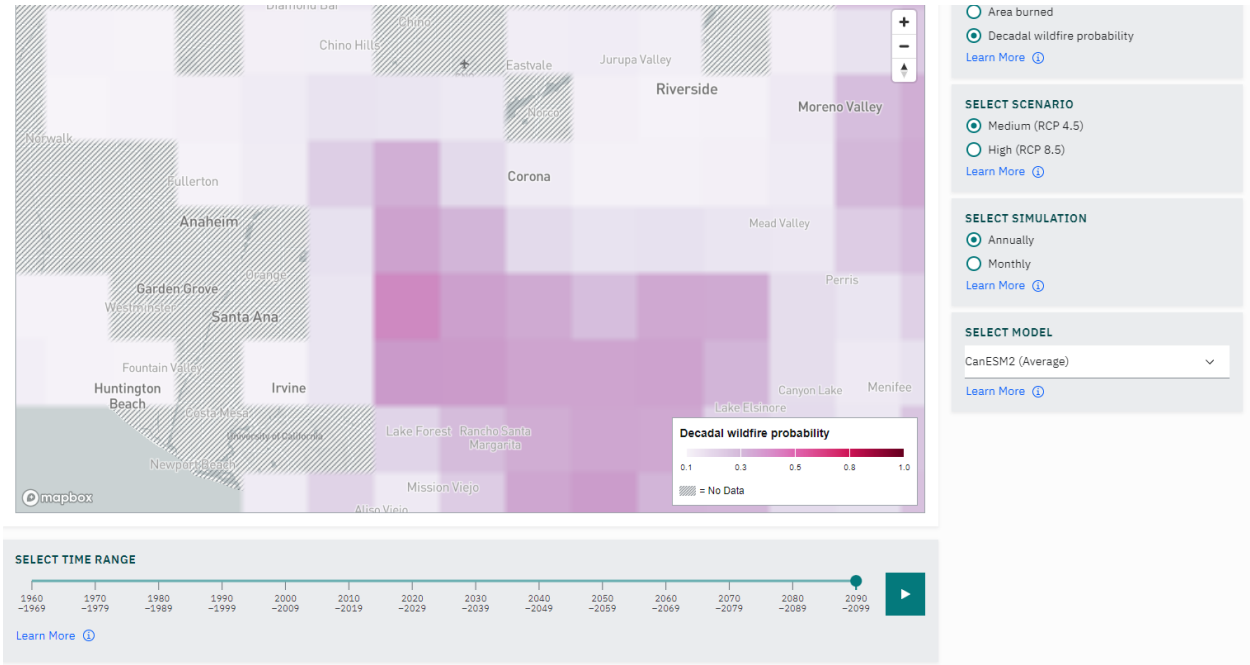
Climate Change and Wildfire

Climate change and its effect on wildfire near the City has been discussed by Cal-Adapt.

Cal-Adapt Predictions

Warmer temperatures can exacerbate drought conditions. Drought often kills plants and trees or leaves them susceptible to disease, which serve as fuel for wildfires. Warmer temperatures could increase the number of wildfires and pest outbreaks, such as the western pine beetle. Cal-Adapt's wildfire tool predicts the potential increase in the amount of burned areas for the year 2090-2099, as compared to recent (2010) conditions. This is shown in Figure 4-94. Based on this model, Cal-Adapt predicts that wildfire risk in Orange County will increase moderately at the end of the century. However, wildfire models can vary depending on the parameters used. Cal-Adapt does not take landscape and fuel sources into account in their model. In all likelihood, in the City, precipitation patterns, high levels of heat, topography, and fuel load will determine the frequency and intensity of future wildfire.

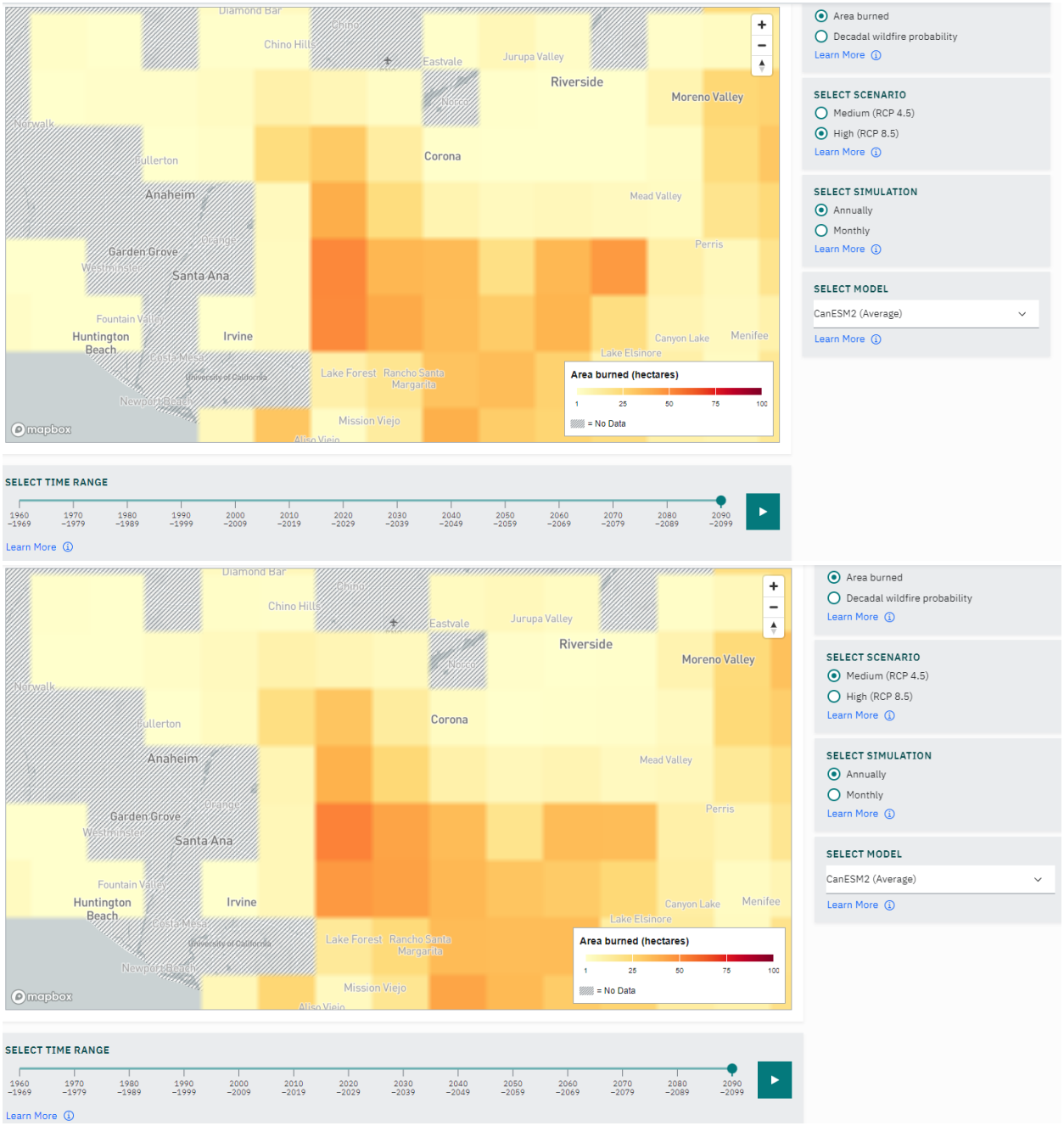
Figure 4-94 City of Placentia – Projected Increase in Wildfire Burn Areas



Source: Cal-Adapt

Wildfire scenario projections were done by Cal-Adapt, based on statistical modeling from historical data of climate, vegetation, population density, and fire history. The fire modeling ran simulations on five variables on a monthly time step - Large fire presence/absence, Number of fires given presence, Area burned in a grid cell given a fire, High severity burned area given a fire and emissions. These are shown on Figure 4-95. The upper chart shows modeled annual averages of area burned for the City and surrounding area under the RCP 4.5 scenario, while the lower chart shows modeled annual averages of area burned for the City under the RCP 8.5 scenario.

Figure 4-95 City of Placentia – Future Annual Averages of Acres Burned under RCP 4.5 and 8.5 Scenarios



Source: Cal-Adapt

Vulnerability Assessment

Vulnerability—Low

Risk and vulnerability to the City from wildfire is of some concern. As noted in the 2019 General Plan Safety Element, Placentia is surrounded by other build-out cities and, with the exception of the far northeast corner of the City, is not adjacent to large wildland areas; therefore, the risk of Wildland-Urban Interface fires is relatively limited.

Though wildfire in the City may be limited, the City is affected by wildfire smoke from areas around the City. Smoke from wildfires is made up of gas and particulate matter, which can be easily observed in the air. Air quality standards have been established to protect human health with the pollutant referred to as PM2.5 which consists of particles 2.5 microns or less in diameter. These smaller sizes of particles are responsible for adverse health effects because of their ability to reach the lower regions of the respiratory tract. Wildfire smoke can have negative effects to those who live in or near a fire burn area. Smoke and air pollution from wildfires can be a severe health hazard.

Vulnerability of the community is discussed in multiple sections that detail how this hazard can affect the City. These sections include assets at risk, impacts, and how future development can be affected by this hazard. The methodologies used for this analysis are discussed below.

Wildfire Analysis Methodologies

It is important to evaluate or quantify the City's risk to wildfire. As detailed above in Section 4.3.17, while the primary concern to the City is from a conflagration or structure fire, there is no mapped hazard data on urban fires to support such an analysis. this GIS analysis focuses on the risk of the City to wildfire based on best available data. The City of Placentia has mapped CAL FIRE data which provides a variety of fire hazard information for California communities. Utilizing this data from CAL FIRE, GIS was used to determine the possible impacts of wildfire within Placentia and how the wildfire risk varies across the Planning Area. Three primary CAL FIRE datasets and associated analysis was used for this Plan:

- Fire Responsibility Areas
- Fire Hazard Severity Zones
- Fire Threat Classes

For the Fire Responsibility Area discussion below, the methodology and results are shown together. For the FHSZ and Fire Threat Classes, the methodologies are below and the analysis results discussed in the Assets at Risk from Wildfire section below.

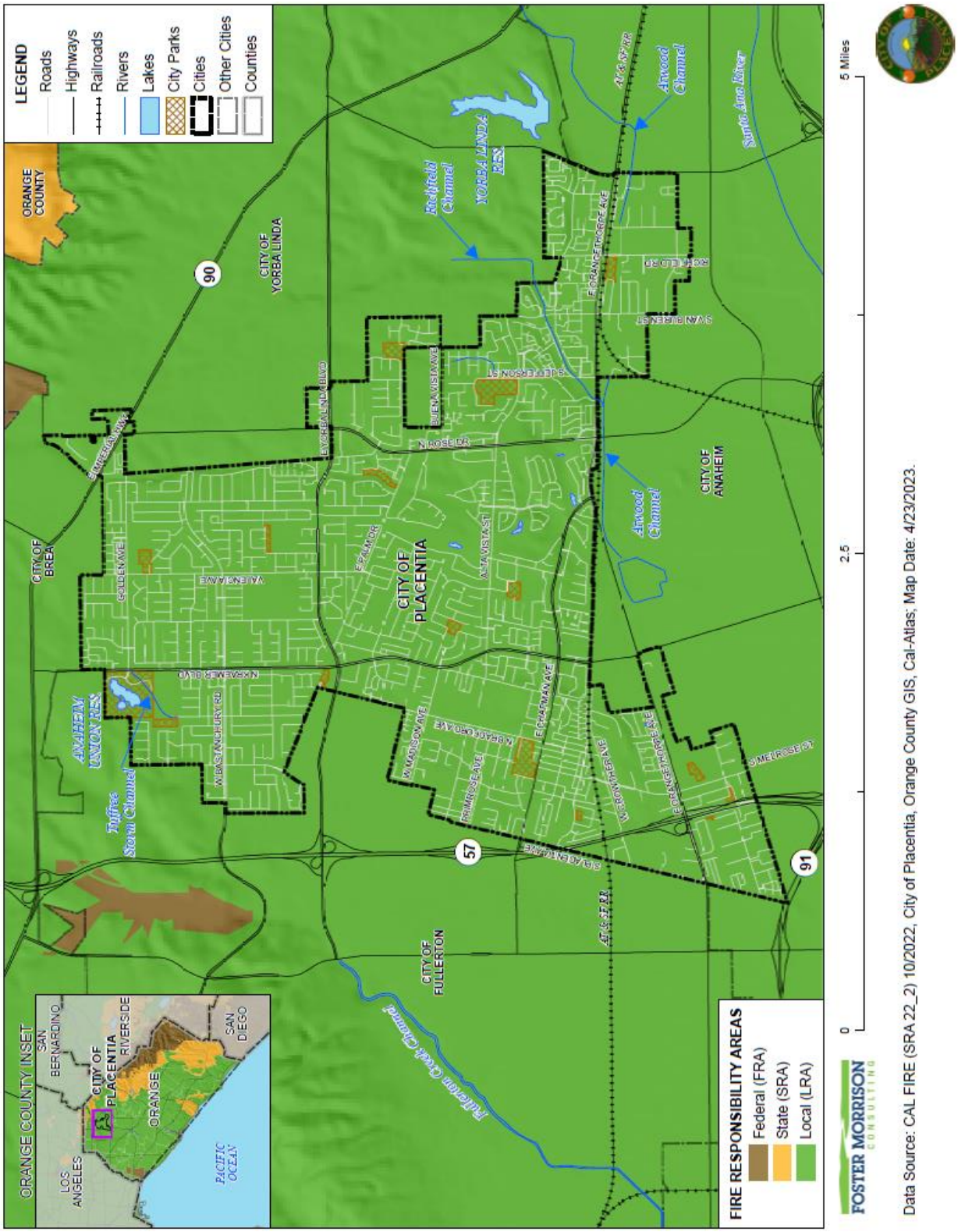
Fire Responsibility Areas

There are numerous wildland fire protection agencies that have responsibility statewide, Countywide, and Citywide, including the USDA Forest Service (FS), the Bureau of Land Management (BLM), and CAL FIRE. CAL FIRE has a legal responsibility to provide fire protection on all SRA lands, which are defined based on land ownership, population density and land use. Fire Responsibility areas are generally

categorized by Federal Responsibility Areas (FRA), State Responsibility Areas (SRA) and Local Responsibility Areas (LRA). The City falls entirely within the Local Responsibility Area.

CAL FIRE's Fire Responsibility Area layer dated October 2022 was used in this analysis to show Placentia's FRA, SRA, and LRA areas. GIS was used to create a centroid, or point representing the center of the Placentia parcel polygon. The FRA, SRA, LRA areas were then overlaid on the parcel centroids. For the purposes of this analysis, the wildfire responsibility area that intersected a parcel centroid was assigned for the entire parcel. The Placentia Planning Area falls entirely within the Local Responsibility Area and is shown in Figure 4-96.

Figure 4-96 City of Placentia– FRA, SRA, and LRA



Fire Hazard Severity Zone

As part of the Fire and Resource Assessment Program (FRAP), CAL FIRE was mandated to map areas of significant fire hazards based on fuels, terrain, weather, and other relevant factors. These zones, referred to as FHSZs, then define the application of various mitigation strategies to reduce risk associated with wildland fires.

Fire hazard is a way to measure the physical fire behavior so that people can predict the damage a fire is likely to cause. Fire hazard measurement includes the speed at which a wildfire moves, the amount of heat the fire produces, and most importantly, the burning fire brands that the fire sends ahead of the flaming front.

The fire hazard model developed by CAL FIRE considers the wildland fuels. Fuel is that part of the natural vegetation that burns during wildfire. The model also considers topography, especially the steepness of the slopes. Fires burn faster as they burn up-slope. Weather (temperature, humidity, and wind) has a significant influence on fire behavior. The model recognizes that some areas of California have more frequent and severe wildfires than other areas. Finally, the model considers the production of burning fire brands (embers) how far they move, and how receptive the landing site is to new fires.

In 2007, CAL FIRE updated its Fire Hazard Severity Zone (FHSZ) maps for the State of California to provide updated map zones, based on new data, science, and technology that will create more accurate zone designations such that mitigation strategies are implemented in areas where hazards warrant these investments. The zones will provide specific designation for application of defensible space and building standards consistent with known mechanisms of fire risk to people, property, and natural resources. The program is still ongoing with fire hazard severity zone maps being updated based on designated responsibility areas: FRA, SRA, and LRA.

CAL FIRE mapped the FHSZs, or areas of significant fire hazard, based on fuels, terrain, weather, and other relevant factors. Analysis was performed using the most current FHSZ dataset (dated 2011 for recommended LRA and draft LRA 2007) and using GIS, the parcel layer was overlaid on these layers. Since it is possible for any given parcel to intersect with multiple categories for purposes of this analysis, the parcel centroid was used to determine which FHSZ to assign to each parcel. Once completed, the parcel boundary layer was joined to the centroid layer and values were transferred based on the identification number in the Assessor's database and the parcel layer. Based on this approach, the FHSZs for the Placentia Planning Area were determined and further broken out by land use and included information on both land and improved values.

This methodology is used below for the FHSZ analysis of people and populations, structures, and critical facilities at risk as well as with respect to future development areas.

Fire Threat

Cal Fire develops and maintains datasets related to wildland fire threat and risk. The Fire Threat dataset, created in 2004, was used for analysis on the City of Placentia. This fire threat layer was used for loss estimation purposes based on its more comprehensive coverage of the Planning Area. The City's parcel

and associated assessor data was used as the basis for the countywide inventory of developed parcels, or structures.

The Fire Threat dataset is a combination of fire frequency, or the probability of a given area to burn, and potential fire behavior. Fire rotation is calculated using fifty years of fire history, as well as climate, vegetation, and land ownership information. Fuel rank is calculated based on expected fire behavior for unique combinations of topography and vegetative fuels under given weather conditions (wind speed, humidity, temperature, and fuel moistures). Fuel rank and fire rotation are then combined to create the 5 threat classes in the Fire Threat dataset, ranging from Little or No Threat to Extreme Threat. There are no areas of Extreme Threat in the City.

Cal Fire's 2017 Fire Threat layer was used for this analysis. GIS was used to create a centroid, or point representing the center of the City of Placentia parcel polygon. Fire Threat was then overlaid on the parcel centroids. For the purposes of this analysis, the wildfire threat class (Little or No Threat | Moderate | High | Very High | Extreme) that intersected a parcel centroid was assigned as the threat zone for the entire parcel.

This methodology is used below for the Fire Threat analysis of people and populations, structures, and critical facilities at risk as well as with respect to future development areas.

Assets at Risk from Wildfire

Assets at risk from wildfire include: people and populations; structures; critical facilities and infrastructure, and community lifelines; natural, historic, and cultural resources; and economic assets and community activities of value. These are discussed in the following sections.

People and Populations

All populations are at some vulnerability to wildfire. Certain vulnerable populations are at the greatest risk to the effects of wildfire as well as smoke and air quality issues that wildfires bring. Vulnerable populations include:

- Unsheltered
- Infants and children under age five and their caregivers
- Elderly (65 and older)
- Individuals with disabilities
- Individuals dependent on medical equipment
- Individuals who exercise, physically train, or compete outdoors
- Individuals who work outdoors
- Individuals with impaired mobility

To further evaluate the impact to the residential population within the City, an analysis was performed to determine population in Fire Hazard Severity Zones (FHSZ). Using GIS, the CAL FIRE FHSZ datasets were overlayed on the improved residential parcel data. Those parcel centroids that intersect each FHSZ were counted and multiplied by the Census Bureau average household size (3.14) for the City; results were tabulated by fire hazard severity zones. According to this analysis shown in Table 4-105, only two improved residential parcels fall in the moderate or higher FHSZ.

Table 4-105 City of Placentia– Improved Residential Parcels and Populations at Risk in FHSZs

Jurisdiction	Moderate		High		Very High	
	Improved Residential Parcels	Population	Improved Residential Parcels	Population	Improved Residential Parcels	Population
Placentia	0	0	2	6	0	0

Source: CAL FIRE, US Census Bureau, Orange County 2022 Parcel/Assessor's Data

An additional separate analysis was performed to determine population in Fire Threat Class. Using GIS, the CAL FIRE Fire Threat Class datasets were overlayed on the improved residential parcel data. Those parcel centroids that intersect each FHSZ were counted and multiplied by the Census Bureau average household size (3.14) for the City; results were tabulated by jurisdiction and fire hazard severity zones. According to this analysis shown in Table 4-106, no residential parcels fall in the moderate or higher Fire Threat Class.

Table 4-106 City of Placentia– Improved Residential Parcels and Populations at Risk in Fire Threat Class

Jurisdiction	Extreme		High		Moderate	
	Improved Residential Parcels	Population at Risk	Improved Residential Parcels	Population at Risk	Improved Residential Parcels	Population at Risk
City of Placentia	0	0	0	0	0	0
Total	**0**	**0**	**0**	**0**	**0**	**0**

Source: CAL FIRE, US Census Bureau, Orange County 2022 Parcel/Assessor's Data)

Structures

Structures in the City have some measure of risk to wildfire. Wildfire can affect the built environment of the City. A GIS analysis of structures at risk in FHSZ and Fire Threat Classes follows.

Fire Hazard Severity Zones and Values at Risk

The City's Fire Hazard Severity Zones were shown in Figure 4-90. Analysis results for the Placentia Planning Area is summarized in Table 4-107. These results are broken out and detailed in Table 4-108, which summarizes the total parcel counts, improved parcel counts, land value, improved structure value, and the estimated contents replacement values based on the CRV factors detailed in Section 4.3.1. Also, it is important to keep in mind that these assessed values may be well below the actual market value of improved parcels located within the landslide incidence and susceptibility areas due primarily to Proposition 13.

Table 4-107 City of Placentia – Count and Values of Parcels (and Structures) by CAL FIRE FHSZ

Fire Hazard Severity Zone	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Very High	0	0	$0	$0	$0	$0
High	2	2	$1,013,514	$379,764	$189,882	$1,583,160
Moderate	0	0	$0	$0	$0	$0
Non-Wildland/Non-Urban	0	0	$0	$0	$0	$0
Urban Unzoned	12,801	11,911	$4,571,889,937	$2,700,100,218	$1,771,873,622	$9,065,049,231
Total	**12,803**	**11,913**	**$4,572,903,451**	**$2,700,479,982**	**$1,772,063,504**	**$9,066,632,391**

Source: CAL FIRE, Orange County 2022 Parcel/Assessor's Data

Table 4-108 City of Placentia – Count and Value of Parcels (and Structures) in CAL FIRE FHSZs by Land Use

Fire Hazard Severity Zone / Land Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
High						
Agricultural	0	0	$0	$0	$0	$0
Commercial	0	0	$0	$0	$0	$0
Industrial	0	0	$0	$0	$0	$0
Miscellaneous	0	0	$0	$0	$0	$0
Residential	2	2	$1,013,514	$379,764	$189,882	$1,583,160
Tax Exempt	0	0	$0	$0	$0	$0
Unknown	0	0	$0	$0	$0	$0
High Total	**2**	**2**	**$1,013,514**	**$379,764**	**$189,882**	**$1,583,160**
Urban Unzoned						
Agricultural	19	2	$1,249,173	$223,742	$223,742	$1,696,657
Commercial	241	215	$284,399,396	$232,574,449	$232,574,449	$757,481,233
Industrial	237	216	$334,480,160	$220,089,648	$330,134,472	$897,925,442
Miscellaneous	3	0	$76,908	$0	$0	$76,908
Residential	12,003	11,427	$3,881,820,864	$2,161,877,661	$1,080,938,884	$7,124,668,762
Tax Exempt	196	51	$69,863,436	$85,334,718	$128,002,075	$283,200,229
Unknown	102	0	$0	$0	$0	$0
Urban Unzoned Total	**12,801**	**11,911**	**$4,571,889,937**	**$2,700,100,218**	**$1,771,873,622**	**$9,065,049,231**

Fire Hazard Severity Zone / Land Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Placentia Total	**12,803**	**11,913**	**$4,572,903,451**	**$2,700,479,982**	**$1,772,063,504**	**$9,066,632,391**

Source: CAL FIRE, Orange County 2022 Parcel/Assessor's Data

Fire Threat Classes and Assets at Risk

Fire Threat Classes in the City were shown on Figure 4-91. Analysis results for the City are summarized in Table 4-109. Table 4-110 summarizes the total parcel counts, improved parcel counts, land value, improved structure value, and the estimated contents replacement values based on the CRV factors detailed in Section 4.3.1 for each Fire Threat Class. Also, it is important to keep in mind that these assessed values may be well below the actual market value of improved parcels located within the landslide incidence and susceptibility areas due primarily to Proposition 13.

Table 4-109 City of Placentia – Count and Value of Parcels (and Structures) by Fire Threat Class

Fire Threat Class	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
Extreme	0	0	$0	$0	$0	$0
High	4	1	$631,646	$1,102,919	$1,654,378	$3,388,943
Moderate	4	0	$257,288	$0	$0	$257,288
Low	3	2	$32,220,145	$50,684,825	$36,585,631	$119,490,601
No Threat	12,792	11,910	$4,539,794,372	$2,648,692,238	$1,733,823,495	$8,943,495,559
Placentia Total	**12,803**	**11,913**	**$4,572,903,451**	**$2,700,479,982**	**$1,772,063,504**	**$9,066,632,391**

Source: CAL FIRE, Orange County 2022 Parcel/Assessor's Data

Table 4-110 City of Placentia – Count and Value of Parcels (and Structures) in Fire Threat Class by Land Use

Fire Threat Class/ Land Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
High						
Agricultural	0	0	$0	$0	$0	$0
Commercial	0	0	$0	$0	$0	$0
Industrial	0	0	$0	$0	$0	$0
Miscellaneous	0	0	$0	$0	$0	$0
Residential	1	0	$443,569	$0	$0	$443,569
Tax Exempt	1	1	$188,077	$1,102,919	$1,654,378	$2,945,374
Unknown	2	0	$0	$0	$0	$0

Fire Threat Class/ Land Use	Total Parcel Count	Improved Parcel Count	Total Land Value	Improved Structure Value	Estimated Contents Value	Total Value
High Total	**4**	**1**	**$631,646**	**$1,102,919**	**$1,654,378**	**$3,388,943**
Moderate						
Agricultural	0	0	$0	$0	$0	$0
Commercial	0	0	$0	$0	$0	$0
Industrial	1	0	$0	$0	$0	$0
Miscellaneous	0	0	$0	$0	$0	$0
Residential	3	0	$257,288	$0	$0	$257,288
Tax Exempt	0	0	$0	$0	$0	$0
Unknown	0	0	$0	$0	$0	
Moderate Total	**4**	**0**	**$257,288**	**$0**	**$0**	**$257,288**
Low						
Agricultural	0	0	$0	$0	$0	$0
Commercial	0	0	$0	$0	$0	$0
Industrial	1	1	$9,804,909	$11,243,219	$16,864,828	$37,912,956
Miscellaneous	0	0	$0	$0	$0	$0
Residential	1	1	$22,382,824	$39,441,606	$19,720,803	$81,545,233
Tax Exempt	1	0	$32,412	$0	$0	$32,412
Unknown	0	0	$0	$0	$0	$0
Low Total	**3**	**2**	**$32,220,145**	**$50,684,825**	**$36,585,631**	**$119,490,601**
No Threat						
Agricultural	19	2	$1,249,173	$223,742	$223,742	$1,696,657
Commercial	241	215	$284,399,396	$232,574,449	$232,574,449	$757,481,233
Industrial	235	215	$324,675,251	$208,846,429	$313,269,644	$860,012,486
Miscellaneous	3	0	$76,908	$0	$0	$76,908
Residential	12,000	11,428	$3,859,750,697	$2,122,815,819	$1,061,407,963	$7,044,005,832
Tax Exempt	194	50	$69,642,947	$84,231,799	$126,347,697	$280,222,443
Unknown	100	**0**	$0	$0	$0	$0
No Threat Total	**12,792**	**11,910**	**$4,539,794,372**	**$2,648,692,238**	**$1,733,823,495**	**$8,943,495,559**
Placentia Total	**12,803**	**11,913**	**$4,572,903,451**	**$2,700,479,982**	**$1,772,063,504**	**$9,066,632,391**

Source: CAL FIRE, Orange County 2022 Parcel/Assessor's Data

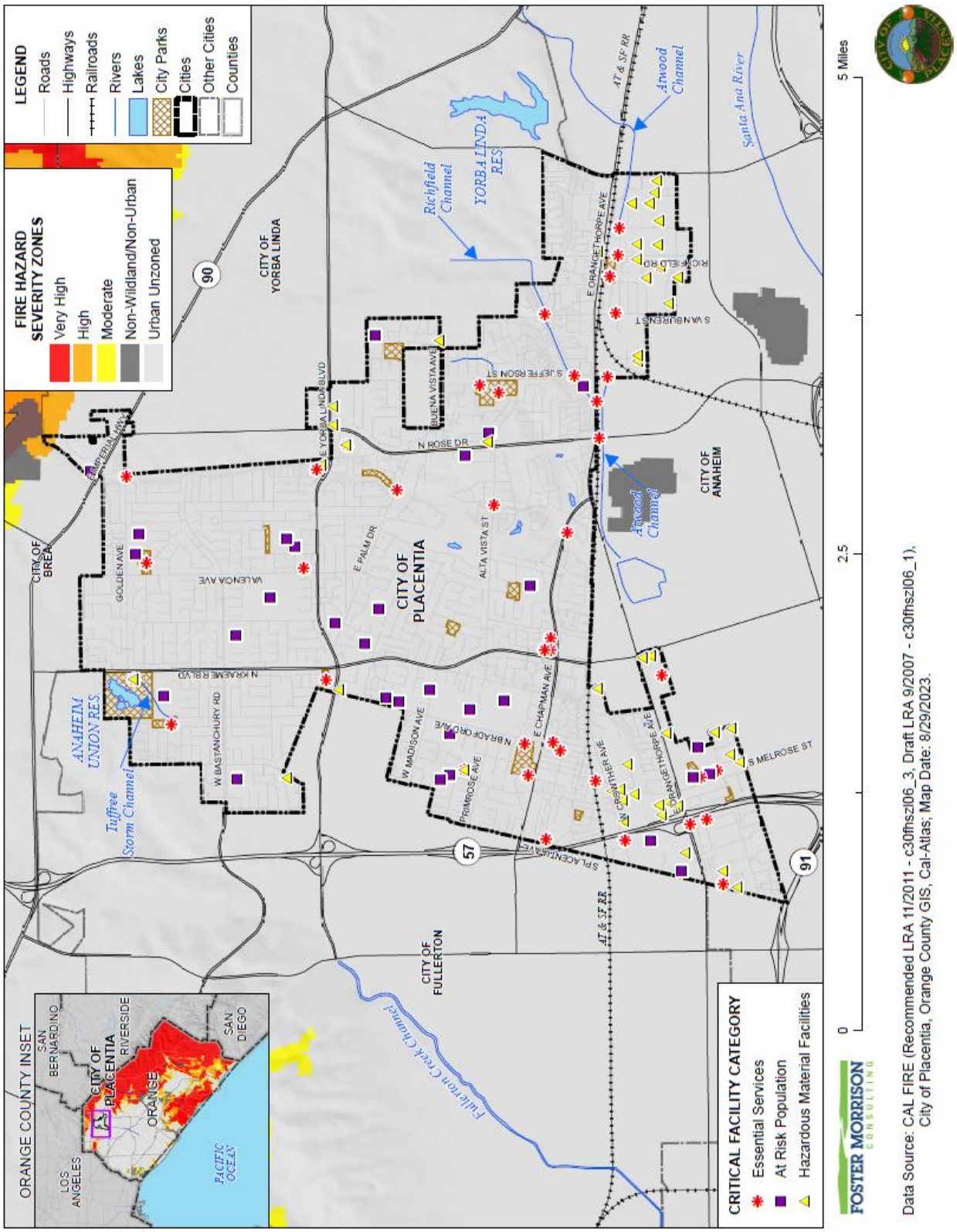
Critical Facilities and Infrastructure, and Community Lifelines

Wildfire presents a threat to critical facilities, infrastructure, and community lifelines. The following analysis discusses critical facilities and infrastructure, followed by community lifelines.

Critical Facilities and Infrastructure

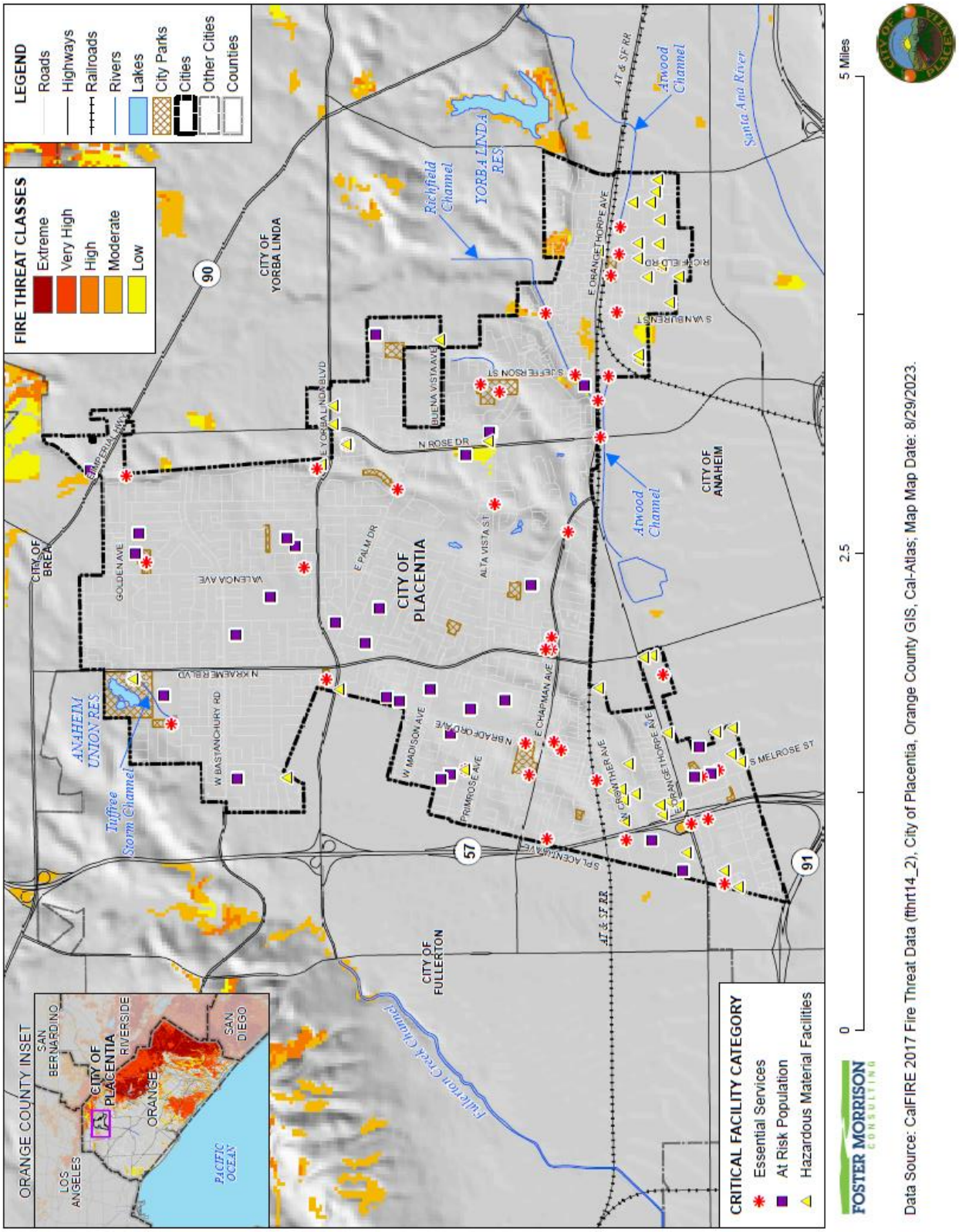
Wildfire can present a risk to the critical facilities and infrastructure in the City. A separate analysis was performed on the critical facility inventory in the City of Placentia to determine critical facilities in the fire hazard severity zones. Using GIS, the fire hazard severity zones were overlayed on the critical facility GIS layer. Figure 4-97 shows critical facilities, as well as the fire hazard severity zones. Details of critical facility category, type, name, and address by fire hazard severity zone are listed in Appendix F. There are no critical facilities at risk to wildfire, all fall within the urban unzoned FHSZs, thus no tabulation of critical facilities is provided.

Figure 4-97 City of Placentia – Critical Facilities in Fire Hazard Severity Zones



A separate analysis was performed on the critical facility inventory in the City of Placentia to determine critical facilities in the fire threat class. Using GIS, the fire threat classes were overlayed on the critical facility GIS layer. Figure 4-98 shows critical facilities, as well as the fire threat classes. As shown, no critical facilities fall in the moderate or higher fire threat class and only one facility, a Senior Apartment fell within an area of low threat. The rest of the facilities fell in areas identified as No Threat, thus a tabular list is not included. Details of critical facility type, name, and address by fire threat class are listed in Appendix F.

Figure 4-98 City of Placentia – Critical Facilities in Fire Threat Class



Community Lifelines

Community lifelines that would be vulnerable to wildfire include:

- **Safety and Security** –Police, Fire, and EMS personnel are often called on to respond during fire emergencies. This would be especially true if a wildfire occurred in or near the City. Emergency resources may be stretched during a large event.
- **Food, Hydration, Shelter** – Shelters may need to be opened to handle those displaced by a wildfire. Food and water would need to be provided.
- **Health and Medical** – There may be injuries and deaths from a wildfire. Patient movement from accident scenes by EMS may have to be rerouted due to fire or smoke issues. Hospitals could see an influx of injured. Public health can be at risk from air quality issues from smoke.
- **Energy** – Wildfires could impact large areas of above ground electric infrastructure, causing widespread power outages. Even the threat of wildfire can cause power outages when fire weather conditions lead to PSPS events. Fire may cause fuel transportation to be delayed, causing local shortages.
- **Communications** – Communication systems can be damaged during a wildfire. An influx of service calls to dispatch centers for reporting of wildfire, power outages, or other issues can occur. Calls to and from family and friends during a wildfire can further overwhelm communication systems such as cell towers and other infrastructure. Demand may exceed the capacity of these systems to remain operational during response efforts. Messaging systems need to be deployed during these times to let the public know about road closures or evacuation routes.
- **Transportation** – Highways and local roads may see closures. These closures can affect response personnel (EMS, Fire, Police) as well as cause additional traffic issues for residents. Evacuation routes may be affected and overwhelmed during a large event.
- **Hazardous Material** – hazardous material facilities can be affected by wildfire. A release during these times can cause additional risk to responders, as well as additional exposure to the environment.
- **Water Systems** – Water systems may be taxed during wildfires. Access to water for firefighting can also be a challenge if power outages occur in affected areas. Wastewater systems can also be affected by an increase in silt, debris ash, and other materials entering the systems.

Given the lack of moderate or higher FHSZs and Fire Threat Class, community lifelines are unlikely to be directly affected by wildfire. However, there always remains the potential for a wildfire escaping from outside areas outside the City and causing vegetation or structure fires within the City.

Natural, Historic, and Cultural Resources

Given the lack of moderate or higher FHSZs and Fire Threat Class, natural, historic, and cultural resources are unlikely to be directly affected by wildfire. However, should a wildfire extend into the Planning Area from neighboring jurisdictions, the impacts to natural, historic and cultural resources could be extensive and include air contamination from the fire plume, contamination from water runoff containing toxic products, and other environmental discharges or releases from burned materials affecting soils, habitat areas, wildlife, and aquatic resources. Historic and cultural resources can be affected and are often more vulnerable due to their older age, construction type, and lack of fire prevention infrastructure such as sprinklers.

Economic Assets and Community Activities of Value

Wildfires can cause direct damage to economic assets such as businesses and commercial centers located in affected areas. Given the lack of moderate or higher FHSZs and Fire Threat Classes, economic assets and community activities of value are unlikely to be directly affected by wildfire. However, should a wildfire extend into the Planning Area from neighboring jurisdictions, it could have a significant economic impact on the City depending on the location, nature and extent of the fire damage.

Impacts from Wildfire

Though not probable in the City of Placentia, an out-of-control wildfire would have multiple impacts. The overall impact to the community from a severe wildfire includes:

- Injury and loss of life.
- Commercial and residential structural and property damage.
- Decreased water quality in area watersheds.
- Flooding after fire is often more severe, as debris and ash left from the fire can form mudflows. As rainwater moves across charred and denuded ground, it can also pick up soil and sediment and carry it in a stream of floodwaters. These mudflows can cause significant damage.
- Wildfires strip slopes of vegetation, exposing them to greater amounts of runoff. This in turn can weaken soils and cause failures on slopes. Major landslides can occur several years after a wildfire.
- Most wildfires burn hot and for long durations that can bake soils, especially those high in clay content, thus increasing the imperviousness of the ground. This increases the runoff generated by storm events, thus increasing the chance of flooding.
- Damage to natural resource habitats and other resources.
- Loss of water, power, roads, phones, and transportation, which could impact, strand, and/or impair mobility for emergency responders and/or area residents.
- Economic losses (jobs, sales, tax revenue) associated with loss of commercial structures.
- Negative impact on commercial and residential property values.
- Air quality can be affected (both with local fires and with fires in the area).
- Loss of churches, which could severely impact the social fabric of the community;
- Loss of schools, which could severely impact the entire school system and disrupt families and teachers, as temporary facilities and relocations would likely be needed.
- Impact on the overall mental health of the community.

All of these impacts may be exacerbated by the effects of climate change, changes in population patterns (migration, density, or the makeup of socially vulnerable populations), and changes in land use and development.

As discussed in the hazard profile section, climate change is anticipated to exacerbate this hazard over time. Regarding population patterns, the City is approaching built out conditions. Population projections for the City show very limited growth over the next 25 years. Populations are anticipated to grow by only 7.3% between 2025 and 2050, which equates to an annual growth of 0.29%, thus future population growth should not increase the potential impacts from this hazard on City assets. With respect to population patterns such as those associated with migration, density, or makeup of socially vulnerable populations the data shows that most socially vulnerable populations and disadvantaged communities are concentrated in the western

portion of the City. Also, FEMA's National Risk Index for Orange County is rated as Very High. Wildfire shows limited hazard risk occurring in the western portion of the City. Thus, even if these population patterns continue, it is unlikely that the vulnerability and potential impacts from this hazard to these City assets will significantly change.

As described in the land use discussion at the end of Section 4.2.2, a new land use map was developed as part of the General Plan efforts in 2023, which establishes the basic pattern of development in the City for the next 20-25 years, including land uses and densities. While future development within hazard areas generally contributes to some increase of impacts on City assets, given the limited potential for significant future growth in Placentia and the lack of moderate or higher FHSZs in the City, future changes in land use and development are unlikely to contribute to any notable change in the vulnerability of the City to this hazard. In addition, the City has a development review process which includes the consideration of hazard constraints and updated building codes that should further limit the impacts of these hazards on City assets.

Air Quality Impacts

Smoke impacts may come from wildfires outside the City. Wildfire smoke can affect people and also contaminate the environment. The 2023 (Draft) State Hazard Mitigation Plan noted that the danger of wildfire smoke comes primarily from particulate matter 2.5 (PM2.5), consisting of fine particles that are 2.5 micrometers (about a ten-thousandth of an inch) or less in diameter. On a given day, California wildfires can produce 10 times more PM2.5 air pollution than is produced by all other pollution sources combined. The small particles in PM2.5 pollution are capable of reaching deep into the lungs, causing a host of complications, including significantly increased risks of heart disease, respiratory disease, asthma, and premature mortality. Smoke from wildfires that burn homes and other structures can additionally contain toxic materials such as asbestos and heavy metals. Studies indicate that wildfire smoke is up to 10 times more harmful than other forms of PM2.5 pollution.

Future Development

Though a future wildfire is considered to be unlikely, future City facilities will take wildfire into account when siting new facilities. Fire hydrants, defensible space, ignition resistant construction, well production, water storage, and on-going maintenance are all wildfire considerations when assessing future development. New facilities will be built to the most current CBC standards, which takes wildfire into account during building design and construction.

Future development areas and their vulnerability to wildfire are discussed further in the below GIS analysis.

GIS Analysis

The City provided 19 future development areas which were used as the basis for the inventory of future development areas for the City. Utilizing the future development area spatial layer, the parcel centroid data was intersected to determine the parcel counts and acreage within each area. Figure 4-99 shows the locations of the future development areas overlayed on the FHSZs. Figure 4-100 shows the locations of the future development areas overlayed on the Fire Threat class. As all future development areas fall outside the areas of fire risk and entirely within the urban unzoned area within the FHSZ data and in areas of No Threat for the Fire Threat layer, no tabular information is included.

Figure 4-99 City of Placentia – Future Development Areas and FHSZs

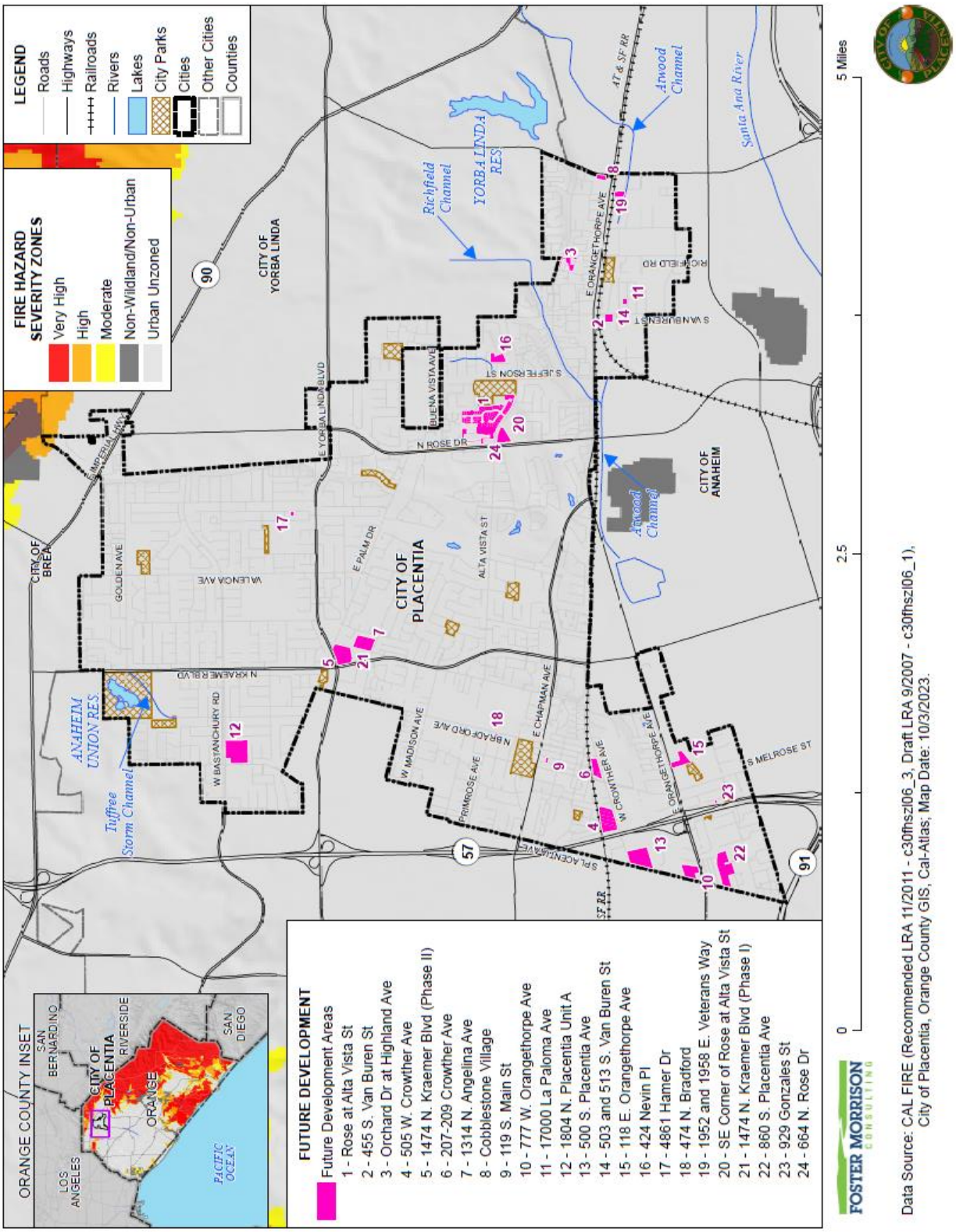
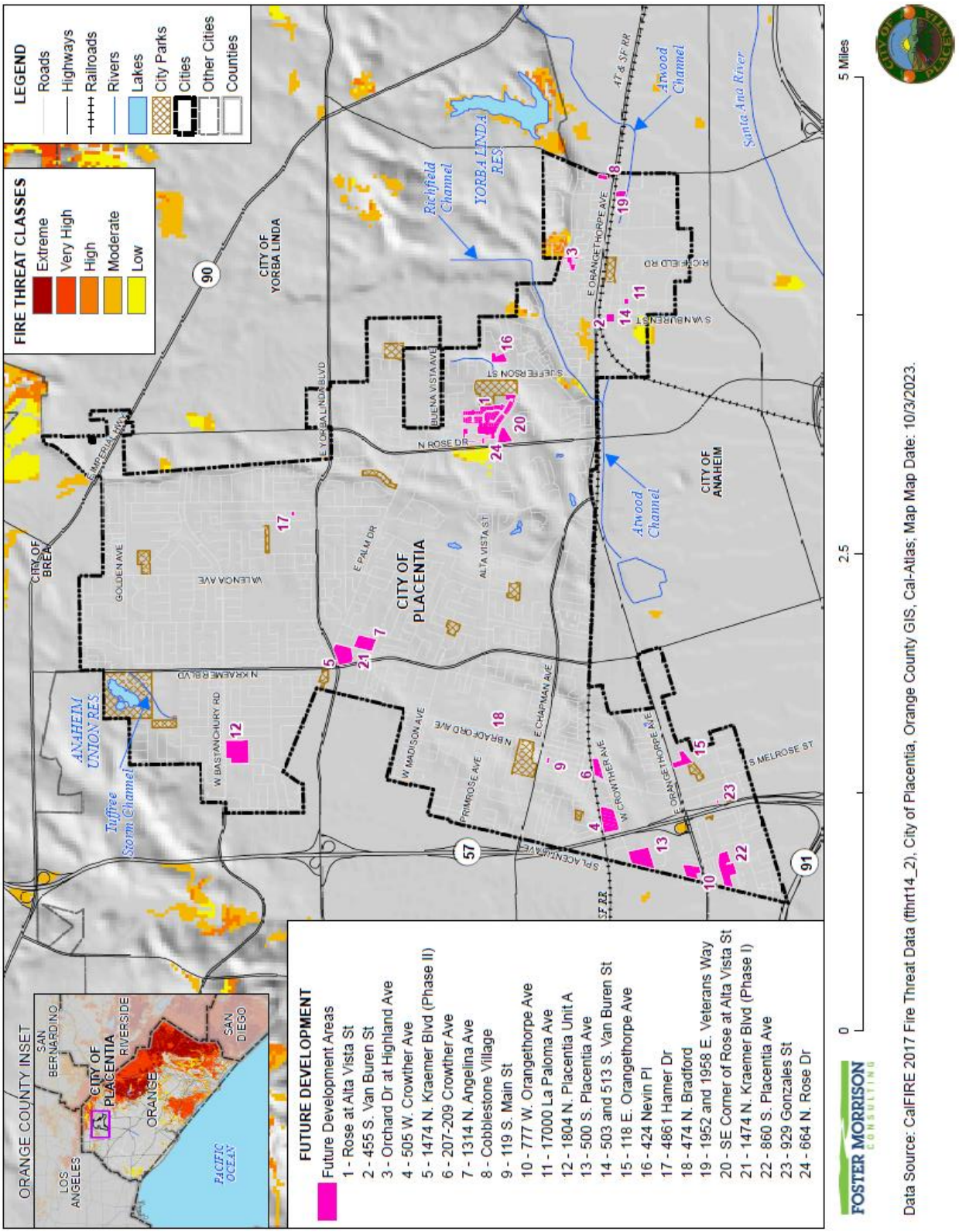


Figure 4-100 City of Placentia – Future Development and Fire Threat Classes



4.4 Capability Assessment

Thus far, the planning process has identified the natural hazards posing a threat to the City of Placentia and described, in general, the vulnerability of the City to these risks. The next step is to assess what loss prevention mechanisms are already in place. This part of the planning process is the mitigation capability assessment. Combining the risk assessment with the mitigation capability assessment results in the City's net vulnerability to disasters, and more accurately focuses the goals, objectives, and proposed actions of this Plan.

This section presents the City's mitigation capabilities and resources. These are in addition to, and supplement, the many plans, reports, and technical information reviewed and used for this LHMP as identified in Chapter 3 and in Chapter 4. Similar to the HMPC's effort to describe hazards, risks, and vulnerability of the City, this mitigation capability assessment describes the City's existing capabilities, programs, and policies currently in use to reduce hazard impacts or that could be used to implement hazard mitigation activities. This assessment is divided into four sections: regulatory mitigation capabilities are discussed in Section 4.4.1; administrative and technical mitigation capabilities are discussed in Section 4.4.2; fiscal mitigation capabilities are discussed in Section 4.4.3; and mitigation education, outreach, and partnerships are discussed in Section 4.4.4. A discussion of other mitigation efforts follows in Section 4.4.5. These capabilities are in addition to, include, and supplement the many plans, reports, and technical information reviewed and used for this LHMP Update.

4.4.1. City of Placentia Regulatory Mitigation Capabilities

Table 4-111 lists planning and land management tools typically used by local jurisdictions to implement hazard mitigation activities and indicates those that are in place in the City. Many of the regulatory capabilities below address hazards, projects, and can be used to implement mitigation actions.

Table 4-111 City of Placentia Regulatory Mitigation Capabilities

Plans	In Place Y/N	Does the plan address hazards? Can the plan be used to carry out mitigation actions? When was it last updated??
Capital Improvements Plan	Y	7-year CIP. Updated every year. Can be used to carry out mitigation actions.
Climate Change Adaptation Plan	N	The County has a Plan that the City has access to.
Community Wildfire Protection Plan	N	
Comprehensive/Master Plan	Y	2018/2019 Plan addresses hazards, especially in the Safety Element (Chapter 7). This document can be used to carry out mitigation actions.
Continuity of Operations Plan	Y	2012 Plan. Can be used to carry out mitigation actions.
Economic Development Plan	Y	As part of the General Plan. Can be used to carry out mitigation actions.
Land Use Plan	Y	As part of the General Plan Land Use Element. Can be used to carry out mitigation actions.
Local Emergency Operations Plan	Y	From 2003. Looking to be updated. Can be used to carry out mitigation actions.

Stormwater Management Plan	Y	Currently in draft state and almost complete. Can be used to carry out mitigation actions.
Transportation Plan	Y	As part of the General Plan in the Circulation Element. Can be used to carry out mitigation actions.
Other (describe)	Y	Urban Forest Management Plan (2019) addressed the drought hazard. It can be used to carry out mitigation actions. Urban Water Management Plans can be used to carry out mitigation actions as well.
Land Use Planning and Ordinances	**Y/N**	**Is the ordinance an effective way to reduce hazard impacts? Is the ordinance adequately administered and enforced?**
Acquisition of land for open space and public recreation use	Y	Done sparingly on a case-by-case basis.
Building code	Y	Title 20. This ordinance is effective, adequately administered, and enforced.
Flood insurance rate maps	Y	FIRM and DFIRM Maps are used in the flood ordinance below.
Floodplain ordinance	Y	Title 21. This ordinance is effective, adequately administered, and enforced.
Natural hazard-specific ordinance (stormwater, steep slope, wildfire)	Y	Title 18 (Fire Protection). This ordinance is effective, adequately administered, and enforced. Though the City has not specific vegetation management ordinance to protect against wildfire, Code Enforcement uses Section 8.06.030 Declaration of a Public Nuisance to ensure that overgrown vegetation, dead trees, weeds, and other debris must be kept to a minimum.
Subdivision ordinance	Y	Title 23. This ordinance is effective, adequately administered, and enforced.
Zoning ordinance	Y	Title 22. This ordinance is effective, adequately administered, and enforced.
Other	Y	Title 17 (Oil and Gas Wells); Title 16 (Storm Drains and Sewers); and Title 11(Emergency Organization). These ordinances ire effective, adequately administered, and enforced.
How can these capabilities be expanded and improved to reduce risk?		
The City is looking to complete a Climate Action Plan. It is one of the mitigation actions in this Plan. The City also hopes to reduce risk through implementation of their new Stormwater Master Plan which is also a mitigation action in this Plan.		

Source: City of Placentia

The following sections discuss in more detail how the capabilities listed in Table 4-111 work to mitigate the effects of hazards on the City.

Municipal Code

Title 11 – Emergency Organization

The declared purposes of this title are to provide for the preparation and carrying out of plans for the protection of persons and property within this city in the event of emergency; the direction of the emergency

organization; and emergency functions of this city with all other public agencies and affected private persons, corporations and organizations.

It shall be the duty of the city disaster council, and it is hereby empowered, to develop and recommend for adoption by the city council, emergency and mutual aid plans and agreements and such ordinances and resolutions and rules and regulations as are necessary to implement such plans and agreements. The disaster council shall meet upon call of the chairman or in his or her absence from the city or inability to call such meeting, upon the call of the vice-chairman.

The Placentia disaster council shall be responsible for the development of the city emergency plan, which plan shall provide for the effective mobilization of all the resources of this city, both public and private to meet any condition constituting a local emergency, state of emergency or state of war emergency; and shall provide for the organization. powers and duties, services, and staff of the emergency organization.

Chapter 16.20 Stormwater Runoff

New Development and Significant Redevelopment. All new development and significant redevelopment within the city shall be undertaken in accordance with:

- The DAMP, including, but not limited to, the development project guidance; and
- Any conditions and requirements established by the development services and/or public works departments, which are reasonably related to the reduction or elimination of pollutants in stormwater runoff from the project site.

Prior to the issuance by the city of a grading permit, building permit or nonresidential plumbing permit for any new development or significant redevelopment, the development services and/or public works departments shall review the project plans and impose terms, conditions and requirements on the project in accordance with this section. If the new development or significant redevelopment will be approved without application for a grading permit, building permit or nonresidential plumbing permit, the development services and/or public works departments shall review the project plans and impose terms, conditions and requirements on the project in accordance with this section prior to the issuance of a discretionary land use approval or, at the city's discretion, prior to recordation of a subdivision or parcel map.

Title 18 – Fire Protection

The purpose of this chapter is to prescribe regulations and govern the safeguarding of life and property from fire and explosion hazards arising from the storage, handling and use of hazardous substances, materials and devices, and from conditions hazardous to life or property in the occupancy of buildings and premises as herein provided. There hereby is adopted as the "Placentia Fire Code," except as otherwise provided in this chapter, those certain fire codes know and designated as the California Fire Code 2022 Edition based on the 2021 International Fire Code as published by the "International Code Council," shall become the fire code of the city for regulating the erection, construction, enlargement, alteration, repair, moving, removal, demolition, conservation, occupancy, equipment, use, height, area and maintenance of all buildings and/or structures in the city for all fire related issues. The Placentia Fire Code, as set forth in this chapter shall be enforced by the local enforcement agency. The fire code official or city administrator or

designee, may detail and designate such staff members as shall be deemed necessary from time to time to enforce this chapter.

Title 20 Building Codes

Except as provided in this chapter, those certain building codes known and designated as the California Building Code 2022 Edition, including all appendices, is hereby adopted by reference as the Building Code of the city of Placentia for regulating the erection, construction, enlargement, alteration, repair, moving, removal, demolition, conversion, occupancy, equipment, use, height, area and maintenance of all buildings and/or structures in the city of Placentia. Whenever the California Code of Regulations and State Building Standards Code of Regulations differ from any provision of the Placentia Building Code, said state regulations shall prevail over the provisions of the Placentia Building Code except as specifically modified herein. Other building codes include:

- The 2021 International Residential Code as published by the International Code Council, including Division II in Chapter 1, and including Appendix AH (Patio Covers) and Appendix AX (Swimming Pool Safety Act), shall become the residential code of the City of Placentia.
- The California Plumbing Code, 2022 Edition, incorporating the "Uniform Plumbing Code," 2021 Edition, including Appendix A and Appendix L, is hereby adopted as the Placentia Plumbing Code.
- The California Electrical Code, 2022 Edition, based on the 2020 National Electrical Code as published by the National Fire Protection Association is hereby adopted as the Placentia Electrical Code.
- The California Mechanical Code, 2022 Edition, is hereby adopted as the "Placentia Mechanical Code," including all appendices thereto and including all amendments made herein, and such code shall be and become the Mechanical Code of the City of Placentia.
- The California Green Building Standards Code 2022 Edition, shall become the Green Building Code of the of the City of Placentia.
- The California Historical Building Code, 2022 Edition, shall become the Existing Building Code of the city, regulating the alteration, repair, addition and change of occupancy of historical structures in the City of Placentia.

Chapter 20.40 Grading and Excavating

The purpose of this chapter is to provide minimum standards to safeguard life and limb, protect property and property values, preserve natural beauty and promote public welfare by regulating and controlling the design, construction, quality of materials, use, location and maintenance of grading, excavating and fill within the city.

Title 21 Flood Plain District

It is the purpose of this title to promote the public health, safety and general welfare and to minimize public and private losses due to flood conditions in specific areas by provisions designed:

- To protect human life and health;
- To minimize expenditure of public money for costly flood control projects;
- To minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public;
- To minimize prolonged business interruptions;

- To minimize damage to public facilities and utilities such as water and gas mains, electric, telephone and sewer lines, streets and bridges located in areas of special flood hazard;
- To help maintain a stable tax base by providing for the sound use and development of areas of special flood hazard so as to minimize future flood blight areas;
- To insure that potential buyers are notified that property is in an area of special flood hazard; and
- To insure that those who occupy the areas of special flood hazard assume responsibility for their actions.

In order to accomplish its purposes, this title includes methods and provisions for:

- Restricting or prohibiting uses which are dangerous to health, safety, and property due to water or erosion hazards, or which result in damaging increases in erosion or flood heights or velocities;
- Requiring that uses vulnerable to floods, including facilities which serve such uses, be protected against flood damage at the time of initial construction;
- Controlling the alteration of natural floodplains, stream channels, and natural protective barriers, which help accommodate or channel flood waters;
- Controlling fill, grading, dredging, and other development which may increase flood damage; and
- Preventing or regulating the construction of flood barriers which will unnaturally divert flood waters or which may increase flood hazards in other areas (Ord. 90-O-100 § 1, 1991).

This title shall apply to all areas of special flood hazards within the jurisdiction of the city. The chief building official is hereby appointed to administer, implement and enforce this title by granting or denying development permits in accord with its provisions.

All new construction and substantial improvement shall be constructed with materials and utility equipment resistant to flood damage. All new construction and substantial improvement shall be constructed using methods and practices that minimize flood damage. All new construction and substantial improvement shall be constructed with electrical, heating, ventilation, plumbing and air conditioning equipment and other service facilities that are designed and/or located so as to prevent water from entering or accumulating within the components during conditions of flooding.

New construction and substantial improvement shall have the lowest floor, including basement, elevated to or above the base flood elevation.

Title 22 Subdivisions

The purpose of this title is to promote the public health, safety, convenience and general welfare; to establish criteria for the design, improvement and survey data of subdivision; and to set out the form and content of tentative maps, parcel maps, and final maps thereof. The procedure to be followed in securing official approval shall be governed by the provisions of this title, and shall comply with the provisions of the zoning title, and shall conform to the adopted specific plans of streets and highways and to the general plan of the city. This Title sets rules for:

- Chapter 22.16 LOTS
- Chapter 22.20 STREETS
- Chapter 22.24 ALLEYS
- Chapter 22.28 SIDEWALKS AND WALKWAYS
- Chapter 22.32 STREET TREES
- Chapter 22.36 DRIVEWAYS

- Chapter 22.40 BLOCKS
- Chapter 22.48 UTILITIES GENERALLY
- Chapter 22.52 UNDERGROUND UTILITY DISTRICT
- Chapter 22.53 RESERVATIONS
- Chapter 22.54 PARK AND RECREATION DEDICATION AND FEES
- Chapter 22.55 SCHOOL SITE DEDICATIONS AND CLASSROOM FACILITIES
- Chapter 22.56 DRAINAGE AND SEWER FACILITIES
- Chapter 22.57 BRIDGE CROSSINGS AND MAJOR THOROUGHFARES
- Chapter 22.60 PRELIMINARY SOILS REPORTS
- Chapter 22.64 IMPROVEMENTS
- Chapter 22.65 SUPPLEMENTAL IMPROVEMENTS
- Chapter 22.66 IMPROVEMENT SECURITY
- Chapter 22.68 VARIANCES
- Chapter 22.70 REVERSION TO ACREAGE
- Chapter 22.72 TENTATIVE SUBMISSION MAPS—FIVE OR MORE PARCELS
- Chapter 22.74 VESTING TENTATIVE MAPS
- Chapter 22.76 FINAL SUBDIVISION MAPS—FIVE OR MORE PARCELS
- Chapter 22.80 SUBDIVISIONS OF FOUR OR LESS PARCELS
- Chapter 22.82 CERTIFICATE OF COMPLIANCE
- Chapter 22.84 CONDOMINIUM CONVERSIONS

Title 23 Zoning

The purpose of this title is to promote the growth of the city in an orderly manner and to promote and protect the public health, safety and general welfare. The zoning, or districting plan effectuated by this title is a part of the master plan and consists of the establishment of various districts, including all the territory within the boundaries of the city, within which the use of land and buildings, the space of buildings, and the height and bulk of buildings are regulated. No buildings or structures shall be erected, reconstructed or structurally altered in any manner, nor shall any building or land be used for any purpose other than as permitted and in conformance with this title and all other ordinances, laws and maps referred to therein.

There is adopted a zoning plan for the City. Said zoning plan is a districting plan, as provided by law.

All departments, official and public employees of the city, vested with the duty or authority to issue permits or licenses shall conform to the provisions of this title, and shall issue no permit or license for uses, buildings or purposes in conflict with the provisions of this title; and any such permit or license issued in conflict with the provisions of this title shall be null and void. It shall be the duty of the building inspector of the city to enforce the provisions of this title pertaining to the erection, construction, reconstruction, moving, conversion, alteration or addition to any building or structure.

Plans

The following plans have been put forth by the City of Placentia. These plans are capabilities the City has to mitigate the effects of natural hazards. They are described in more detail below.

Capital Improvements Plan (updated yearly)

The Capital Improvements Plan in place as of the writing of this LHMP was the FY2022-2023 version. The Capital Improvement Program (CIP) identifies major public improvements to the City's infrastructure over the next five years and includes new projects, upgrades to existing facilities as well as rehabilitation of streets and roadways. This Plan can be used to plan capital outflows for mitigation related activities.

Comprehensive/Master Plan (2018/2019)

California State law requires that we adopt a General Plan that provides a policy framework for the long-term physical development of the community. Placentia's General Plan is a means to express the community's development goals and provide specific public policies related to the public and private uses of the community's land resources.

The General Plan contains 10 Elements. State law requires the City to include 7 mandatory Elements including; Land Use, Mobility, Housing, Conservation, Open-Space, Noise and Safety. State law also allows us to include optional Elements. Placentia has included 2 optional Elements as an additional part of this General Plan, which include the Economic Development and Sustainability Elements. A third element was added, Health, Wellness and Environmental Justice, to help address the community's health with a specific focus on disadvantaged communities.

The Safety Element (Chapter 7) is the section most concerned with hazards in the City and their mitigation. The Safety Element and this LHMP are inextricably linked. The following goals from the Safety Element can be used to help in mitigation planning.

Safety Element Goals

Geologic and Seismic Hazards

GOAL SAF – 1 Minimize the risk to public health and safety and disruptions to vital services, economic vitality, and social order resulting from seismic and geologic activities.

Urban Fire Hazards

GOAL SAF – 2 Protect the lives and property and minimize the exposure of residents, businesses owners, and visitors from the hazards of urban fires.

Flood & Dam Inundation Hazards

GOAL SAF – 3 Reduce, to the greatest extent possible, the risk to life, property and public investment by flood hazards.

Hazardous Materials and Waste

GOAL SAF–- 4 Decrease the risk of exposure for life, property and the environment to hazardous materials and hazardous waste.

Climate Change

GOAL SAF – 5 Increase Placentia's ability to adapt and become resilient to the effects of climate change, including extreme heat and poor air quality, while achieving other health and environmental benefits.

Police and Law Enforcement

GOAL SAF – 6 Maintain law and order in the City for the safety of the community through programs that promote positive partnerships between neighbors and the Police Department.

Disaster Preparedness, Response and Recovery

GOAL SAF – 7 Minimize the risk to life and property through emergency preparedness and public awareness.

Economic Development Plan

The City's Economic Development Plan is part of the General Plan (Chapter 9). The purpose of this Element is to identify key areas in the City that present immediate opportunities for economic development, mid-term actions the City can take to positively impact the bottom line within a year or two, and longer-term actions that can provide benefits for the City over the next ten years. This Element is meant to be a tool for use by City Staff and leaders to create new revenue for the City so that it can continue to provide a high level of community service. This revenue can be used for mitigation of hazards. The Element provides goals and policies for implementing, in stages, the strategies outlined in this chapter. These goals and policies can be used to help implement mitigation actions.

Land Use Plan

The Land Use Plan for Placentia is part of the General Plan (Chapter 2). The Land Use Element sets our vision in motion, as it will shape the way the City evolves over the next twenty years. This Element serves as the long-range planning guide for development in the City. It determines where people live, work, shop, play and socialize; and our quality of life depends on how each of these fit together in a coherent pattern to create a sense of place that fosters health and well-being.

The Land Use Element serves as a guide to public officials, the investment community and private citizens for decisions regarding the type, intensity and general distribution of uses of land for housing, business, industry, and open space. The Element provides public officials with the framework for directing new development and providing high-quality public infrastructure and community services in a way that achieves the community vision. This development and changes in land use patterns is a place where mitigation of natural hazards can occur.

Orange County Climate Action Plan (2017)

In January 2015, Governor Brown outlined ambitious targets through the year 2050 and created benchmarks for the year 2030 including; 50 percent electricity reliability derived from renewable sources; a reduction of petroleum in vehicles by 50 percent; double the efficiency of existing buildings; and an increasing in

clean heating fuels. The Association of California Cities – Orange County (ACC-OC) realizes that these statewide goals will eventually require participation from every city through quantifiable and measurable efforts. Maintaining the ability for each city to create their own sustainable action plan is the most effective way to meet the requirements of the state and honor the unique needs of each individual municipality. The ACC-OC Energy and Environment Committee was created to address the potential impact that these laws and goals will have on local government as the state begins its implementation process. This document will provide guiding principles for cities to take a proactive role in assisting the state in its efforts, ahead of any duplicative requirements that the state may mandate from cities to ensure cooperation.

Stormwater Management Plan (2023)

The City of Placentia Storm Drain Master Plan (SDMP) is a long-term planning tool that evaluates the existing storm drain system based on hydraulic analyses. This document updates the previous 2001 Storm Drain Master Plan. The 2001 SDMP divided the City into six watersheds A, B, C, F, G, and H. Watershed C is located to the east of Watershed A and Watershed B and West of Watersheds G and H and includes area tributary to the Carbon Canyon Channel (E03). Watersheds G and H are located in the southeast corner of the City and are tributary to the Richfield Channel.

The goals of the SDMP are to update the previous SDMP to account for new developments since 2001 and prepare a long-term planning tool that expedites the process for identifying future drainage system maintenance and improvements. The master plan is considered a "living document", intended to be updated over time, where current recommended system improvements can be modified to accommodate future development or redevelopment. To better allow for future updates, this report, and its accompanying data, document the assumptions used during the analysis.

Transportation Plan

The Transportation Plan for Placentia is part of the General Plan (Chapter 3). The Mobility Element of the General Plan represents the City's overall transportation management plan. The transportation plan includes both the physical transportation system itself such as streets, highways, rail lines, bicycle routes and sidewalks, as well as the various modes of transportation such as cars, buses, trucks, trains, bicycles, ridesharing, on demand service and pedestrians using these facilities.

These various modes of transportation provide for the movement of people, goods, and products throughout the City. The circulation and transportation system provide a vital role in shaping, managing and operating the overall form and structure as well as economic development of the City as it connects various parts of the City internally and externally to the surrounding region.

The Transportation Plan can be used to help the City prepare for and mitigate hazards. Mitigation actions requiring the movement of citizens can be fulfilled in partnership with this Plan.

Urban Forest Management Plan (2019)

The intent of the Urban Forest Management Program is to address the long-term management and maintenance of the City' trees through an effective management plan and policies as well as provide the community an active stake in the City's Urban Forest. The Plan identifies long-term preservation and

enhancement objectives and key management considerations including pruning standards, forest expansion, infrastructure maintenance, environmental resources, land use, aesthetics and community objectives. This guiding document includes best practices, technologies, and city policies while allowing for future revision to maintain its relevance for the next 20 years.

This Urban Forest Management Plan puts forth goals and actions related to the mitigation actions of this LHMP. The plans will work in coordination to reduce the risk and vulnerability to the trees in the City.

Urban Water Management Plans

These plans were discussed in great detail in the Water Shortage discussion in Section 4.3.7. The are the

- 2020 Placentia-Yorba Linda Service Area Urban Water Management Plan
- 2020 Yorba Linda Water District Urban Water Management Plan

4.4.2. City of Placentia Administrative/Technical Mitigation Capabilities

Table 4-112 identifies the City personnel responsible for activities related to mitigation and loss prevention in the City.

Table 4-112 City of Placentia Administrative/Technical Mitigation Capabilities

Administration	In Place Y/N	Describe capability Is coordination effective?
Staff		**Is staffing adequate to enforce regulations? Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective?**
Chief Building Official	Y	City of Placentia has a full-time building official
Civil Engineer, including dam and levee safety	Y	City engineer works with US Army Corps of Engineers to ensure dam and levee integrity and safety
Community Planner	Y	City of Placentia has a full-time planning manager
Emergency Manager	Y	City of Placentia has a full-time Emergency and Health Services Manager that participates in County Operational Area coordination
Floodplain Administrator	Y	City of Placentia has a dedicated floodplain Administrator
GIS Coordinator	Y	City of Placentia has a full time GIS Coordinator
Planning Commission	Y	City of Placentia has a Planning Commission
Other		
Technical	**Y/N**	**Has capability been used to assess/mitigate risk in the past?**
Grant writing	Y	Yes, grant applications have been made for FEMA funded opportunities
Hazard data and information	Y	Yes, in the development of the City's Emergency Operations Plan and associated annexes

GIS analysis	Y	GIS analysis enables a more thorough and precise review of the topographic and physical characteristics of the community.
Mutual aid agreements	Y	Mutual aid agreements between OC Police Agencies that are party to the county-wide law enforcement association
Other		
How can these capabilities be expanded and improved to reduce risk?		
City of Placentia Fire and Life Safety is working toward acceptance into the OC Fire Chiefs Association master mutual aid agreement. By entering the OCFCA MMA, the PFLSD will be able to improve its training capabilities thus reducing the risk on fireground operations and improving overall abilities and response capacity.		

Source: City of Placentia

4.4.3. City of Placentia Fiscal Mitigation Capabilities

Table 4-113 identifies financial tools or resources that the City could potentially use to help fund mitigation activities.

Table 4-113 City of Placentia Fiscal Mitigation Capabilities

Funding Resource	In Place Y/N	Has the funding resource been used in past and for what type of activities? Could the resource be used to fund future mitigation actions?
Capital improvements project funding	Y	All matters of capital improvements to City infrastructure
Community Development Block Grant	Y	Facade and Pedestrian Improvements
Federal funding programs (non-FEMA)	Y	Street projects and Transportation Improvements
Fees for water, sewer, gas, or electric services	Y	Sewers only, capital improvement and maintenance
Impact fees for new development	Y	Traffic mitigation, Storm Drain and Sewer
State funding programs	Y	Transportation projects
Stormwater utility fee	N	
Other	Y	Capital Improvement and General Fund reinforcement
How can these capabilities be expanded and improved to reduce risk?		
The City can continue to apply fees and grant funds to risk reduction strategies and perform community education to reduce risk shared by business and residents.		

Source: City of Placentia

4.4.4. City of Placentia Mitigation Education, Outreach, and Partnerships

Table 4-114 identifies education and outreach programs and methods already in place that could be/or are used to implement mitigation activities and communicate hazard-related information.

Table 4-114 City of Placentia Mitigation Education, Outreach, and Partnerships

Program/Organization	In Place Y/N	How widespread are each of these in your community?
Community newsletters	Y	Administrators weekly and quarterly newsletters are disseminated throughout the community by social media, mailers, and available to the public at community centers
Hazard awareness campaigns (such as Firewise, Storm Ready, Severe Weather Awareness Week, school programs, public events)	Y	City conducts public events like national night out, fire safety awareness and community emergency response training to increase the awareness of local hazards
Local news	Y	City has channel 3 on local TV programming that it uses to disseminate information to the community
Organizations that interact with underserved and vulnerable communities	Y	Lot 318 and PATH both interact with our under severed and vulnerable communities
Social media	Y	Instagram, Facebook, Twitter, and City dedicated YouTube channel
Other		
How can these capabilities be expanded and improved to reduce risk?		
City is in process of hiring a risk reduction specialist as part of its Fire and Life Safety Department. A risk reductions specialist will focus on public education to mitigate the risk associated with fires, earthquakes, and extreme weather events.		

Source: City of Placentia

4.4.5. Other Mitigation Efforts

The next sections detail those mitigation efforts the City pursues that have not been previously discussed in the tables above. This includes:

Dam Failure Capabilities

Prado Dam is an existing facility constructed by the Corps of Engineers in 1941. The plan of improvement for the Prado Dam and reservoir, which has an estimated cost of $880 million includes:

- Raising the existing embankment 28.4 feet to an elevation of 594.4 feet - Completed.
- Raising the spillway crest from elevation of 543 ft. to 563 ft – Completed.
- Constructing new outlet works increasing the maximum discharge capacity from 9,000 CFS to 30,000 CFS – Completed.
- Constructing new levees and dikes- Underway
- Acquiring over 1,700 acres of property rights for reservoir expansion -Underway
- Relocating and protecting 30 various utility lines- Underway
- Increasing reservoir area from 6,695 acres to 10,256 acres.
- Increasing-impoundment from 217,000 acre-feet to 362,000 acre-feet.

Earthquake Capabilities

City noted that several public facilities have been retrofitted against earthquake in recent years: the Police Department and City Hall, Corporation (Public Works) Yard, and 2 fire stations. The Public Safety Facility – same as Corporate Yard is being constructed to modern building codes that factor in earthquake shaking.

Extreme Heat Capabilities

The City is currently working on a Heat Contingency Plan.

Multi-Hazard Capabilities

The City requires all new construction to have underground utilities.

An article from Fullerton College titled Greening Southern California cities noted that the City of Placentia has been working on promoting environmental justice by reducing pollution exposure to improve air quality. On October 1, 2019, the Placentia City Council adopted a new General Plan that includes goals, policies and implementation actions. For, example, the plan calls for more windows in buildings to reduce electric lighting needs. Joseph Lambert, the Director of Development Services for Placentia, cited Veteran's Village in Placentia, which serves military veterans who are homeless or disabled. The state-of-the-art development is LEED Gold certified, utilizing energy efficient design principles and building materials.

Natural Gas Pipeline Capabilities

In order to safely transport and deliver natural gas through its more than 100,00 miles of pipeline, SCE rigorously maintains its natural gas pipelines, monitor the natural gas for quality, and add a distinctive odor to help detect leaks. SCE has Emergency Management team(s), throughout all its service territories, where it is able to respond quickly, effectively, and safely when emergencies happen.

SCE regularly performs the following pipeline safety tasks:

- Patrolling
- Testing
- Repairing
- Replacing pipelines

Pandemic Capabilities

The City of Placentia has worked with the County of Orange Healthcare agency to develop a local plan for pandemics. Additionally, the City has entered into agreements with the County of Orange to support two (2) Point of dispensing (POD) sites within city boundaries to assist in dissemination of medications and materials to the community during a declared pandemic response.

4.5 Natural Hazards Summary

Table 4-115 summarizes the results of the hazard identification and hazard profile for the City based on the hazard identification data and input from the HMPC. For each hazard profiled in Section 4.2, this table includes the probability of future occurrence and whether the hazard is considered a priority hazard for the City based on the hazard profiles and vulnerability assessment.

Priority Hazards

As detailed in the hazard identification section, those hazards identified as a high or medium significance in Table 4-115 are considered priority hazards for mitigation planning. This was done initially for the City in Table 4-3. Based on the results of the risk assessment, some of these may have changed. Vulnerability and significance were initially determined based on the hazard profile, focusing on key criteria such as frequency, extent, and resulting damage, including deaths/injuries and property, crop, and economic damage. The ability of Placentia to reduce losses through implementation of existing and new mitigation measures was also considered as to the significance of a hazard. Those hazards that occur infrequently or have little or no impact on the City of Placentia were determined to be of low significance and not considered a priority hazard for mitigation planning purposes. This assessment was used by the HMPC to prioritize those hazards of greatest significance to Placentia, enabling the City to focus resources where they are most needed.

Table 4-115 Hazard Identification and Determination of Priority Hazards for Mitigation Planning

Hazard	Probability of Future Occurrence	Vulnerability	Priority Hazard
Climate Change	Highly Likely	Medium	Y
Dam Failure	Unlikely	High	Y
Drought & Water Shortage	Highly Likely	Medium	Y
Earthquake (and earthquake liquefaction)	Likely	High	Y
Flood: 1%/0.2% annual chance	Occasional/Unlikely	Medium	Y
Flood: Localized/Stormwater Flooding	Highly Likely	Medium	Y
Haz Mat Transportation Release	Unlikely	Medium	N
Landslide	Likely	Low	N
Levee Failure	Unlikely	Medium	N
Natural Gas Pipeline	Unlikely	High	N
Pandemic	Likely	Medium	Y
Severe Weather: Extreme Heat	Highly Likely	Medium	Y
Severe Weather: Heavy Rain and Storms (with thunderstorm winds)	Highly Likely	Medium	Y
Severe Weather: High Wind and Tornado	Highly Likely	Medium	Y
Subsidence	Unlikely	Low	N

Hazard	Probability of Future Occurrence	Vulnerability	Priority Hazard
Urban Fire	Highly Likely	High	Y
Wildfire (with smoke/ air quality)	Highly Likely	Low	N

Source: City of Placentia

Chapter 5 Mitigation Strategy

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

This section describes the mitigation strategy process and mitigation action plan for this 2023 City of Placentia Local Hazard Mitigation Plan (LHMP). It describes how the City met the following requirements from the 10-step planning process:

- Planning Step 6: Set Goals
- Planning Step 7: Review Possible Activities
- Planning Step 8: Draft an Action Plan

5.1 Mitigation Strategy: Overview

The results of the planning process, the risk assessment, the goal setting, the identification of mitigation actions, and the hard work of the Hazard Mitigation Planning Committee (HMPC) led to the mitigation strategy and mitigation action plan for this LHMP.

Taking all of the above into consideration, the HMPC developed the following umbrella mitigation strategy for this LHMP:

- **Communicate** the hazard information collected and analyzed through this planning process as well as HMPC success stories so that the community better understands what can happen where and what they themselves can do to be better prepared.
- **Implement** the action plan recommendations of this LHMP.
- **Use/enforce** existing rules, regulations, policies, and procedures already in existence.
- **Monitor** multi-objective management opportunities so that funding opportunities may be shared and packaged, and broader constituent support may be garnered.

5.1.1. Continued Compliance with NFIP

To participate in the National Flood Insurance Program (NFIP), a community must adopt and enforce floodplain management regulations that meet or exceed the minimum requirements of the Program. These requirements are intended to prevent loss of life and property and to reduce taxpayer's costs for disaster relief as well as minimize economic and social hardships that result from flooding. Participation in the NFIP provides a community with access to flood insurance.

Detailed below is a description of the City's flood management program to ensure continued compliance with the NFIP. Also to be considered are the flood mitigation actions contained in this LHMP that support the ongoing efforts by the City to minimize the risk and vulnerability of the community to the flood hazard and to enhance their overall floodplain management program.

City of Placentia's Flood Management Program

The City of Placentia has participated in the Regular Phase of the NFIP since February 15, 1980. Since then, the City has administered floodplain management regulations that meet the minimum requirements of the NFIP. Under that arrangement, residents and businesses paid the same flood insurance premium rates as most other communities in the country.

The Community Rating System (CRS), a voluntary program under the NFIP, was created in 1990. It is designed to recognize floodplain management activities that go above and beyond the NFIP's minimum requirements. If a community implements public information, mapping, regulatory, loss reduction and/or flood preparedness activities and submits the appropriate documentation to FEMA, then its residents can qualify for a flood insurance premium rate reduction. The City does not currently participate in the CRS program.

Presently, the City manages its floodplains in compliance with NFIP requirements and implements a floodplain management program designed to protect the people and property of the City. Floodplain regulations are a critical element in local floodplain management and are a primary component in the City's participation in the NFIP.

The City will continue to manage their floodplains in continued compliance with the NFIP. An overview of the City's NFIP status and floodplain management program is discussed on Table 5-1.

Table 5-1 City of Placentia NFIP Status

NFIP Topic	Comments
Staff Resources	
Who is responsible for floodplain management in your community? Do they serve any roles other than Community Floodplain Administrator (FPA)?	The designated floodplain administrator for the City of Placentia is Andrew Gonzales. Mr. Gonzales serves an additional role as the Planning Manager for the Development Services Department overseeing and managing long range land use policies and code changes, along with managing residential, commercial, and industrial development projects throughout the city.
Is the Community FPA or NFIP Coordinator a Certified Floodplain Manager?	No, the current FPA is not a certified Floodplain Manager.
Is floodplain management an auxiliary function?	Floodplain management is additional function of the Planning Manager's duties. The floodplain administration functions is not considered to be auxiliary to the Planning Manager's overall job duties.

NFIP Topic	Comments
Provide an explanation of NFIP administration services (e.g., permit review, GIS, education or outreach, inspections, engineering capability)	NFIP outreach services are provided through plan check review of properties or projects located within the 100-year SFHA through advisement to the property owners, business owners, and stakeholders of the measures for floodplain compliance. A public portal is provided on the city's website that affords property owners, business owners, and stakeholders the ability to determine their risk of flooding and provides information on their respective flood zone. (https://data-placentia.opendata.arcgis.com/datasets/placentia::flood-hazard-zones-1/explore?location=33.873428%2C-117.839094%2C16.61)
What are the barriers to running an effective NFIP program in the community, if any?	No barriers are identified.
Insurance Summary	
How many NFIP policies are in the community? What is the total premium and coverage?	40 policies $33,842 in premiums $10,437,900 in coverage
How many claims have been paid in the community? What is the total amount of paid claims? How many of the claims were for substantial damage?	12 claims $57,128.07in claims paid 2 substantial damage claims
How many structures (residential and non-residential) are exposed to flood risk within the community?	123 in 1% annual chance 1,664 in 0.2% annual chance
Are there Repetitive Loss (RL) and Severe Repetitive Loss Properties (SRL) structures in the community?	0 RL properties 0 SRL properties
Describe any areas of flood risk with limited NFIP policy coverage	Unknown, the City has not conducted a flood insurance analysis
How does the community teach property owners or other stakeholders about the importance flood insurance?	The City does not currently have a n place to educate the public on flood insurance
What digital sources (like the FEMA Map Service Center, National Flood Hazard Layer) or non-regulatory tools does the community use?	The FEMA Flood Map Service Center is utilized review floodplain properties and in the preparation of FIRMettes. Furthermore, the City of Placentia utilizes an internal GIS system that provides maps with digitally delineated boundaries of all flood zones within the city.
Compliance History	
Is the community in good standing with the NFIP?	Y
Are there any outstanding compliance issues (i.e., current violations)?	N
How does the community identify substantially damaged/improved structures? What is the process to make sure these structures are brought into compliance?	The City of Placentia determines substantially damaged/improved as or destroyed by fire, explosion, earthquake or other act to an extent of more than fifty (50) percent of the appraised value thereof, according to the assessor's records, or improvements that exceed more than fifty (50) percent of the appraised value to its original condition and square footage as either substantially damaged or substantially improved.

NFIP Topic	Comments
When was the most recent Community Assistance Visit (CAV) or Community Assistance Contact (CAC)?	CAV 07/24/2012
Is a CAV or CAC scheduled or needed?	N
Regulation	
When did the community enter the NFIP?	02/15/1980
Are the FIRMs digital or paper?	Digital
How does the community enforce local floodplain regulations and monitor compliance?	Floodplain requirements are enforced by the City of Placentia Municipal Code (PMC) through Title 21 – Floodplain District.
Do floodplain development regulations meet or exceed FEMA or State minimum requirements? If so, in what ways?	They exceed the floodplain requirements by mandating a minimum one-foot freeboard mandate for all structures and mechanical equipment located within the 100-year SHFA.
How are Letters of Map Change (LOMCs) tracked and compiled?	All LOMAs, CLOMRS, LOMRS are tracked through digital means through both a hard copy and digital spreadsheet. All information regarding the properties are manually inputted into the tracking spreadsheet and all relevant documentation is digitally scanned and saved into a communal digital folder.
Provide an explanation of the permitting process.	All properties are fully evaluated based upon each property's respective location within the city. Properties within 100-year SFHA are evaluated for floodplain compliance upon an inquiry for proposed improvements. Those improvements are evaluated based on a comparison of the cost of improvements and the depreciated value of the structure to determine that said improvements do not exceed more than 50% of the structure prior to the improvements. Plans are reviewed by the floodplain administrator and only approved if compliance to both NFIP regulations and the Placentia Municipal Code are met. Through the construction process the FPA will inspect the property and will provide final approval if improvements are consistent with the approved plans.
Community Rating System	
Does the community participate in CRS? If so, what is the community's CRS Class Ranking?	N
What categories and activities provide CRS points and how can the class be improved?	N/A
Does the plan include CRS planning requirements?	N/A

Source: FEMA/City of Placentia

5.1.2. Integration of Mitigation with Post Disaster Recovery and Mitigation Strategy Funding Opportunities

Hazard Mitigation actions are essential to weaving long-term resiliency into all community and City recovery efforts so that at-risk infrastructure, development, and other City assets are stronger and more

resilient for the next severe storm event. Mitigation measures to reduce the risk and vulnerability of a community to future disaster losses can be implemented in advance of a disaster event and also as part of post-disaster recovery efforts.

Mitigation applied to recovery helps jurisdictions become more resilient and sustainable. It is often most efficient to fund all eligible infrastructure mitigation through FEMA's Public Assistance mitigation program if the asset was damaged in a storm or other hazard event. Mitigation work can be added to project worksheets if they can be proven to be cost-beneficial. Integration of mitigation into post disaster recovery efforts should be considered by as part of post disaster redevelopment and mitigation policies and procedures.

The City's EOP, through its policies and procedures, seek to mitigate the effects of hazards, prepare for measures to be taken which will preserve life and minimize damage, enhance response during emergencies and provide necessary assistance, and establish a recovery system in order to return the City of Placentia to its normal state of affairs. Mitigation is emphasized as a major component of recovery efforts.

Mitigation Strategy Funding Opportunities

An understanding of the various funding streams and opportunities will enable the City to match identified mitigation projects with the grant programs that are most likely to fund them. Additionally, some of the funding opportunities can be utilized together. Mitigation grant pre- and post-funding opportunities include the following.

FEMA HMA Grants

Cal OES administers four main types of HMA grants: (1) Hazard Mitigation Grant Program, (2) Pre-Disaster Mitigation Program, (3) Flood Mitigation Assistance Program, and (4) Building Resilient Infrastructure and Communities. Eligible applicants for the HMA include state and local governments, certain private non-profits, and federally recognized Indian tribal governments. While private citizens cannot apply directly for the grant programs, they can benefit from the programs if they are included in an application sponsored by an eligible applicant.

FEMA Public Assistance Section 406 Mitigation

The Robert T. Stafford Disaster Relief and Emergency Assistance Act provides FEMA the authority to fund the restoration of eligible facilities that have sustained damage due to a presidentially declared disaster. The regulations contain a provision for the consideration of funding additional measures that will enhance a facility's ability to resist similar damage in future events.

Community Development Block Grants

The California Department of Housing and Community Development administers the State's Community Development Block Grant (CDBG) program with funding provided by the U.S. Department of Housing and Urban Development. The program is available to all non-entitlement communities that meet applicable threshold requirements. All projects must meet one of the national objectives of the program – projects must benefit 51 percent low- and moderate-income people, aid in the prevention or clearance of slum and blight, or meet an urgent need. Grant funds can generally be used in federally declared disaster areas for

CDBG eligible activities including the replacement or repair of infrastructure and housing damaged during, or as a result of, the declared disaster.

Small Business Loans

SBA offers low-interest, fixed-rate loans to disaster victims, enabling them to repair or replace property damaged or destroyed in declared disasters. It also offers such loans to affected small businesses to help them recover from economic injury caused by such disasters. Loans may also be increased up to 20 percent of the total amount of disaster damage to real estate and/or leasehold improvements to make improvements that lessen the risk of property damage by possible future disasters of the same kind.

Increased Cost of Compliance

Increased Cost of Compliance (ICC) coverage is one of several resources for flood insurance policyholders who need additional help rebuilding after a flood. It provides up to $30,000 to help cover the cost of mitigation measures that will reduce flood risk. ICC coverage is a part of most standard flood insurance policies available under NFIP.

5.2 Goals and Objectives

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

Up to this point in the planning process, the HMPC has organized resources, assessed hazards and risks, and documented mitigation capabilities. The resulting goals, objectives, and mitigation actions were developed based on these tasks. The HMPC held a series of meetings and exercises designed to achieve a collaborative mitigation strategy as described further throughout this section. Appendix C documents the information covered in these mitigation strategy meetings, including information on goals development and the identification and prioritization of mitigation alternatives by the HMPC.

During the initial goal-setting meeting, the HMPC reviewed the results of the hazard identification, vulnerability assessment, and capability assessment. This analysis of the risk assessment identified areas where improvements could be made and provided the framework for the HMPC to formulate planning goals and objectives and to develop the mitigation strategy for the City of Placentia Planning Area.

Goals were defined for the purpose of this mitigation plan as broad-based public policy statements that:

- Represent basic desires of the City;
- Are nonspecific, in that they refer to the quality (not the quantity) of the outcome;
- Are future-oriented, in that they are achievable in the future; and
- Are time-independent, in that they are not scheduled events.

Goals are stated without regard to implementation. Implementation cost, schedule, and means are not considered. Goals are defined before considering how to accomplish them so that they are not dependent on the means of achievement. Goal statements form the basis for objectives and actions that will be used

as means to achieve the goals. Objectives define strategies to attain the goals and are more specific and measurable.

HMPC members were provided with the list of sample goals to consider. They were told that they could use, combine, or revise the statements provided or develop new ones, keeping the risk assessment in mind. Each member was given three index cards and asked to write a goal statement on each. Goal statements were collected and grouped into similar themes during the meeting. The goal statements were then grouped into similar topics. New goals from the HMPC were discussed until the team came to consensus. Some of the statements were determined to be better suited as objectives or actual mitigation actions and were integrated into the goals or set aside for later use.

Based on the risk assessment review and goal setting process, the HMPC identified the following goals and objectives, which provide the direction for reducing future hazard-related losses within the City of Placentia Planning Area.

GOAL 1: Reduce risk and vulnerability of the City of Placentia to natural hazards, including climate change considerations, and prevent injuries, loss of life, and damage to property, economy and the environment.

Objectives

- Promote and enhance community resiliency
- Reduce the effects of climate change on the community to the greatest extent possible
- Reduce risk and vulnerability through the equitable and accessible planning and implementation of hazard mitigation actions and priorities
- Utilize code enhancements and enforcement to reduce hazard impacts

GOAL 2: Provide protection for critical facilities, infrastructure, and community lifelines. Create redundancy and reliability to minimize loss and decrease the impacts of a disaster, and facilitate recovery.

Objectives:

- Identify and implement infrastructure improvements and risk reduction measures
- Promote the use of shared infrastructure with neighboring communities and agencies
- Develop contingency plans to reduce critical facility and infrastructure failures

GOAL 3: Promote public awareness, education, and understanding of natural hazards and the risks they present to quality of life, property and the economy; and encourage individual responsibility to minimize impacts to natural hazards.

Objectives:

- Improve community awareness and promote self-sufficiency and sustainability
- Educate the whole community, including actions to take before, during and after a hazard event to increase resiliency citywide
- Establish and outreach evacuation routes and options for sheltering in place

Goal 4: Build capacity and capabilities to increase disaster resilience for all hazards with a focus on the whole community.

Objectives:

- Identify and implement low cost, manageable mitigation actions and priorities (i.e., the low hanging fruit)
- Increase disaster resilience among historically underserved populations, individuals with a disability or access and functional needs, and communities disproportionately impacted by disasters and climate change
- Leverage and support interagency and public-private coordination and the use of shared resources
- Work closely with ALL connected and applicable agencies
- Establish and utilize mutual and automatic aid to subsidize and reinforce limitations in City equipment and personnel.
- Establish interagency relationships pre-disaster and to ensure continuity of plans
- Integrate mitigation principals into community policies and regulations to support equitable outcomes to benefit the whole community

5.3 Identification and Analysis of Mitigation Actions

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

In order to identify and select mitigation actions to support the mitigation goals, each hazard identified in Section 4.5 was evaluated. Only those hazards that were determined to be a priority hazard for purposes of mitigation action development were considered further in the development of hazard-specific mitigation action.

These priority hazards (in alphabetical order) are:

- Climate Change
- Dam Failure
- Drought & Water Shortage
- Earthquake/ Earthquake Liquefaction / Earthquake induced landslide
- Flood: 1%/0.2% annual chance
- Flood: Localized/Stormwater
- Pandemic
- Severe Weather: Extreme Heat
- Severe Weather: Heavy Rains and Storms
- Severe Weather: High Wind and Tornado
- Urban Fire

The HMPC eliminated the hazards identified below from further consideration in the development of mitigation actions because the risk of a hazard event in the City is unlikely or nonexistent, the vulnerability of the City is low, capabilities are already in place to mitigate negative impacts, or the City does not have the authority or control over mitigation of the hazard. The eliminated hazards are:

- Hazardous Materials Transportation Release
- Landslide
- Levee Failure
- Natural Gas Pipeline
- Subsidence
- Wildfire

The resulting mitigation strategy presented in this Chapter focuses on those mitigation actions that the City of Placentia has the authority, resources, and capacity to consider for implementation over the next 5-years covered by this LHMP. Further, it is important to note that **all the hazards addressed in this LHMP are included in the City's multi-hazard public education mitigation action as well as in other multi-hazard and emergency management actions.**

Once it was determined which hazards warranted the development of specific mitigation actions, the HMPC analyzed viable mitigation options that supported the identified goals and objectives. The HMPC was provided with the following list of categories of mitigation actions, which originate from the NFIP's Community Rating System:

- Prevention
- Property protection
- Structural projects
- Natural resource protection
- Emergency services
- Public information

The HMPC was provided with examples of potential mitigation actions for each of the above categories. The HMPC was also instructed to consider both existing and future buildings in considering possible mitigation actions. A facilitated discussion then took place to examine and analyze the options. Appendix C provides a detailed review and discussion of the six mitigation categories to assist in the review and identification of possible mitigation activities or projects. Also utilized in the review of possible mitigation measures is FEMA's publication on Mitigation Ideas, by hazard type. Prevention type mitigation alternatives were discussed for each of the priority hazards. This was followed by a brainstorming session that generated a list of preferred mitigation actions by hazard.

5.3.1. Prioritization Process

Once the mitigation actions were identified, the HMPC was provided with several decision-making tools, including FEMA's recommended prioritization criteria, STAPLEE sustainable disaster recovery criteria; Smart Growth principles; and others, to assist in deciding why one recommended action might be more important, more effective, or more likely to be implemented than another. STAPLEE stands for the following:

- Social: Does the measure treat people fairly? (e.g., different groups, different generations)
- Technical: Is the action technically feasible? Does it solve the problem?
- Administrative: Are there adequate staffing, funding, and other capabilities to implement the project?
- Political: Who are the stakeholders? Will there be adequate political and public support for the project?
- Legal: Does the jurisdiction have the legal authority to implement the action? Is it legal?

- Economic: Is the action cost-beneficial? Is there funding available? Will the action contribute to the local economy?
- Environmental: Does the action comply with environmental regulations? Will there be negative environmental consequences from the action?

In accordance with the DMA requirements, an emphasis was placed on the importance of a benefit-cost analysis in determining action priority. Other criteria used to assist in evaluating the benefit-cost of a mitigation action includes:

- Contribution of the action to save life or property
- Availability of funding and perceived cost-effectiveness
- Available resources for implementation
- Ability of the action to address the problem

The Mitigation Strategy Meeting Handout, which included hazard summaries, mitigation action categories, sample hazard actions, and prioritization criteria is included in Appendix C.

With these criteria in mind, HMPC members were each given a set of nine colored dots, three each of red, blue, and green. The dots were assigned red for high priority (worth five points), blue for medium priority (worth three points), and green for low priority (worth one point). The team was asked to use the dots to prioritize actions with the above criteria in mind. The point score for each action was totaled. Appendix C contains the total score given to each identified mitigation action.

The process of identification and analysis of mitigation alternatives allowed the HMPC to come to consensus and to prioritize recommended mitigation actions. During the voting process, emphasis was placed on the importance of a benefit-cost review in determining project priority; however, this was not a quantitative analysis. The team agreed that prioritizing the actions collectively enabled the actions to be ranked in order of relative importance and helped steer the development of additional actions that meet the more important objectives while eliminating some of the actions which did not garner much support.

Benefit-cost was also considered in greater detail in the development of the Mitigation Action Plan detailed below in Section 5.4. The cost-effectiveness of any mitigation alternative will be considered in greater detail through performing benefit-cost project analyses when seeking FEMA mitigation grant funding for eligible actions associated with this LHMP.

Recognizing the limitations in prioritizing actions from multiple departments and the regulatory requirement to prioritize by benefit-cost to ensure cost-effectiveness, the HMPC decided to pursue actions that contributed to saving lives and property as first and foremost, with additional consideration given to the benefit-cost aspect of a project. This process drove the development of a determination of a high, medium, or low priority for each mitigation action, and a comprehensive prioritized action plan for the City of Placentia Planning Area.

5.4 Mitigation Action Plan

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

This mitigation action plan was developed to present the recommendations developed by the HMPC for how the City of Placentia Planning Area can reduce the risk and vulnerability of people, property, structures, critical facilities and community systems, natural and cultural resources, and economic assets to future disaster losses. Emphasis was placed on both existing and future development. The action plan summarizes who is responsible for implementing each of the prioritized actions as well as when and how the actions will be implemented. Each action summary also includes a discussion of the benefit-cost review conducted to meet the regulatory requirements of the Disaster Mitigation Act.

Table 5-2 identifies the mitigation actions; the goals addressed by each action, whether the action protects existing or future development, whether the action supports continued compliance with the NFIP, and the mitigation type or category. Following this summary table of mitigation actions, a detailed implementation description is included for each mitigation action identified in the table. The implementation of any mitigation action in this LHMP is subject to available funding and desires of the City as the primary implementing agency for this LHMP.

As described throughout this LHMP Update, the City of Placentia has many risks and vulnerabilities to identified hazards. Although many possible mitigation actions, as detailed in Appendix C, were brainstormed and prioritized during the mitigation strategy meetings, the resulting mitigation strategy presented in this Chapter 5 of this LHMP focuses only on those mitigation actions that are both reasonable and realistic for the City to consider for implementation over the next 5-years covered by this Plan. Thus, only a portion of the actions identified in Appendix C have been carried forward into the mitigation strategy presented in Table 5-2. Although many good ideas were developed during the mitigation action brainstorming process, the reality of determining which priority actions to develop and include in this LHMP came down to the actual priorities of the City, individuals and departments based in part on City management and department direction, staffing, and available funding. The overall value of the mitigation action table in Appendix C is that it represents a wide-range of mitigation actions that can be consulted and developed for this LHMP Update during annual plan reviews and the formal 5-year update process.

It is also important to note that the City has numerous existing, detailed action descriptions, which include benefit-cost estimates, in other planning documents and programs, such as stormwater plans, water management plans, climate plans, and capital improvement budgets and reports. These actions are considered to be part of this LHMP, and the details, to avoid duplication, should be referenced in their original source document. The HMPC also realizes that new needs and priorities may arise as a result of a disaster or other circumstances and reserves the right to support new actions, as necessary, as long as they conform to the overall goals of this LHMP.

Further, it should be clarified that the actions included in this mitigation strategy are subject to further review and refinement; alternatives analyses; reprioritization due to funding availability and/or other criteria; and City Council approval. The City is not obligated by this document to implement any or all of these projects. Rather this mitigation strategy represents the desires of the City to mitigate the risks and vulnerabilities from identified hazards. The actual selection, prioritization, and implementation of these actions will also be further evaluated in accordance with the mitigation categories and criteria contained in Appendix C, and, as always, the availability of funding.

It should be noted that some of these mitigation efforts are collaborative efforts among multiple local, state, and federal agencies. **In addition, the public outreach and education action, as well as many of the emergency services and other multi-hazard actions, apply to all hazards regardless of hazard priority.** Collectively, this Placentia multi-hazard mitigation strategy includes only those actions and projects which reflect the actual priorities and capacity of the City to implement over the next 5-years covered by this LHMP.

Table 5-2 City of Placentia Mitigation Actions

Action Title	Goals Addressed	Address Existing Development	Address Future Development	Continued Compliance with NFIP	Mitigation Type
Multi-Hazard Actions					
Action 1. Integrate Local Hazard Mitigation Plan into Safety Element of General Plan	1, 2, 3, 4	X	X		Prevention
Action 2. StormReady Certification for City of Placentia	1, 2, 3, 4	X	X	X	Prevention Property Protection Public Education Emergency Services
Action 3. Enhance Public Education and Awareness of Hazards and Public Understanding of Hazards and Preparedness for Disaster Events	1, 2, 3, 4	X	X	X	Public Education
Action 4. Review Permitting and Code Enforcement Practices for all Hazards	1, 2, 3, 4	X	X		Prevention
Action 5. Create a Mechanism to Ensure Diversity, Equity, and Inclusion is Implemented in all City Projects (e.g., to Equitably Consider Disadvantaged and Socially Vulnerable Populations)	1, 2, 3, 4	X	X		Prevention
Action 6. Emergency Operations Plan Update	1, 2, 3, 4	X	X		Emergency Services
Action 7. Evacuation Planning and Messaging	1, 2, 3, 4	X	X		Emergency Services
Action 8. Establish Back up Power Sources for Critical Facilities in Placentia	1, 2, 3, 4	X	X		Prevention Property Protection Natural Resource Protection Emergency Services
Climate Change and Severe Weather: Extreme Heat Actions					
Action 9. Develop Climate Action Plan	1, 2, 3, 4	X	X	X	Prevention

Action Title	Goals Addressed	Address Existing Development	Address Future Development	Continued Compliance with NFIP	Mitigation Type
Action 10. Implement Cool Infrastructure Projects	1, 2, 3, 4	X	X		Property Protection
Dam Failure, Floods: 1%/0.5%/0.2% Annual Chance, Floods: Localized Stormwater, Severe Weather: Heavy Rains and Storms Actions					
Action 11. Local Flood Ordinance Revision to meet California Building Code Requirements	1, 2, 4	X	X	X	Prevention
Action 12. Storm Drain Capacity Enhancement Projects	1, 2, 4	X	X	X	Prevention Structural
Earthquake and Earthquake Liquefaction Actions					
Action 13. Earthquake Retrofit / Seismic Assessment of City Infrastructure	1, 2, 4	X	X		Property Protection Structural Projects
Pandemic Actions					
Action 14. Pandemic Planning/Point of Dispensing Model Improvements	1, 2, 3, 4	X	X		Prevention
Severe Weather: Extreme Heat, Heavy Rain and Storms, High Winds, and Drought Actions					
Action 15. Implementation of Urban Tree Management Plan and Program	1, 2, 4	X	X		Prevention Natural Resource Protection
Fire Actions					
Action 16. Adoption and Enforcement of the California Fire Code by Reference with Local Amendments	1, 2, 4	X	X		Prevention
Action 17. Development of Vegetation Management Ordinance	1, 2, 3, 4	X	X		Prevention

Multi-Hazard Actions

Action 1. Integrate Local Hazard Mitigation Plan into Safety Element of General Plan

Hazards Addressed: Multi-hazard (Climate Change, Dam Failure, Drought & Water shortage, Earthquake, Floods: 1%/0.5%/0.2% annual chance, Floods: Localized Stormwater, Landslides, Levee Failure, Natural Gas Pipeline, Pandemic, , Severe Weather: Extreme Heat, Severe Weather: Heavy Rains and Storms, Severe Weather: High Winds and Tornados, Subsidence, Urban Fire, Wildfire)

Goals Addressed: 1, 2, 3, 4

Issue/Background: In 2006, the state adopted Assembly Bill (AB) 2140 which added provisions specifying what is to be included in a Local Hazard Mitigation Plan (LHMP) and requiring a linkage between a local jurisdiction's LHMP and the Safety Element of their General Plan. AB 2140 requires a jurisdiction to adopt the LHMP into the Safety Element of the General Plan in order to be fully eligible for disaster relief funding under the California Disaster Assistance Act. AB 2140 can be met by either including the LHMP language specific to AB 2140 as part of the Safety Element or to incorporate the LHMP by reference into the Safety Element of the General Plan.

Project Description: In accordance with AB 2140, the City of Placentia will adopt their FEMA-approved LHMP in accordance with the federal Disaster Mitigation Act of 2000 as part of the Safety Element of its General Plan. Adoption of the LHMP into the Safety Element of the General Plan may be by reference or incorporation.

Other Alternatives: No action

Existing Planning Mechanisms through which Action will be Implemented: Safety Element of General Plan

Responsible Office/Partners: City of Placentia Department of Development Services/Planning

Cost Estimate: Jurisdictional board/staff time

Benefits (avoided Losses): Incorporation of an adopted LHMP into the Safety Element of the General Plan will help jurisdictions maximize the cost recovery potential following a disaster.

Potential Funding: City budgets

Timeline: 2024

Project Priority: High

Action 2. StormReady Certification for City of Placentia

Hazards Addressed: Floods: 1%/0.5%/0.2% annual chance, Floods: Localized Stormwater, Severe Weather: Extreme Heat, Severe Weather: Heavy Rains and Storms, Severe Weather: High Winds and Tornadoes

Goals Addressed: 1, 2, 3, 4

Issue/Background: The National Weather Service established the StormReady program to help local governments improve the timeliness and effectiveness of hazardous weather-related warnings for the public. The program encourages communities to take a new, proactive approach to improving local hazardous weather operations by providing emergency managers with clear-cut guidelines on how to improve their hazardous weather operations. Some 98 percent of all Presidentially declared disasters are weather related, leading to around 500 deaths per year and nearly $15 billion in damage. The StormReady program helps arm America's communities with the communication and safety skills needed to save lives and property--before, during and after the event. StormReady helps community leaders and emergency managers strengthen local safety programs.

Project Description: This project entails developing a StormReady application for certification.

To be officially StormReady, a community must:

- Establish a 24-hour warning point and emergency operations center,
- Have more than one way to receive severe weather warnings and forecasts and to alert the public,
- Create a system that monitors weather conditions locally,
- Promote the importance of public readiness through community seminars, and
- Develop a formal hazardous weather plan, which includes training severe weather spotters and holding emergency exercises.

Being designated a StormReady community by the National Weather Service is a good measure of a community's emergency warning program for weather hazards. It is also credited by the CRS.

Other Alternatives: Continue utilizing the National Weather Service and other existing sources for storm information

Existing Planning Mechanism(s) through which Action Will Be Implemented: City of Placentia Emergency Operations Plan and related Annexes

Responsible Agency/ Department/Partners: City of Placentia Administration Department: Emergency and Health Services Manager, in conjunction with the City Public Works Department and Stormwater and Flood Programs

Cost Estimate: Staff time of $8,000 to $10,000

Benefits (Losses Avoided): A StormReady certification will lead to better communication to save lives, reduce injuries, and protect property during major storm events.

Timeline: Within 5 years

Potential Funding: City budgets

Project Priority: Medium

Action 3. Enhance Public Education and Awareness of Hazards and Public Understanding of Hazards and Preparedness for Disaster Events

Hazards Addressed: Multi-hazard (Climate Change, Dam Failure, Drought & Water shortage, Earthquake, Floods: 1%/0.5%/0.2% annual chance, Floods: Localized Stormwater, Landslides, Levee Failure, Natural Gas Pipeline, Pandemic, Severe Weather: Extreme Heat, Severe Weather: Heavy Rains and Storms, Severe Weather: High Winds and Tornados, Subsidence, Urban Fire, Wildfire)

Goals Addressed: 1, 2, 3, 4

Issue/Background: Public Information (or lack thereof) has been identified as a potential issue or threat when disasters happen. If the City isn't putting out frequent communications, misinformation is likely to spread.

The City of Placentia plays a key role in public outreach/education efforts to communicate the potential risk and vulnerability of their community to the effects of hazards. A comprehensive multi-hazard public education program will better inform the community of hazards of concern and actions the public can take to be better prepared for the next hazard event or disaster.

Project Description: A comprehensive multi-hazard outreach program will ascertain both broad and targeted educational needs throughout the community. The City will work with other agencies as appropriate to develop timely and consistent annual outreach messages in order to communicate the risk and vulnerability of hazards of concern to the community. This includes measures the public can take to be better prepared and to reduce the damages and other impacts from a hazard event. The public outreach effort will leverage and build upon existing mechanisms, will include elements to meet the goals of this LHMP, and will consider:

- Using a variety of information outlets, including websites, social media platforms, news media, schools, and local, public sponsored events;
- Development of a public information and education website on hazards of concern to be posted on the City website and updated as needed;
- Creating and distributing (where applicable) brochures, leaflets, water bill inserts, websites, and public service announcements and other hazard-specific information;
- Displaying public outreach information in City office buildings, libraries, and other public places and events;
- Developing public-private partnerships and incentives to support public education activities.

The project will be implemented throughout the year. A year-long calendar for outreach will be established to guide the outreach and education process. Each month will focus on a different potential hazard and articles, graphics, videos, and other outreach materials will be developed to better tell the story to the public.

Other Alternatives: Continue public information activities currently in place.

Existing Planning Mechanism(s) through which Action Will Be Implemented: The City already has established City website, newsletter, social media pages where this information can be promoted. The City will use existing audiences and subscribers to reach with this information and seek out how to further engage the public, including those underserved and vulnerable populations.

Responsible Office/Partners: Emergency and Health Services, Communications and Marketing

Cost Estimate: $20,000-$30,000 annually

Benefits (Losses Avoided): The community will be better prepared and informed to respond if these hazards happen. Effective public outreach and education can reduce impacts associated with future hazard events and disasters, including loss of life, injury, and property damage.

Potential Funding: Cost of staff time, general budgets

Timeline: Efforts will start in 2024 and continue annually. The City will establish a formal calendar to guide outreach and education efforts and refine each year.

Project Priority: High

Action 4. Review Permitting and Code Enforcement Practices for all Hazards

Hazards Addressed: Multi-hazard (Climate Change, Dam Failure, Drought & Water shortage, Earthquake, Floods: 1%/0.5%/0.2% annual chance, Floods: Localized Stormwater, Landslides, Levee Failure, Natural Gas Pipeline, Pandemic, Severe Weather: Extreme Heat, Severe Weather: Heavy Rains and Storms, Severe Weather: High Winds and Tornados, Subsidence, Urban Fire, Wildfire)

Goals Addressed: 1, 2, 3, 4

Issue/Background: Review Permitting and Code Enforcement Practices for all hazards. This review will ensure that the City's adopted Building and Code Enforcement related Codes adequately address safety concerns to minimize structural damage due to electricity/gas fires related to substandard building conditions. Structural damage, fire/flood from substandard property conditions could potentially affect surrounding properties and the surrounding neighborhood.

Project Description: Review Permitting and Code Enforcement Practices for all hazards. This review will ensure that the City's adopted Building and Code Enforcement related Codes adequately address safety concerns to minimize structural damage due to electricity/gas fires related to substandard building conditions. Structural damage, fire/flood could potentially affect surrounding properties.

- Title 20 of the Placentia Municipal Code (PMC): https://library.qcode.us/lib/placentia_ca/pub/municipal_code/item/title_20 codified the latest 2022 Building Codes and the 2021 International Property Maintenance Code.
- Title 18 of the Placentia Municipal Code (PMC): https://library.qcode.us/lib/placentia_ca/pub/municipal_code/item/title_18 codified the latest 2022 Fire Codes

Other Alternatives: Continue with existing permitting and enforcement processes

Existing Planning Mechanism(s) through which Action Will Be Implemented: Placentia Municipal Code (PMC)

Responsible Office/Partners: Development Services Department/Emergency Operations staff

Cost Estimate: Staff time for review

Benefits (Losses Avoided): Compliance with State Law, safer structures, safer neighborhoods, safe residents

Potential Funding: City budgets

Timeline: Initiate in year 1; complete by end of year 2

Project Priority: Medium

Action 5. Create a Mechanism to Ensure Diversity, Equity, and Inclusion is Implemented in all City Projects (e.g., to Equitably Consider Disadvantaged and Socially Vulnerable Populations)

Hazards Addressed: Multi-hazard (Climate Change, Dam Failure, Drought & Water shortage, Earthquake, Floods: 1%/0.5%/0.2% annual chance, Floods: Localized Stormwater, Landslides, Levee Failure, Natural Gas Pipeline, Pandemic, Severe Weather: Extreme Heat, Severe Weather: Heavy Rains and Storms, Severe Weather: High Winds and Tornados, Subsidence, Urban Fire, Wildfire)

Goals Addressed: 1, 2, 3, 4

Issue/Background: Senate Bill 1000 requires jurisdictions to address environmental justice within "Disadvantaged Communities." While it would be the hope that all persons are given equal access to healthy environments, healthy foods, parks and recreational facilities, and medical assistance, this is not always the case. Those in neighborhoods of lower income are more likely to be at a disadvantage when it comes to this equal access to programs and places that make and keep us healthy. This disadvantage gave way to the notion of environmental justice (EJ), which arose out of the social and environmental movements of the 1960s and 1970s based on the fact that polluting facilities were being located in neighborhoods that were mostly minority or low income. According to the State of California SB 1000 Implementation Toolkit, "Planning for Healthy Communities," low-income residents, communities of color, tribal nations, and immigrant communities have disproportionately experienced some of the greatest environmental burdens and related health problems throughout the history of the United States. This inequity is the result of many factors: inappropriate zoning and negligent land use planning, structural inequities, failure to enforce proper zoning, discriminatory housing and lending practices, limited political and economic power, the prioritization of business interests over public health and development patterns that tend to concentrate pollution, and environmental hazards, in certain communities. These factors can lead to communities having a less healthy environment, with the balance of economic and environmental benefits based outside of these communities. Environmental justice seeks to remedy this imbalance, based on the democratic values of fairness and equity.

Project Description: In 2019, the Placentia City Council adopted a comprehensive General Plan update including adoption of the City's Health, Wellness & Environmental Justice Element. This General Plan Element, in an effort to balance the scales of environmental justice, sets general health and wellness goals

for the city at large, but will pay particular attention, and set particular policies for those in disadvantaged communities. In order to reduce unique and compounded health risks in disadvantaged communities and to promote environmental justice, goals and policies of this Element will focus on the following specific areas:

- Reducing pollution exposure and improving air quality;
- Promoting public and recreational facilities;
- Promoting health food access;
- Promoting safe and sanitary homes;
- Promoting physical activity;
- Promoting "civil engagement" in the public decision-making process; and
- Prioritizing improvements and programs that address the needs of disadvantaged communities.

The aforementioned goals can be accomplished by following the specific Goals (17) and Policies contained in the Health, Wellness & Environmental Justice Element. This Element is quite unique in that in most instances, the Goals and Policies of this Element take precedence over the other General Plan Elements.

Other Alternatives: None

Existing Planning Mechanism(s) through which Action Will Be Implemented: General Plan, LHMP, Placentia Municipal Code (PMC)

Responsible Office/Partners: Development Services Department/Emergency Operations staff

Cost Estimate: Staff time for review

Benefits (Losses Avoided): Compliance with State Law, safer structures, safer neighborhoods, safe streets, safe sidewalks, safe parks, safe access to food and medical treatment.

Potential Funding: General Fund

Timeline: Initiate in year 1; complete by end of year 2

Project Priority: High

Action 6. Emergency Operations Plan Update

Hazards Addressed: Multi-hazard (Climate Change, Dam Failure, Drought & Water shortage, Earthquake, Floods: 1%/0.5%/0.2% annual chance, Floods: Localized Stormwater, Landslides, Levee Failure, Natural Gas Pipeline, Pandemic, Severe Weather: Extreme Heat, Severe Weather: Heavy Rains and Storms, Severe Weather: High Winds and Tornados, Subsidence, Urban Fire, Wildfire)

Goals Addressed: 1, 2, 3, 4

Issue/Background: The City of Placentia is in need of updating its Emergency Operations Plan. The last known plan for the City was done in 2003. Since then the City has started a local City Fire Department,

contracted out 911-Paramedic services and transitioned the Placentia Police Dispatch Center into an all hazards emergency communications center handling all Fire/EMS/PD & Public Works calls for service.

Project Description: Update the City's Emergency Operations Plan (EOP) with Annexes, including a new Severe Weather Annex to address protocols for Heat and Heavy Rains/Storms; Evacuation and Shelter in place Annex with considerations for animal care and sheltering and Access and Functional Needs populations.

Other Alternatives: No action. Continue operating under 2003 EOP

Existing Planning Mechanism(s) through which Action Will Be Implemented: The City will convene the Disaster Council as codified in local ordinance. The Disaster Council will be convened to discuss and identify responsibility and task to be performed to ensure that a comprehensive EOP is developed that meets the needs of the City at present day.

Responsible Office/Partners: The City's Administration department with the emergency and health services division will lead in the re-development of a revised EOP.

Cost Estimate: $50,000 - $75,000

Benefits (Losses Avoided): The benefits to a revised City EOP will be improved coordination of response and resource utilization through pre-planning and assignment of responsibilities. A current EOP addressing notifications, evacuations, care and shelter and other required components can save lives, reduce injuries and limit damage to structures, critical facilities, and the natural environment.

Potential Funding: General Fund

Timeline: 1 to 2 years

Project Priority: High Priority

Action 7. Evacuation Planning and Messaging

Hazards Addressed: Multi-hazard (Climate Change, Dam Failure, Drought & Water shortage, Earthquake, Floods: 1%/0.5%/0.2% annual chance, Floods: Localized Stormwater, Landslides, Levee Failure, Natural Gas Pipeline, Pandemic, Severe Weather: Extreme Heat, Severe Weather: Heavy Rains and Storms, Severe Weather: High Winds and Tornados, Subsidence, Urban Fire, Wildfire)

Goals Addressed: 1, 2, 3, 4

Issue/Background: The City of Placentia does not have an Evacuation Plan in place. In the event of a hazard event or disaster, Placentia residents and visitors would likely encounter traffic jams on the major arterial roads that would lead toward safety. The City of Placentia needs to plan for the evacuation of City residents and visitors should a major disaster occur.

Project Description: Coordinate with Orange County OEM to identify local and regional evacuation routes and evacuation messaging for City of Placentia. This effort should also consider options for shelters,

refuge areas, safety zones, and signage. Evacuation planning should include a messaging component for public notification of need to evacuate, shelter in place, or otherwise seek refuge. This effort will identify locations for care and reception if evacuation advisories or orders are issued. The City's will traffic manager will be involved as necessary to assist in identifying the best routes for egress out of the city and to the highway system. Evacuation planning and messaging will be included as appropriate in the EOP and associated Annexes.

Other Alternatives: No action. Continue to operate without a City focused evacuation plan.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Placentia Emergency Management Program, Emergency Operations Plan

Responsible Office/Partners: City Emergency and Health Services department will take the lead in coordinating with Orange County OEM

Cost Estimate: $$50,000 - $100,000

Benefits (Losses Avoided): Improve emergency preparedness of roads, related infrastructure, and personal preparation. Improve speed & coordination of evacuations. Improve public safety. Save lives.

Potential Funding: General Fund, Capital Improvement program funding, FEMA HMPG, BRIC, PDM, or other grants.

Timeline: 1- 1 ½ years

Project Priority: High Priority

Action 8. Establish Back up Power Sources for Critical Facilities in Placentia

Hazards Addressed: Multi-hazard (Climate Change, Dam Failure, Drought & Water shortage, Earthquake, Floods: 1%/0.5%/0.2% annual chance, Floods: Localized Stormwater, Landslides, Levee Failure, Natural Gas Pipeline, Pandemic, Severe Weather: Extreme Heat, Severe Weather: Heavy Rains and Storms, Severe Weather: High Winds and Tornados, Subsidence, Urban Fire, Wildfire)

Goals Addressed: 1, 2, 3, 4

Issue/Background: City of Placentia has numerous critical facilities which do not have adequate backup power. During times of a power outage, staff must prioritize those facilities that do not have backup power. The Police Department has an aging and undersized generator; thus, staff must determine which systems will be inoperable during power outages. In other parts of the city, staff must determine where portable generators should be placed first, and then moved, as there are not enough generators to power all of the critical facilities at the same time.

Project Description: Establish backup power sources for critical facilities within the city. Among facilities in need or new or replacement backup power systems: Placentia Police Department, Tynes Gym, Gomez Community Center, Backs Community Building, Aguirre Building.

Other Alternatives: None

Existing Planning Mechanism(s) through which Action Will Be Implemented: Capital Improvement Plan

Responsible Office/Partners: Public Works

Cost Estimate: 5+ Million

Benefits (Losses Avoided): Critical facilities can function after events where power is knocked out. This increases life safety and the ability for the City to respond to hazard events.

Potential Funding: FEMA HMGP grants, City Budget

Timeline: Within next 5 years

Project Priority: High Priority

Climate Change and Severe Weather: Extreme Heat Actions

Action 9. Develop Climate Action Plan

Hazards Addressed: Multi-hazard: Climate Change, Extreme Heat, other hazards exacerbated by Climate Change

Goals Addressed: 1, 2, 3, 4

Issue/Background: The passage of historic legislation, AB 32, the California Global Warming Solutions Act of 2006, has changed the way cities consider long-term planning for their communities. The objective of AB 32 requires California to reduce its greenhouse gas (GHG) emissions to 1990 levels by 2020. In addition to current goals, in January 2015, Governor Brown outlined ambitious targets through the year 2050 and created benchmarks for the year 2030 including; 50 percent electricity reliability derived from renewable sources; a reduction of petroleum in vehicles by 50 percent; double the efficiency of existing buildings; and an increasing in clean heating fuels. The Association of California Cities- Orange County (ACC-OC) realizes that these statewide goals will eventually require participation from every city through quantifiable and measurable efforts.

Project Description: The Climate Action Plan will: Provide a "plan" that will provide best practices on Sustainability and Climate Action Plan creation and will augment the sustainability efforts already found in the General Plan and within the Local Hazard Mitigation Plan.

Other Alternatives: No action

Existing Planning Mechanism(s) through which Action Will Be Implemented: General Plan, LHMP

Responsible Office/Partners: Development Services Department/Emergency Operations staff

Cost Estimate: $35,000

Benefits (Losses Avoided): Compliance with State Law; Life Safety and Property Protection

Potential Funding: General Fund

Timeline: 1-3 years

Project Priority: High

Action 10. Implement Cool Infrastructure Projects

Hazards Addressed: Climate Change and Extreme Heat

Goals Addressed: 1, 2, 3, 4

Issue/Background: The City of Placentia has many older buildings that need roof repair. City is looking at utilizing Title 24 compliant roofing materials but does not have the funding to replace all. The Title 24 roofing code established new requirements to promote the installation of Cool Roofs in steep slope construction.

Project Description: Replace roofs of older city buildings with Title 24 complaint cool roof materials. Cool roofs are roofs designed to reflect more sunlight and absorb less hat than a standard roof, and need to meet or exceed the .20 requirement for aged REF.

Other Alternatives: None

Existing Planning Mechanism(s) through which Action Will Be Implemented: The City of Placentia will utilize its facility condition assessment to be performed to determine which of its community facilities and City Hall complex will benefit most from cool roof technology.

Responsible Office/Partners: Public Works

Cost Estimate: 7.5 million

Benefits (Losses Avoided): Benefits of cool roof technology are aiding in the City of Placentia being committed to adhering to the California Energy Commission energy standards

Potential Funding: FEMA HMGP grants, Capital Improvement Fund

Timeline: 3-5 years

Project Priority: Medium / High Priority

Dam Failure, Floods: 1%/0.5%/0.2% Annual Chance, Floods: Localized Stormwater, Severe Weather: Heavy Rains and Storms Actions

Action 11. Local Flood Ordinance Revision to meet California Building Code Requirements

Hazards Addressed: Dam Failure, Floods: 1%/0.5%/0.2% annual chance, Floods: Localized Stormwater, Severe Weather: Heavy Rains and Storms

Goals Addressed: 1, 2, 4

Issue/Background: Most of the City is not in a flood hazard zone, however, some areas on the east and south sides are in the 500-year flood zone (0.2% chance of flooding each year) and could see increased flooding and reduced drainage from intense storms. A small pocket of homes between Highway 57 and Orangethorpe Avenue is in the 100-year flood zone (1% chance of flooding each year) and is most likely to be impacted from flooding due to changes in rainfall. The La Jolla community in the southwest corner of Placentia is located in the 100-year flood zone, with a portion in the 500-year flood zone.

Project Description: Use best practices through planning, design, and building processes to mitigate flood hazards. Adoption of floodplain requirements to address California Code requirements for buoyancy load, hydrodynamic load, and hydrostatic load, including incorporation of best practices utilized and referenced by the National Flood Insurance Technical Bulletins for properties located in Special Flood Hazard Areas.

Other Alternatives: No action.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Placentia Municipal Code and Safety Element of General Plan.

Responsible Office/Partners: City of Placentia Department of Development Services

Cost Estimate: Jurisdictional board/staff time.

Benefits (Losses Avoided): Incorporation of a revised Local Flood Ordinance that corresponds with the California Building Code will help jurisdictions maximize the cost recovery potential following a disaster.

Potential Funding: City budget

Timeline: To be completed in 2024

Project Priority (H, M, L): Medium

Action 12. Storm Drain Capacity Enhancement Projects

Hazards Addressed: Severe storm events (including flooding)

Issue/Background: The City recently completed a Citywide storm drain master plan that evaluated the condition of the City's storm drain system and its ability to capture and convey storm water based on 100-

year flood events. The master plan identified several areas throughout the City that require upsized storm drains and catch basins to eliminate flood hazards during severe rain events.

Project Description: Upsize storm drain lines in seven (7) separate projects totaling 9,502 linear feet of storm drain lines for a total estimated cost of $14 million. The seven (7) projects are located in Watershed A, B and F.

Other Alternatives: There have been no other alternatives to reducing these flood hazards other than to upsize the existing infrastructure.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Projects have been identified in the 2023 Storm Drain Master Plan Update and will be implemented as part of larger street improvement projects and/or when funding is available.

Responsible Office/Partners: Placentia Public Works Department

Cost Estimate: $14,718,000

Benefits (Losses Avoided): Unknown dollar figure. The flood hazards exist in residential neighborhoods which could result in extensive damage to homes and contents found therein.

Potential Funding: Local funds and developer impact fees.

Timeline: Unknown at this time. But projects expected to be initiated within the next 1-3 years.

Project Priority (H, M, L): High

Earthquake and Earthquake Liquefaction Actions

Action 13. Earthquake Retrofit / Seismic Assessment of City Infrastructure

Hazards Addressed: Earthquake and Liquefaction

Goals Addressed: 1, 2, 4

Issue/Background: The City of Placentia resides in an area of moderate to low seismicity with several fault zones which can generate between a 5 and 7 magnitude earthquake. The City needs to complete a seismic screening of all public infrastructure to determine the seismic risk and a plan of action which can be implemented to mitigate potential safety and operational risk associate a seismic event.

Project Description: Determine the seismic vulnerability of Placentia's infrastructure including bridges, essential roadway facilities, buildings, and utilities and determine a plan of action to ensure the safety and functionality of public infrastructure during and after a seismic event. Perform an engineering seismic assessment of all public infrastructure Citywide including bridges, essential roadway facilities, buildings, and utilities and determine a plan of action to ensure the safety and functionality of public infrastructure during and after a seismic event.

Other Alternatives: None

Existing Planning Mechanism(s) through which Action Will Be Implemented: None

Responsible Office/Partners: Public Works

Cost Estimate: $500,000

Benefits (Losses Avoided): Assess seismic risk and vulnerabilities. Determine specific mitigations to avoid injury, loss of life, and operational ability during and after a seismic event.

Potential Funding: FEMA HMGP grant, City Capital Improvement Program, City Budgets

Timeline: 3-4 years

Project Priority: High Priority

Pandemic Actions

Action 14. Pandemic Planning/Point of Dispensing Model Improvements

Hazards Addressed: Pandemic

Issue/Background: In 2020, the world experienced a Pandemic of COVID-19 that caused the loss millions of lives world-wide. The City of Placentia has partnered with the County of Orange Healthcare Agency to develop preparedness plans and Point of Dispensing (POD) models. Since the end of the declared worldwide emergency, the County POD program has been undertaking a remaking process which the City of Placentia has a need to be part of the dialog and resulting new planning model

Goals Addressed: 1, 2, 3, 4

Project Description: Work collaboratively with the County Healthcare Agency to revise the Point of Dispensing model. Cities should be prepared to utilize the POD model for a variety of dispensing needs. Pharmacological agents, food, water, information resources may all be items that are dispensed through a City of Placentia POD.

Other Alternatives: Continue working with existing plans/POD models

Existing Planning Mechanism(s) through which Action Will Be Implemented: Orange County Pandemic Planning. The County of Orange has created a Point of Dispensing model that was utilized during the 2020 Pandemic. The prior model will be reevaluated and improved to ensure that the program actions may be taken.

Responsible Office/Partners: City of Placentia administration through the Emergency and Health Services management office, in conjunction with County OEM

Cost Estimate: $10,000

Benefits (Losses Avoided): An effective POD model will protect public health and limit loss of life during future pandemics.

Potential Funding: City Staff Time and City budgets to augment County funds

Timeline: 1-2 years

Project Priority: Medium

Severe Weather: Extreme Heat, Heavy Rain and Storms, High Winds, and Drought Actions

Action 15. Implementation of Urban Tree Management Plan and Program

Hazards Addressed: Climate Change / Drought & Water Shortage/ Severe Weather (Extreme Heat /Heavy Rains and Storm / High Winds)

Goals Addressed: 1, 2, 4

Issue/Background: The average tree canopy for a city to combat environmental issue should be a minimum 20%. Placentia's canopy is only 11%. Many of the trees need to be replaced and we have nearly 10,000 open tree wells that could be planted. Our Urban Tree Management Plan has indicated that there is opportunity to install up to 72,000 trees to accomplish our plan goals.

Project Description: Implement the Urban Forest Management Plan and secure additional funding to finance the suggested improvements.

Other Alternatives: None

Existing Planning Mechanism(s) through which Action Will Be Implemented: Urban Forest Management Plan adopted in 2021. Education of the public so they understand the importance of planting trees.

Responsible Office/Partners: Community Development and Public Works

Cost Estimate: $2.5 million

Benefits (Losses Avoided): An average Gold Medallion with a 5" diameter will remove 101 lbs. of CO2 per year and intercept 213 gallons of runoff, helping to clean the air and reduce polluted runoff into the ocean. Tree lined streets absorb noise and catch the dust in the air.

Potential Funding: General Fund or CIP

Timeline: 5 years

Project Priority: Medium Priority

Fire Actions

Action 16. Adoption and Enforcement of the California Fire Code by Reference with Local Amendments

Hazards Addressed: Urban Fire and Wildfire

Goals Addressed: 1, 2, 4

Issue/Background: The City of Placentia is responsible for providing life and fire safety services to the community. Triennial model code adoption practices will ensure the enforcement of the California Fire Code is in alignment with the most recent changes set forth by the Office of the State Fire Marshal.

Project Description: A triennial code adoption process with specific local amendments to the California model codes Title 24 Parts 1-12, will ensure that life and fire safety is addressed based on the city of Placentia's specific needs. The adoption process includes establishing the Placentia Fire Code as local ordinance through partnership with development services department, code enforcement, and the police department to ensure uniformity and eliminate conflicts in local requirements.

Other Alternatives: Continue in current code cycle year beyond triennial updates.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Existing code adoption practices will be reviewed for effectiveness and accuracy. Ongoing evaluation of effectiveness of amendments in reducing life and property losses within the community, including financial impacts on those directly affected by amendments as related to the Safety Element of the General Plan.

Responsible Office/Partners: Placentia Fire and Life Safety Department

Cost Estimate: Costs are based on triennial purchase of new code sets at approximately $3,000. Additional costs for review of ordinance updates by City Attorney are TBD based on current rates and city contracts, in addition to staff time.

Benefits (Losses Avoided): Provide a proactive approach to community enforcement, education, and engineering in regard to fire code regulations, directly reducing property loss and protecting life safety.

Potential Funding: City budgets

Timeline: Initiated in 2022 under direction of the contract fire marshal and ongoing. Currently being reviewed and updated regularly.

Project Priority: High

Action 17. Development of Vegetation Management Ordinance

Hazards Addressed: Urban Fire and Wildfire

Goals Addressed: 1, 2, 3, 4

Issue/Background: The City of Placentia has a greater risk to wildfire than 61% of the communities in the nation. The potential for ember cast and conflagration is present due to our proximity to neighboring very high fire hazard severity zones, supporting the need for the local fuel modification guideline to be adopted as ordinance.

Project Description: This project involves reviewing the current fuel modification guideline for applicability outside the Wildland Urban Interface, amending the guideline to align with local needs, and following the appropriate process to adopt as an ordinance.

Other Alternatives: Continuing to enforce requirements as guideline.

Existing Planning Mechanism(s) through which Action Will Be Implemented: Existing development guidelines will be reviewed for accuracy and applicability to the local community as it relates to the safety element of the general plan.

Responsible Office/Partners: Placentia Fire and Life Safety

Cost Estimate: Staff time and city attorney fees based on current contract rates.

Benefits (Losses Avoided): Provide safeguards against conflagration within the community by requiring pro-active measures during development and alteration of structures and land.

Potential Funding: City budgets

Timeline: Initiated in 2022 and ongoing, with completion of first draft by initiation of next triennial state model code adoption process.

Project Priority: High

Chapter 6 Plan Adoption

Requirement §201.6(c)(5): [The local hazard mitigation plan shall include] documentation that the plan has been formally approved by the governing body of the jurisdiction requesting approval of the plan (e.g., City Council, county commissioner, Tribal Council).

The purpose of formally adopting this 2023 LHMP Update is to secure buy-in from the City of Placentia, raise awareness of the Plan, and formalize the Plan's approval and implementation. The adoption of this Local Hazard Mitigation Plan (LHMP) completes Planning Step 9 of the 10-step planning process: Adopt the Plan, in accordance with the requirements of DMA 2000. The governing board for the City has adopted this 2023 LHMP by passing a resolution. A copy of the generic resolution is included in Appendix D: Adoption Resolution.

Chapter 7 Plan Implementation and Maintenance

Requirement §201.6(c)(4): [The plan maintenance process shall include a] section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle.

Implementation and maintenance of this 2023 City of Placentia LHMP is critical to the overall success of hazard mitigation planning. This is Planning Step 10 of the 10-step process. This chapter provides an overview of the overall strategy for plan implementation and maintenance and outlines the method and schedule for monitoring, updating, and evaluating the Plan. The chapter also discusses incorporating the LHMP into existing planning mechanisms and how to address continued public involvement.

7.1 Implementation

Once adopted, this LHMP faces the truest test of its worth: implementation. While this LHMP contains many worthwhile actions, the City will need to decide which action(s) to undertake first. Two factors will help with making that decision: the priority assigned the actions in the planning process and funding availability. Low or no-cost actions most easily demonstrate progress toward successful plan implementation.

An important implementation mechanism that is highly effective and low-cost is incorporation of the LHMP recommendations and their underlying principles into other plans and mechanisms, such as the general plan, strategic plans, earthquake and stormwater plans, Emergency Operations Plans (EOPS), evacuation plans, and other hazard and emergency management planning efforts for the City of Placentia. The City already implements policies and programs to reduce losses to life and property from hazards. This LHMP builds upon the momentum developed through previous and related planning efforts and mitigation programs and recommends implementing actions, where possible, through these other program mechanisms.

Mitigation is most successful when it is incorporated into the day-to-day functions and priorities of the City of Placentia. Implementation can be accomplished by adhering to the schedules identified for each action and through constant, pervasive, and energetic efforts to network and highlight the multi-objective, win-win benefits to each program and the Placentia community and its stakeholders. This effort is achieved through the routine actions of monitoring agendas, attending meetings, and promoting a safe, sustainable community. Additional mitigation strategies could include consistent and ongoing enforcement of existing policies and vigilant review of programs for coordination and multi-objective opportunities.

Simultaneous to these efforts, it is important to maintain a constant monitoring of funding opportunities that can be leveraged to implement some of the more costly recommended actions. This could include creating and maintaining a bank of ideas on how to meet local match or participation requirements. When funding does become available, the City will be in a better position to capitalize on the opportunity. Funding opportunities to be monitored include special pre- and post-disaster funds, state and federal programs and

earmarked funds, benefit assessments, and other state and federal grant programs, including those that can serve or support multi-objective applications.

Responsibility for Implementation of Goals and Activities

Led by the City of Placentia, Emergency and Health Services Manager, Administration Department, as the lead for this LHMP project, the officials and staff appointed to head each department within the City are charged with implementation of various activities in this LHMP. During the annual reviews as described later in this section, an assessment of progress on each of the goals and activities in this LHMP should be determined and noted. At that time, recommendations were made to modify timeframes for completion of activities, funding resources, and responsible entities. On an annual basis, the priority standing of various activities may also be changed. Some activities that are found not to be doable may be deleted from this LHMP entirely and activities addressing problems unforeseen during development of the Plan may be added.

7.1.1. Role of Hazard Mitigation Planning Committee (HMPC) in Implementation and Maintenance

With adoption of this LHMP, the City of Placentia, Emergency and Health Services Manager, Administration Department, will be responsible for LHMP implementation and maintenance. The HMPC identified in Appendix A (or a similar committee) will reconvene annually each year to ensure mitigation strategies are being implemented and the City continues to maintain compliance with the NFIP and other applicable mitigation programs. As such, the City of Placentia will continue its relationship with the HMPC, and:

- Act as a forum for hazard mitigation issues;
- Disseminate hazard mitigation ideas and activities to all participants;
- Pursue the implementation of high-priority, low/no-cost recommended actions;
- Ensure hazard mitigation remains a consideration for City decision makers;
- Maintain a vigilant monitoring of multi-objective cost-share opportunities to help the City implement the LHMP's recommended actions for which no current funding exists;
- Monitor and assist in the implementation and update of this LHMP;
- Report on LHMP progress and recommended changes to the City governing board (i.e., City Council); and
- Inform and solicit input from the public.

The primary duty of the City is to see this LHMP successfully carried out and to report to their governing board and the public on the status of LHMP implementation and mitigation opportunities. Other duties include reviewing and promoting mitigation proposals, considering stakeholder concerns about hazard mitigation, passing concerns on to appropriate entities, and posting relevant information on the City website.

7.2 Maintenance

Plan maintenance implies an ongoing effort to monitor and evaluate LHMP implementation and to update this LHMP as progress, roadblocks, or changing circumstances are recognized.

7.2.1. Maintenance Schedule

The City of Placentia, Emergency and Health Services Manager, Administration Department, is responsible for initiating LHMP reviews. In order to monitor progress and update the status of mitigation strategies identified in this LHMP, the City of Placentia, Emergency and Health Services Manager, Administration Department, and the HMPC will revisit this LHMP annually each year and following a hazard event to review progress on LHMP implementation. As required by DMA 2000 in order to meet LHMP requirements for local governments, the HMPC will also submit a formal, five-year written update to the State and FEMA Region IX, unless disaster or other circumstances (e.g., changing regulations) require a change to this schedule. With this LHMP anticipated to be fully approved and adopted in early 2024, the next LHMP Update for the City of Placentia will occur in 2029.

7.2.2. Maintenance Evaluation Process

Evaluation of progress can be achieved by monitoring changes in vulnerabilities identified in this LHMP. Changes in vulnerability can be identified by noting:

- Decreased vulnerability as a result of implementing recommended actions;
- Increased vulnerability as a result of failed or ineffective mitigation actions; and/or
- Increased vulnerability as a result of new development (and/or annexation);
- Increased vulnerability resulting from unforeseen or new circumstances.

Updates to this LHMP will:

- Consider changes in vulnerability due to action implementation;
- Document success stories where mitigation efforts have proven effective;
- Document areas where mitigation actions were not effective;
- Document any new hazards that may arise or were previously overlooked;
- Incorporate new data or studies on hazards and risks;
- Incorporate new capabilities or changes in capabilities;
- Incorporate growth and development-related changes to infrastructure inventories; and
- Incorporate new action recommendations or changes in action prioritization.

Changes will be made to this LHMP to accommodate actions that have failed or are not considered feasible after a review of their consistency with established criteria, time frame, City priorities, and/or funding resources. All mitigation actions will be reviewed as well during the monitoring and update of this LHMP to determine feasibility of future implementation. Updating of this LHMP will be by written changes and submissions, as the HMPC deems appropriate and necessary, and as approved by City Council. In keeping with the five-year update process, the HMPC will convene public meetings to solicit public input on this LHMP and its routine maintenance and the final product will be again adopted by the Placentia City Council.

Annual Plan Review Process

For this LHMP review process, the City of Placentia, Emergency and Health Services Manager, Administration Department, as lead will be responsible for facilitating, coordinating, and scheduling reviews and maintenance of this LHMP. The LHMP is intended to be a living document. The review of

this 2023 LHMP will normally occur on an annual basis each year and will be conducted by the HMPC as follows:

- The City of Placentia, Emergency and Health Services Manager, Administration Department, will place an advertisement in the local newspaper advising the public of the date, time, and place for each annual review of the LHMP and will be responsible for leading the meeting to review this LHMP.
- Notices will be mailed to the members of the HMPC, federal, state, and local agencies, non-profit groups, local planning agencies, representatives of business interests, representatives from underserved and vulnerable populations, neighboring communities, and others advising them of the date, time, and place for the review.
- City officials will be noticed by email and telephone or personal visit and urged to participate.
- Prior to the review, department heads and others tasked with implementation of the various activities will be queried concerning progress on each activity in their area of responsibility and asked to present a report at the review meeting.
- The local news media will be contacted, and a copy of the current LHMP will be available for public comment on the Placentia LHMP website.
- After the review meeting, minutes of the meeting and an annual report will be prepared by the HMPC and forwarded to the news media (public) and all City departments. The report will also be presented to the Placentia City Council for review, and a request will be made that the City Council take action to recognize and adopt any changes resulting from the review.
- A copy of the 2023 LHMP will be continually posted on the City's website as will the annual status report.

Criteria for Annual Reviews

The criteria recommended in 44 CFR 201 and 206 will be utilized in reviewing and updating this LHMP. More specifically, the reviews should include the following information:

- City growth or change in the past year.
- The number of substantially damaged or substantially improved structures by flood zone.
- The renovations to City infrastructure including water, sewer, drainage, roads, bridges, gas lines, and buildings.
- Natural hazard occurrences that required activation of the Emergency Operations Center (EOC) and whether or not the event resulted in a presidential disaster declaration.
- Natural hazard occurrences that were not of a magnitude to warrant activation of the EOC or a federal disaster declaration but were severe enough to cause damage in the City or closure of offices, schools, or public services.
- The dates of hazard events descriptions.
- Documented damages due to the event.
- Closures of places of employment or schools and the number of days closed.
- Road or bridge closures and other school access routes due to the hazard and the length of time closed.
- Assessment of the number of City buildings damaged and whether the damage was minor, substantial, major, or if buildings were destroyed.
- Review of any changes in federal, state, and local policies to determine the impact of these policies on the City and how and if the policy changes can or should be incorporated into the LHMP.
- Review of the status of implementation of projects and actions (mitigation strategies) including projects completed will be noted. Projects behind schedule will include a reason for delay of implementation.

7.2.3. Incorporation into Existing Planning Mechanisms

Another important implementation mechanism that is highly effective and low-cost is incorporation of these 2023 LHMP recommendations and their underlying principles into other City plans and mechanisms. Where possible, the City will use existing plans and/or programs to implement hazard mitigation actions. As previously stated in Section 7.1 of this Plan, mitigation is most successful when it is incorporated into the day-to-day functions and priorities of government and development. The point is re-emphasized here. As described in this LHMP's capability assessment, the City already implements policies and programs to reduce losses to life and property from hazards. This LHMP builds upon the momentum developed through previous and related planning efforts and mitigation programs and recommends implementing actions, where possible, through these other program mechanisms. These existing mechanisms include:

- City General and strategic plans
- City Emergency Operations Plans (EOP), EOP Annexes, and other emergency management efforts
- City regulations, ordinances, and local amendments
- Flood/stormwater plans
- Capital improvement plans and budgets
- Other plans and policies outlined in the capability assessment
- Other plans, regulations, and practices with a mitigation focus

HMPC members involved in these other planning mechanisms will be responsible for integrating the findings and recommendations of this LHMP with these other plans, programs, etc., as appropriate. As described in Section 7.1 Implementation, incorporation into existing planning mechanisms will be done through the routine actions of:

- monitoring other planning/program agendas;
- attending other planning/program meetings;
- participating in other planning processes; and
- monitoring community budget meetings for other City program opportunities.

The successful implementation of this mitigation strategy will require constant and vigilant review of existing plans and programs for coordination and multi-objective opportunities that promote a safe, sustainable community.

Examples of incorporation of the LHMP into existing programs and planning mechanisms include:

1. As recommended by Assembly Bill 2140, the City should adopt (by reference or incorporation) this LHMP into the Safety Element of their General Plan. Evidence of such adoption (by formal, certified resolution) shall be provided to CAL OES and FEMA.
2. Integration of flood and stormwater actions identified in this mitigation strategy with the in-process City Stormwater Master Plan and program. Key people responsible for mitigation of the flood hazards in the City participated on the HMPC. City flood and drainage projects were identified and integrated into this LHMP. Actual implementation of these projects will likely occur through the City's new Stormwater Master Plan.
3. Integration of this LHMP into the City's future Climate Action Plan. It is anticipated that this LHMP will be used to inform the Climate Action Plan, also included as an action in this mitigation strategy,

and conversely risk and vulnerability data and climate adaptation strategies developed for the Climate Action Plan will be integrated into future updates of this LHMP for the City.

4. Use of the LHMP risk assessment and other information to update the hazard analysis in future updates of the City's Emergency Operations Plan, EOP Annexes, and other emergency planning efforts for the City (also a current mitigation action for the City).

Efforts should continuously be made to monitor the progress of mitigation actions implemented through these other program and planning mechanisms and, where appropriate, their priority actions should be incorporated into updates of this LHMP.

7.2.4. Continued Public Involvement

Continued public involvement is imperative to the overall success of this LHMP's implementation. The update process provides an opportunity to solicit participation from new and existing stakeholders and to publicize success stores from the plan implementation and seek additional public comment. The LHMP maintenance and update process will include continued public and stakeholder involvement and input through attendance at designated City meetings, web postings, press releases to local media, and through public hearings.

Public Involvement Process for Annual Reviews

The public will be noticed by placing an advertisement in the newspaper and other public locations specifying the date and time for the review and inviting public participation. The HMPC, local, state, and regional agencies will be notified and invited to attend and participate.

Public Involvement for Five-year Update

When the HMPC reconvenes for the update, they will coordinate with all stakeholders participating in the planning process—including those that joined the committee since the planning process began—to update and revise this LHMP. In reconvening, the HMPC will identify a public outreach strategy involving the greater public. The strategy will include a plan for public involvement and will be responsible for disseminating information through a variety of media channels detailing the LHMP update process. As part of this effort, public meetings will be held, and public comments will be solicited on the next LHMP Update draft.

In addition, continued public involvement and outreach efforts will place an emphasis on identifying and inviting representatives from underserved and vulnerable populations to be part of the next, 2029 City of Placentia LHMP Update. As a starting point the underserved and vulnerable population groups identified for this 2023 LHMP Update will be contacted to invite them to the 2029 LHMP Update process with additional groups identified and added to assist in meeting the ongoing goal of mitigation planning for the whole community.

Appendix A Planning Process

A.1 Lists of HMPC Invites/Stakeholders

A.1.1. LHMP Invite List

Name	Position	Department
City of Placentia		
Patrick Powers	Emergency and Health Services Manager	Administration
Janice Lee	GIS Technician	Development Services
Joel Cardenas	Public Works Superintendent	Public Works
Jason Dobine	Fire Chief	Fire and Life Safety Department
Amanda Horner	Fire Marshal	Fire
Crystal Adams	Sr. Management Analyst	Fire
David Radomski	Sergeant - IT/Special Projects	Police Department
Dan Pivaroff	Senior Code Enforcement Officer	Code Enforcement
Edgar Montelongo	Code Enforcement Officer	Code Enforcement
Jeannette Ortega	Economic Development Manager	Administration
Nicolette Vialpando	Communications and Marketing Analyst	Administration
Veronica Ortiz	Community Services Supervisor	Community Services
Felipe Zambrano	Sr. Community Services Coordinator	Community Services
Lesley Whittaker	Associate Planner	Development Services
Joe Lambert	Director of Development Services	Development Services
Andrew Gonzales	Senior Planner	Development Services
Ward Smith	Mayor	Mayor
Craig Green	–	–
Luis Estevez	Deputy City Administrator	Administration
Matthew Brand	Community Services Coordinator	Development Services
Orange County		
Matt Ankley	Emergency Management Specialist	OCTA
Stefani Waterman	–	OC Animal Care
Delcie Hynes	Emergency Coordinator	OC Social Services Agency
Ethan Brown	Senior Emergency Management Coord	OCEMD

Name	Position	Department
Beck Levin	Systems Change Advocate	Dayle McIntosh Center of Orange County
Other Agencies/Groups		
Victoria LaMar-Haas	Program Manager	Cal OES
Alison Kearns	Risk Analysis Branch Chief	FEMA Region IX
Valerie Laktash	Administrative Director of Operations	Placentia Linda Hospital
Yesenia Baltierra	Asst. Library Director	Placentia Library District
Cynthia Quimby	Government Relations Manager?	Southern California Edison
Tony Cardenas	Government Relations Manager	Southern California Edison
Clarissa Serpas	Governmental Liason	Southern California Gas
Rosanne Weston	Engineering Manager	Yorba Linda Water District
Reza Afshar	–	Yorba Linda Water District
Del Webb	–	Golden State Water District
Jason Sanchez	–	Burlington Northern Santa Fe
Shawn Blair	–	Burlington Northern Santa Fe
Craig Green	City Resident/(Former City Councilmember	City Resident
Walt Lynch	President	Placentia Chamber of Commerce
Christopher Pena	Emergency Management Coordinator	City of Yorba Linda
Jannine Wilmoth	Emergency Manager	City of Anaheim
Kristi Hofstetter Batiste	–	City of Fullerton
Lisa Keyworth	–	City of Brea
Anselmo Templado	Officer	California Highway Patrol
Mitch Howell	Officer	California Highway Patrol
Michael Johnson	–	Republic Services
Nick Polichetti	-	Streetscape and Transportation Commission
Maverick Shuck	Chairperson	Placentia Park Arts and Rec Commission
Monica Rusich	Program Manager	American Red Cross - OC

A.1.2. HMPC Participant List

Name	Position	Department
City of Placentia		
Patrick Powers	Emergency and Health Services Manager	Administration
Janice Lee	GIS Technician	Development Services

Name	Position	Department
Joel Cardenas	Public Works Superintendent	Public Works
Amanda Horner	Fire Marshal	Fire
Crystal Adams	Sr. Management Analyst	Fire
Dan Pivaroff	Senior Code Enforcement Officer	Code Enforcement
Edgar Montelongo	Code Enforcement Officer	Code Enforcement
Nicolette Vialpando	Communications and Marketing Analyst	Administration
Veronica Ortiz	Community Services Supervisor	Community Services
Joe Lambert	Director of Development Services	Development Services
Andrew Gonzales	Senior Planner	Development Services
Ward Smith	Mayor	Mayor
Craig Green	–	–
Luis Estevez	Deputy City Administrator	Administration
Matthew Brand	Community Services Coordinator	Development Services
Orange County		
Stefani Waterman	–	OC Animal Care
Ethan Brown	Senior Emergency Management Coord	OCEMD
Beck Levin	Systems Change Advocate	Dayle McIntosh Center of Orange County
Other Agencies/Groups		
Valerie Laktash	Administrative Director of Operations	Placentia Linda Hospital
Cynthia Quimby	Government Relations Manager?	Southern California Edison
Tony Cardenas	Government Relations Manager	Southern California Edison
Reza Afshar	–	Yorba Linda Water District
Craig Green	City Resident/(Former City Councilmember	City Resident
Christopher Pena	Emergency Management Coordinator	City of Yorba Linda
Jannine Wilmoth	Emergency Manager	City of Anaheim
Anselmo Templado	Officer	California Highway Patrol
Mitch Howell	Officer	California Highway Patrol
Jeanine Foster	Owner	Foster Morrison Consulting
Brenna Howell	Owner	Howell Consulting

A.2 Website for Hazard Mitigation Plan

A.3 Kickoff Meeting

A.3.1. Kickoff Meeting Invite to HMPC and Stakeholders

From: Patrick Powers <ppowers@placentia.org>
Sent: Tuesday, February 21, 2023 3:33 PM
To: Patrick Powers <ppowers@placentia.org>; Janice Lee <jlee@placentia.org>; Joel Cardenas <JCardenas@placentia.org>; David Radomski <DRadomski@placentia.org>; Daniel Pivaroff <dpivaroff@placentia.org>; Jeannette Ortega <JOrtega@placentia.org>; Nicolette Vialpando <nvialpando@placentia.org>; Veronica Ortiz <vortiz@placentia.org>; Lesley Whittaker <lwhittaker@placentia.org>; 'mankley@octa.net' <mankley@octa.net>; 'stefani.waterman@occr.ocgov.com' <stefani.waterman@occr.ocgov.com>; 'Delcie.Hynes@ssa.ocgov.com' <Delcie.Hynes@ssa.ocgov.com>; 'ETBrown@ocsheriff.gov' <ETBrown@ocsheriff.gov>; 'victoria.lamar-haas@caloes.ca.gov' <victoria.lamar-haas@caloes.ca.gov>; 'Alison.kearns@fema.dhs.gov' <Alison.kearns@fema.dhs.gov>; 'Valerie.Laktash@tenethealth.com' <Valerie.Laktash@tenethealth.com>; 'ybaltierra@placentialibrary.org' <ybaltierra@placentialibrary.org>; 'cynthia.quimby@sce.com' <cynthia.quimby@sce.com>; 'CSerpas@socalgas.com' <CSerpas@socalgas.com>; 'rweston@ylwd.com' <rweston@ylwd.com>; Webb, Del <delwebb@gswater.com>; 'jason.sanchez@BNSF.com' <jason.sanchez@BNSF.com>; 'shawn.blair2@BNSF.com' <shawn.blair2@BNSF.com>; 'craig-green@prodigy.neet' <craig-green@prodigy.neet>; 'waltlynch@lynchambulance.com' <waltlynch@lynchambulance.com>; 'cpena@yorbalindaca.gov' <cpena@yorbalindaca.gov>; 'Jwilmoth@anaheim.net' <Jwilmoth@anaheim.net>; 'Kristi.Hofstetterbatiste@fullertonfire.org' <Kristi.Hofstetterbatiste@fullertonfire.org>; 'lisak@cityofbrea.net' <lisak@cityofbrea.net>; 'anselmo.templado@chp.ca.gov' <anselmo.templado@chp.ca.gov>; 'mhowell@chp.ca.gov' <mhowell@chp.ca.gov>; 'michael.johnson2@republicservices.com' <michael.johnson2@republicservices.com>; 'npolichetti@gmail.com' <npolichetti@gmail.com>; 'mashuck1225@gmail.com' <mashuck1225@gmail.com>; 'monica.ruzich@redcross.org' <monica.ruzich@redcross.org>; Jason Dobine <jdobine@placentia.org>
Cc: Jeanine Foster <jeanine.foster@fostermorrison.com>; Chris Morrison <chris.morrison@fostermorrison.com>; Rosanna Ramirez <rramirez@placentia.org>; Joseph Lambert <jlambert@placentia.org>; Luis Estevez <lestevez@placentia.org>
Subject: City of Placentia - Local Hazard Mitigation Planning Committee Invite

City of Placentia LHMP: Kickoff meeting email invite

Greetings:

The City of Placentia is kicking off efforts to develop a Local Hazard Mitigation Plan (LHMP). The purpose of the LHMP development process is to help reduce the impacts of natural hazards to the citizens, property, and critical infrastructure in the City. The Disaster Mitigation Act of 2000 (DMA 2000) requires that local governments have a FEMA-approved LHMP in place to be eligible for certain pre- and post-disaster mitigation funding to protect communities from future disaster-related losses.

You are receiving this notice because we would like to invite you to take part in the LHMP development process as a member of the Hazard Mitigation Planning Committee (HMPC).
City, agency, and stakeholder participation and coordination is a requirement of an approved plan, as is the inclusion of any hazard data, information, and mitigation projects your department or agency considers important to the development of the LHMP. Thus, your input will be critical to the success of this project. Participation includes:

- Attending and participating in the HMPC meetings (5 anticipated over the next 9 months)

- Providing available data/information requested of the HMPC
- Reviewing and providing comments on the plan drafts

City of Placentia, Emergency and Health Services Manager, is taking the lead on coordinating this project for the City. A project kickoff meeting of the HMPC will be held at the following time and location:

March 9, 2023 (Thursday), 1:30 - 4:00 pm
City of Placentia Council Chambers
401 E. Chapman Ave.
City of Placentia, CA 92870

The kickoff meeting will explain the LHMP development process and how you can be involved. Please RSVP and plan on attending or delegating attendance to this important meeting.

Thank you,
Patrick Powers

Patrick Powers | Emergency and Health Services Manager | Administration
City of Placentia | 401 E. Chapman Ave. Placentia, CA 92870
☎ (714) 993-8214 | ✉ ppowers@placentia.org

A.3.2. Kickoff Meeting Agenda

CITY OF PLACENTIA
LOCAL HAZARD MITIGATION PLAN (LHMP)
HMPC MEETING #1
March 9, 2023

1. Introductions
2. Hazard Mitigation & the Disaster Mitigation Act Planning Requirements
3. The Role of the Hazard Mitigation Planning Committee (HMPC)
4. Planning for Public Input
5. Coordinating with other Agencies
6. Hazard Identification
7. Schedule
8. Data Needs
9. Questions and Answers

A.3.3. Kickoff Meeting Sign-in Sheet

SIGN-IN SHEET
City of Placentia
LOCAL HAZARD MITIGATION PLANNING PROJECT
HMPC Kickoff Meeting #1
March 9, 2023

Name/Title	Email Address	Phone	Department/Organization/ Affiliation
Stefani Waterman	stefani.waterman@ocpw.ocgov.com	714- 796-4943	OC Animal Care
Tony Cardenas	tony.cardenas@sce.com	(714) 994-4023	Southern California Edison
Brenna Harwell	brenna@brennaharwell.com	916 202 2635	Brenna Harwell Energy Management
ANSELMO TEMPLADO	ANSELMO.TEMPLADO@CHP.CA.GOV	714-358-5500	CHP
MITCH HOWELL	MHOWELL@CHP.CA.GOV	714-338-5500	CHP Santa Ana
Jannine Wilmoth	JWilmoth@anaheim.net	714-296-5161	Anaheim Fire
Christopher Peña	cpena@yorbalindca.gov	714 961 7118	Yorba Linda EM
Valerie Lakitsch	valerie.lakitsch@tonetheatth.com	714 532 6397	Placentia Linda Hosp
Cristal Adamny	cadamny@placentia.org	714 993 8249	Placentia Fire
MONTELONGO EDGAR	emontelongo@placentia.org	714 993 8175	Code enforcement
Daniel Pimentel	DRivadeneira@placentia.org	714 993 8173	Sr. Code enforcement
Felix Zavaleta	fzavaleta@placentia.org	714 993-8233	Comm. Serv
Joe Lambert	JLambert@placentia.org	993-8234	Dev. Serv. / Planning
Ethan Brown	ETBrown@ocsheriff.gov	714-628-7043	OCSD - END

SIGN-IN SHEET
City of Placentia
LOCAL HAZARD MITIGATION PLANNING PROJECT
HMPC Kickoff Meeting #1
March 9, 2023

Name/Title	Email Address	Phone	Department/Organization/ Affiliation
Patrick Powers Emergency Health Mgr	ppowers@placentia.org	714 458-7350	Admin City of Placentia
Jeanine Foster, PM	jeanine.foster@fostermorrison.com	303-717-7171	Foster Morrison

A.4 Risk Assessment Meeting

A.4.1. Emailed Invite to Risk Assessment Meeting

From: Patrick Powers <ppowers@placentia.org>
Sent: Monday, April 10, 2023 11:01 AM
To: Janice Lee <jlee@placentia.org>; Joel Cardenas <JCardenas@placentia.org>; David Radomski <DRadomski@placentia.org>; Daniel Pivaroff <dpivaroff@placentia.org>; Jeannette Ortega <JOrtega@placentia.org>; Nicolette Vialpando <nvialpando@placentia.org>; Veronica Ortiz <vortiz@placentia.org>; Lesley Whittaker <lwhittaker@placentia.org>; 'mankley@octa.net' <mankley@octa.net>; 'stefani.waterman@occr.ocgov.com' <stefani.waterman@occr.ocgov.com>; 'Delcie.Hynes@ssa.ocgov.com' <Delcie.Hynes@ssa.ocgov.com>; 'ETBrown@ocsheriff.gov' <ETBrown@ocsheriff.gov>; 'victoria.lamar-haas@caloes.ca.gov' <victoria.lamar-haas@caloes.ca.gov>; 'Alison.kearns@fema.dhs.gov' <Alison.kearns@fema.dhs.gov>; 'Valerie.Laktash@tenethealth.com' <Valerie.Laktash@tenethealth.com>; 'ybaltierra@placentialibrary.org' <ybaltierra@placentialibrary.org>; 'cynthia.quimby@sce.com' <cynthia.quimby@sce.com>; 'CSerpas@socalgas.com' <CSerpas@socalgas.com>; 'rweston@ylwd.com' <rweston@ylwd.com>; Webb, Del <delwebb@gswater.com>; 'jason.sanchez@BNSF.com' <jason.sanchez@BNSF.com>; 'shawn.blair2@BNSF.com' <shawn.blair2@BNSF.com>; 'craig-green@prodigy.neet' <craig-green@prodigy.neet>; 'waltlynch@lynchambulance.com' <waltlynch@lynchambulance.com>; 'cpena@yorbalindaca.gov' <cpena@yorbalindaca.gov>; 'Jwilmoth@anaheim.net' <Jwilmoth@anaheim.net>; 'Kristi.Hofstetterbatiste@fullertonfire.org' <Kristi.Hofstetterbatiste@fullertonfire.org>; 'lisak@cityofbrea.net' <lisak@cityofbrea.net>; 'anselmo.templado@chp.ca.gov' <anselmo.templado@chp.ca.gov>; 'mhowell@chp.ca.gov' <mhowell@chp.ca.gov>; 'michael.johnson2@republicservices.com' <michael.johnson2@republicservices.com>; 'npolichetti@gmail.com' <npolichetti@gmail.com>; 'mashuck1225@gmail.com' <mashuck1225@gmail.com>; 'monica.ruzich@redcross.org' <monica.ruzich@redcross.org>; Edgar Montelongo <emontelongo@placentia.org>; Crystal Adams <cadams@placentia.org>; Felipe Zambrano <FZambrano@placentia.org>; Joseph Lambert <jlambert@placentia.org>; Ward L. Smith <WSmith@placentia.org>; 'tony.cardenas@scc.com' <tony.cardenas@scc.com>; 'blevin@daylemc.org' <blevin@daylemc.org>; Andrew Gonzales <agonzales@placentia.org>; Amanda Horner <ahorner@placentia.org>
Cc: Rosanna Ramirez <rramirez@placentia.org>; Luis Estevez <lestevez@placentia.org>; Jeanine Foster <jeanine.foster@fostermorrison.com>; Chris Morrison <chris.morrison@fostermorrison.com>; 'brenna@brennahowell.com' <brenna@brennahowell.com>
Subject: Placentia Local Hazard Mitigation Planning Committee Invite - May 10th, 2023

Hello City of Placentia Hazard Mitigation Planning Committee:

You are invited to attend the 2nd Hazard Mitigation Planning Committee (HMPC) Meeting for the development of the City of Placentia's 2023 Local Hazard Mitigation Plan (LHMP):

Placentia HMPC Meeting #2 – Risk Assessment Meeting:
Wednesday, May 10, 2023
1:30 - 4:30 pm
City of Placentia Council Chambers
401 E. Chapman Ave.
City of Placentia, CA 92870

Earlier this year, Placentia initiated the development of an LHMP for the City. Many of you attended the HMPC kickoff meeting in early March. Since the kickoff meeting, the Foster Morrison team and City staff have been working to collect data to develop Chapter 4 of the LHMP, the Risk Assessment Chapter.

Please RSVP to me and plan on participating (or delegating your participation). The City appreciates your ongoing participation and input.

Thanks everyone!

Patrick Powers

Patrick Powers | Emergency and Health Services Manager | Administration
City of Placentia | 401 E. Chapman Ave. Placentia, CA 92870
☎ (714) 993-8214 | ✉ ppowers@placentia.org

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A.4.2. Risk Assessment Meeting Agenda

CITY OF PLACENTIA
Local Hazard Mitigation Plan (LHMP) Update
Risk Assessment Meeting
May 10, 2023

1. Introductions
2. Status of the DMA Planning Process
3. Review (and discussions/input) of the Risk Assessment
4. Open Discussion and Input on the Risk Assessment (Handout)
5. Review of Data Needs
6. Next Steps

SIGN-IN SHEET
City of Placentia
LOCAL HAZARD MITIGATION PLANNING PROJECT
HMPC Risk Assessment Meeting #2
May 10, 2023

Name/Title	Email Address	Phone	Department/Organization/ Affiliation
PATRICK POWERS Emerg Health	ppowers@placentia.org	714 458-7350	City of Placentia
Reza Afshar, Senior Engineer	rafshar@YLWD.com	714-701-3106	Yorba Linda water District
Joel Cardenas PW Supervisor	JCardenas@placentia.org	714 993-8154	City of Placentia
CRAIG S. GREEN	CGREEN@PLACENTIA.ORG	714 222-8603	Resident
Beck Levin	blevin@daylemc.org	714-621-3300x340	Dayle McIntosh Ctr
Amanda Horner, FM	ahorner@placentia.org	714-993-8246	City of Placentia Fire & Life Safety
Stefani Waterman	Stefani.waterman@ocgov.com	714-796-6463	OC Animal Care
Janice Lee	jlee@placentia.org		City of Placentia
ANDREW GONZALES	AGONZALES@PLACENTIA.ORG	714 993-8218	CITY OF PLACENTIA - DSD
Nicolette Vialpando	nvialpando@placentia.org	714 993 8107	COP - DS/ Admin
Ethan Brown	ETBrown@ocsheriff.gov	714-628-3028	OCSD - EM
Joe Lambert	JLambert		COP- Dev. Serv.
Matthew Brand	mbrand@placentia.org	714-993-8243	COP- Community Services
Veronica Ortiz	VOrtiz@placentia.org	714-993-8222	Community Services

SIGN-IN SHEET
City of Placentia
LOCAL HAZARD MITIGATION PLANNING PROJECT
HMPC Risk Assessment Meeting #2
May 10, 2023

Name/Title	Email Address	Phone	Department/Organization/ Affiliation
CHRIS PEÑA EMERG MGR	CPENA@YORBALINDACA.GOV YORBA	714961-7118	CITY OF YORBA LINDA

A.5 Mitigation Strategy Meetings

A.5.1. Email Invites to Mitigation Strategy Meetings

From: Jeanine Foster <jeanine.foster@fostermorrison.com>
Sent: Thursday, June 22, 2023 3:57 PM
To: Jeanine Foster; Patrick Powers; Janice Lee; Joel Cardenas; David Radomski; Daniel Pivaroff; Jeannette Ortega; Nicolette Vialpando; Veronica Ortiz; Lesley Whittaker; mankley@octa.net; stefani.waterman@occr.ocgov.com; Delcie.Hynes@ssa.ocgov.com; ETBrown@ocsheriff.gov; victoria.lamar-haas@caloes.ca.gov; Alison.kearns@fema.dhs.gov; Valerie.Laktash@tenethealth.com; ybaltierra@placentialibrary.org; cynthia.quimby@sce.com; CSerpas@socalgas.com; Webb, Del; jason.sanchez@BNSF.com; shawn.blair2@BNSF.com; craig-green@prodigy.neet; waltlynch@lynchambulance.com; cpena@yorbalindaca.gov; Jwilmoth@anaheim.net; Kristi.Hofstetterbatiste@fullertonfire.org; lisak@cityofbrea.net; anselmo.templado@chp.ca.gov; mhowell@chp.ca.gov; michael.johnson2@republicservices.com; npolichetti@gmail.com; mashuck1225@gmail.com; monica.ruzich@redcross.org; Edgar Montelongo; Felipe Zambrano; Joseph Lambert; Ward L. Smith; tony.cardenas@scc.com; blevin@daylemc.org; Andrew Gonzales; Amanda Horner; RAfshar@ylwd.com; johndrogers@tenethealth.com; Craig Green; Matt Brand
Cc: Chris Morrison; Brenna Howell
Subject: Placentia LHMP: Mitigation Strategy Meeting (1 of 2)
When: Tuesday, July 11, 2023 2:30 PM-5:30 PM (UTC-07:00) Mountain Time (US & Canada).
Where: City of Placentia, Front Community Room; 401 E. Chapman Ave.; City of Placentia, CA 92870

EMAIL FROM EXTERNAL SOURCE: Don't reply, click on a link or open an attachment unless you recognize the sender and know the content to be safe. If you believe this email to be unsafe, please use the Report Phish button in Outlook to notify the IT department.

All,

You are invited to the 3rd and 4th planning committee meetings for the development of the City of Placentia's Local Hazard Mitigation Plan (LHMP). The City kicked-off its hazard mitigation planning effort with a Kickoff meeting in March of 2023. A second, risk assessment meeting was held in early May.

These upcoming meetings will begin the most important phase of our LHMP planning process – the Mitigation Strategy. During the first meeting, we will be briefly revisiting the risk assessment data developed to date and will be establishing LHMP goals and objectives. During the second meeting, we will be working to identify and evaluate potential mitigation actions and projects for reducing the community's risk and vulnerability to identified hazards and disasters.

The meetings will be held as follows:

July 11, 2023 (Tuesday) 1:30 - 4:00 pm
July 12, 2023 (Wednesday) 9:00 - 12:00 pm
City of Placentia, Front Community Room
401 E. Chapman Ave.
City of Placentia, CA 92870

Note: These are not duplicate meetings, please plan on attending both days.

Prep for these working meetings:

1. **Identify and bring your mitigation project ideas to the meetings!**
   Please make sure everyone attends that has mitigation actions and projects to include in the LHMP for all identified priority hazards.

2. **Attached is a FEMA publication – Mitigation Ideas**
   Take a look – it is easy to skim through and will give you mitigation ideas, by hazard. What fits for the City of Placentia?

Please RSVP and plan on attending or delegating attendance to these important meetings. **Everyone with mitigation project ideas should attend.** City and agency participation and coordination is a requirement of an approved plan, as is the inclusion of any hazard data, information, and mitigation projects your department or agency may want to see included in the plan. Your continued participation and input is critical to the success of this project.

Thank You!

Jeanine Foster
Foster Morrison Consulting
(303) 717-7171

A.5.2. Mitigation Strategy Meeting Agenda

City of Placentia
Local Hazard Mitigation Plan (LHMP) Update
Mitigation Strategy Meetings
July 11th and 12th 2023

HMPC Meeting #3:

1. Introductions
2. LHMP Project Status and Next Steps/Timeline
3. Priority Hazards Review
4. Develop Plan Goals and Objectives
5. Introduction to HMPC Meeting #4: Mitigation Alternatives/Actions/Projects

HMPC Meeting #4:

1. Introductions
2. Review Mitigation Categories and Selection Criteria
3. Brainstorming of Mitigation Alternatives/Actions/Projects by Hazard
4. Review of Voting Process for Prioritization of Mitigation Actions/Projects
5. Questions

SIGN-IN SHEET
City of Placentia
LOCAL HAZARD MITIGATION PLANNING PROJECT
HMPC Mitigation Strategy Meeting #3
July 11, 2023

Name/Title	Email Address	Phone	Department/Organization/ Affiliation
Reza Afshar - Senior Eng.	rafshar@YLWD.com	714-701-3106	YLWD
Matt Brand Coordinator	mbrand@placentia.org	714-993-8232	Placentia
PATRICK POWERS	ppowers@placentia.org	714 458-7350	Placentia
WARD SMITH	WSMITH@PLACENTIA.ORG	714-448-9429	PLACENTIA
CRAIG S GREEN	CRAIG.S.GREEN@SCE.COM	714 222-8649	SCE/EDISON
Joel Cardenas	JCardenas@placentia.org	714 920-8987	Placentia
Nicolette Vialpando	nvialpando@placentia.org	714-993-8107	City
Cynthia Quinby	cynthia.quinby@sce.com	949-988-9709	SCE
Joe Lambert	JLambert@placentia.org	714-993-8234	Placentia
Jeanine Foster	jeanine.foster@fostermorrison.com	303 717-7171	Foster Morrison
Brenna Howell	brenna@brennahowell.com	916 207-2635	Howell Consulting

SIGN-IN SHEET
City of Placentia
LOCAL HAZARD MITIGATION PLANNING PROJECT
HMPC Mitigation Strategy Meeting #4
July 12, 2023

Name/Title	Email Address	Phone	Department/Organization/ Affiliation
Reza Afshar - Senior Eng.	rafshar@ylwd.com	714-701-3106	YLWD
Stefanii Watermann	Stefani.watermann@ocer.ocgov.com	714 796-6463	OC Animal Care
Chris Pena	CPENA@YORBALINDACA.GOV	714 961-7118	City of Yorba Linda
Craig S. Green	Craig-Greene Prodigy.net	714 222-8603	Resident & Placentia
Nicolette Vialpando	nvialpando@placentia.org	714 993-8107	City of Placentia
Matthew Brand	mbrand@placentia.org	714-993-8232	City of Placentia
Patrick Powers	ppowers@placentia.org	714 993-8214	City of Placentia
Joe Lambert	JLambert@placentia.org	714 993.8234	" " "
Ward Smith	WSMITH@PLACENTIA.ORG	714-448-9429	" " "
Brenna Howell	brenna@brennahowell.com	916 207-2635	HowellConsulting

A.6 Final HMPC Meeting

A.6.1. Final HMPC Meeting Invite

From: Jeanine Foster <jeanine.foster@fostermorrison.com>
Sent: Wednesday, October 18, 2023 12:22 PM
To: Jeanine Foster; ppowers@placentia.org; jlee@placentia.org; jcardenas@placentia.org; dradomski@placentia.org; dpivaroff@placentia.org; jortega@placentia.org; nvialpando@placentia.org; vortiz@placentia.org; lwhittaker@placentia.org; mankley@octa.net; stefani.waterman@occr.ocgov.com; Delcie.Hynes@ssa.ocgov.com; ETBrown@ocsheriff.gov; victoria.lamar-haas@caloes.ca.gov; Alison.kearns@fema.dhs.gov; Valerie.Laktash@tenethealth.com; ybaltierra@placentialibrary.org; cynthia.quimby@sce.com; CSerpas@socalgas.com; delwebb@gswater.com; jason.sanchez@BNSF.com; shawn.blair2@BNSF.com; waltlynch@lynchambulance.com; cpena@yorbalindaca.gov; Jwilmoth@anaheim.net; Kristi.Hofstetterbatiste@fullertonfire.org; lisak@cityofbrea.net; anselmo.templado@chp.ca.gov; mhowell@chp.ca.gov; michael.johnson2@republicservices.com; npolichetti@gmail.com; mashuck1225@gmail.com; monica.ruzich@redcross.org; emontelongo@placentia.org; fzambrano@placentia.org; jlambert@placentia.org; wsmith@placentia.org; tony.cardenas@scc.com; blevin@daylemc.org; agonzales@placentia.org; ahorner@placentia.org; RAfshar@ylwd.com; cgreen@placentia.org; mbrand@placentia.org; craig-green@prodigy.net
Cc: Chris Morrison; Brenna Howell; Nicolette Drulias
Subject: Placentia LHMP: Final Meetings and Input on the Draft Plan
When: Thursday, November 2, 2023 10:00 AM-12:30 PM (UTC-07:00) Mountain Time (US & Canada).
Where: City of Placentia City Hall, Front Community Room, 401 East Chapman Ave.

All,

Please see below information on the final steps for the City of Placentia LHMP:

LHMP Public Review Draft and Public Meeting. The LHMP Public Review Draft is up on the City website for public review and comment at: https://www.placentia.org/1035/Local-Hazard-Mitigation-Plan. A hard copy of the LHMP has also been placed for review at the City Clerk Recorders front counter at Placentia City Hall. **A public meeting on the Draft LHMP will be held Wednesday, November 1 from 5:30-7:00 pm at the City of Placentia City Hall**, **Front Community Room**, 401 E. Chapman Ave. A press release and other outreach is being issued by the City. Please help get the word out to the public.

Final HMPC Meeting. Our **final planning committee meeting is scheduled for Thursday November 2 from 9 – 11:30, at the same location, City of Placentia City Hall, Front Community Room**. It is important that everyone attend this final meeting to address any public comments received and to finalize all input to the LHMP.

Final LHMP Input. All final planning committee (and public and stakeholder) input on the Draft LHMP needs to be provided no later than November 9, 2023. Please take time to download and review the document from the City website.

There are several options for providing comments on the LHMP Public Review Draft:

- Email comments to Jeanine.foster@fostermorrison.com or ppowers@placentia.org
- Drop off written comments or send by mail to: City of Placentia, Administration Department, Attn. Patrick Powers, 401 E. Chapman Ave. Placentia, CA 92870
- Bring comments to the public or planning committee meeting

If you have any questions, please contact me at Jeanine.foster@fostermorrison.com or Patrick Powers at ppowers@placentia.org.

Thank you for your continued engagement in the process.

Jeanine Foster
Foster Morrison Consulting
(303) 717-7171

A.6.2. Final HMPC Meeting Agenda

AGENDA
City of Placentia
Local Hazard Mitigation Plan Update
Final HMPC Meeting
November 2, 2023

1. Introductions
2. Status of the LHMP Update Process
3. Addressing Public Comments
4. Final HMPC Input: Outstanding Items
5. Final Steps

SIGN-IN SHEET
City of Placentia
LOCAL HAZARD MITIGATION PLANNING PROJECT
HMPC Final Meeting #5
November 2, 2023

Name/Title	Email Address	Phone	Department/Organization/ Affiliation
CRAIG S. GREEN	CGREEN @PLACENTIA.ORG	714 222 8603	City Resident
Beck Levin	blevin@daylemc.org	7146213300	DMC
DANIEL PIVARNOFF	DPIVARNOFF@PLACENTIA.ORG	7149938173	Dev. Svs.
Randy Eaby	READY @placentia.org	714 993-8126	Dev. Svs.
STEPHEN JOHNSON	SJOHNSON@PLACENTIA.ORG	714 993 8175	DEV. SVS.
PATRICK POWERS	PPOWERS@placentia.org	714 993 8214	City of Plac
Joel Cardenas	JCardenas@Placentia.org	714-993-8154	City of Placentia
Jamie Lee.	jLee@placentia.org		Dev. Serv.
Joe Lambert	JLambert@placentia.org		Dev. Serv.
Jeanine Foster	jeanine.foster@fosterMorrison.com	303 717-7171	Foster Morrison

A.7 Public Involvement

A.7.1. Public Meeting #1 Press Release

City of Placentia
Press Release

For Immediate Release
February 22, 2023

Contact: Damien R. Arrula
City Administrator
(714) 993-8171
administration@placentia.org

CITY OF PLACENTIA LOCAL HAZARD MITIGATION PLAN: KICKOFF MEETING
PUBLIC MEETING #1

PLACENTIA, CA – The City of Placentia is developing a 2023 Local Hazard Mitigation Plan (LHMP). Floods, earthquakes, fires, and severe weather are just a few of the hazards of concern to the City. While natural hazards such as these cannot be prevented, an LHMP forms the foundation for a community's long-term strategy to reduce disaster losses by breaking the repeated cycle of disaster damage and reconstruction. In addition, communities with a FEMA-approved LHMP are eligible to apply for both pre-and post-disaster mitigation grant funding and are better positioned to respond and recover when disasters occur.

The people most aware of potential hazards are the people that live and work in the affected community. Therefore, in addition to plan participation by local, state, and federal agencies, the City is seeking members of the public to participate in our LHMP development process.

No background or expertise is required. The City encourages attendance and participation by the public at the upcoming LHMP Planning Committee and Public Meetings to kick off the project.

Planning Committee Kickoff Meeting
March 9, 2023 (Thursday)
1:30 – 4:00 pm

Public Information Kickoff Meeting
March 9, 2023 (Thursday)
5:30 – 7:00 pm

Both meetings will be held in the City of Placentia Council Chambers 401 E. Chapman Avenue, Placentia, CA 92870.

For more information, contact Patrick Powers at (714) 993-8214 or ppowers@placentia.org.

--END—

A.7.2. Public Meeting #1 in the City Administrator's Weekly Briefing

PLACENTIA, CA

City Administrator's
Weekly Briefing

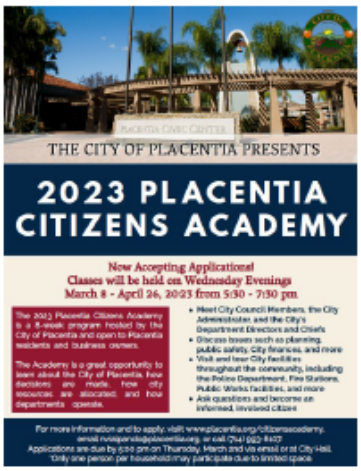
From: *Damien R. Arrula*

February 23, 2023

"Rich Heritage, Bright Future"

ADMINISTRATION DEPARTMENT

Apply Today for the 2023 Placentia Citizens Academy



The City is excited to announce the start of the next Citizens Academy! The Placentia Citizens Academy will be an eight-week educational program designed to empower residents and business owners in learning more about the City, including how our City governance works, how decisions are made, learning about how City resources are allocated, as well as understanding how departments operate and learn about the magic of the operations behind the scenes.

Participants will tour City facilities, ask questions, and become more informed and involved citizens. The Citizens Academy will begin on March 8th and run every Wednesday from 5:30 pm - 7:30 pm through April 26th.

To participate, you must be a Placentia resident or business owner and be 18 years of age or older. For more information and to apply, please click here. The City is accepting applications through **Thursday, March 2nd at 5:00 pm.**

E-Waste Recycle Events

The Placentia Chamber is pleased to announce their upcoming e-Waste Recycling Event on Saturday, March 4th and Sunday, March 5th from 9:00 am—3:00 pm at the Placentia Town Center. All proceeds from the events go to the PYLUSD Grant Program to enhance the budgets of local Placentia/Yorba Linda classrooms.

They will take anything with a screen or a cord. All computer components (printers, keyboard, mouse, etc.), laptop batteries, stereos, speakers, vacuums, satellite dish/boxes, small appliances. CDs, DVDs, lamps, ceiling fans, Christmas lights, power tools and their batteries, lawnmowers, and more. Most things that plug into an outlet will be accepted.

Service charges for major appliances will include: $10 - Microwaves, Cooling Units (Water Dispensers, Air Conditioners, Personal Refrigerators) $20 - Water Heaters, Exercise Equipment (Treadmills, Stationary Bikes, Ellipticals) $30 - Washing Machines, Dryers, Dishwashers, Stoves.

$40 - Refrigerators (Standard 2-3 doors). Light bulbs and household batteries will not be accepted.

Get the iPlacentia App:

App Store | Google Play

Follow us on Social Media:

Upcoming Meetings and Events

2/27/23	Placentia Community Foundation
2/28/23	Historical Committee
3/7/23	City Council Meeting
3/8/23	Senior Advisory Committee
3/9/23	Local Hazard Mitigation Plan Meeting

For additional information or questions about this Weekly Briefing, please email: CAWeekly@placentia.org

ADMINISTRATION DEPARTMENT

Purchase a Legacy Brick Today

The City is partnering with the Community Foundation to create an opportunity for the community to invest in a one-of-a-kind historic project by incorporating legacy brick dedication program into the restoration of the Kraemer Park Memorial Fountain. The City and the Foundation are selling personalized commemorative bricks as part of this legacy project. The deadline to purchase a brick has been extended through March. For questions about the Legacy Brick Program, visit www.placentia.org/legacybrick or contact (714) 993-8232.

Apply for a Job with the City of Placentia

The City is currently hiring for a variety of jobs. At the City of Placentia, we strive to make a difference by continually developing our progressive and innovative workforce. Our team works together to foster an environment that promotes diversity, creativity, and respect for everyone's opinions to ensure a better result for the community we serve. If you are interested in a public sector career with an established agency dedicated to improving the way its employees work, develop, and thrive, a position with us would be an excellent opportunity for you. Don't wait; apply today! For more information on open positions, please visit www.placentia.org/jobs.

Emergency Program for Asian Citrus Psyllid and Huanglongbing

CITRUS PEST & DISEASE PREVENTION DIVISION
CALIFORNIA DEPARTMENT OF FOOD AND AGRICULTURE

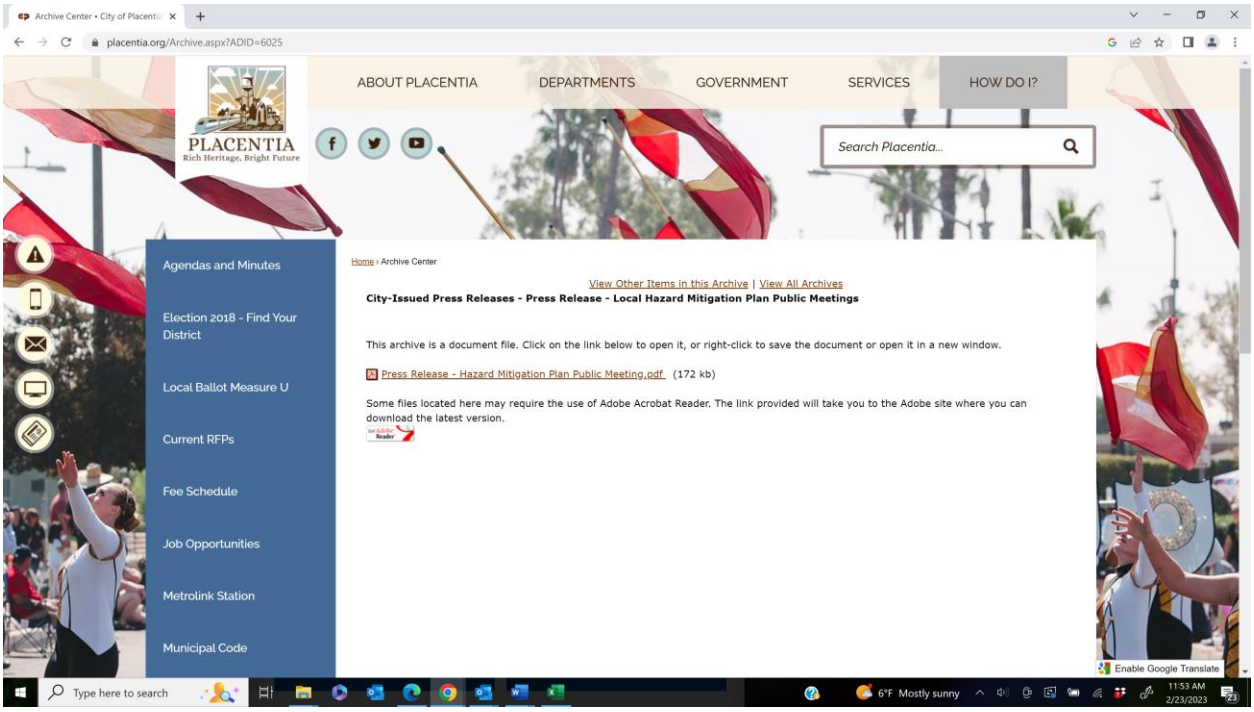
Between January 6, 2023 and January 27, 2023, the California Department of Food and Agriculture (CDFA) confirmed the presence of the causative bacterial agent of the citrus disease huanglongbing (HLB) in citrus tree tissue and the insect vector, Asian citrus psyllid (ACP), Diaphorina citri Kuwayama. Citrus tree tissues and insect vectors were collected in the cities and communities of Anaheim, Brea, Buena Park, Fullerton, Garden Grove, Huntington Beach, La Habra, Orange, Placentia, Santa Ana, Westminster and Yorba Linda in Orange County. HLB is a devastating disease of citrus and is spread by ACP as they feed on host plants. Unless emergency action is taken to remove sources of the HLB inoculum and disrupt the ACP life cycle, there is high potential for sudden future detections of ACP in Orange County and transmission of HLB to other areas. Residents of affected properties shall be invited to a public meeting or contacted directly by CDFA staff. Consultation with the California Department of Pesticide Regulation, the Office of Environmental Health Hazard Assessment, and the county agricultural commissioner's office will be provided at the public meeting or upon request to address residents' questions and concerns. Residents will be notified in writing at least 48 hours in advance of any treatment. For any questions related to this program, call (800) 491-1899 for assistance.

Local Hazard Mitigation Plan—Community Meeting

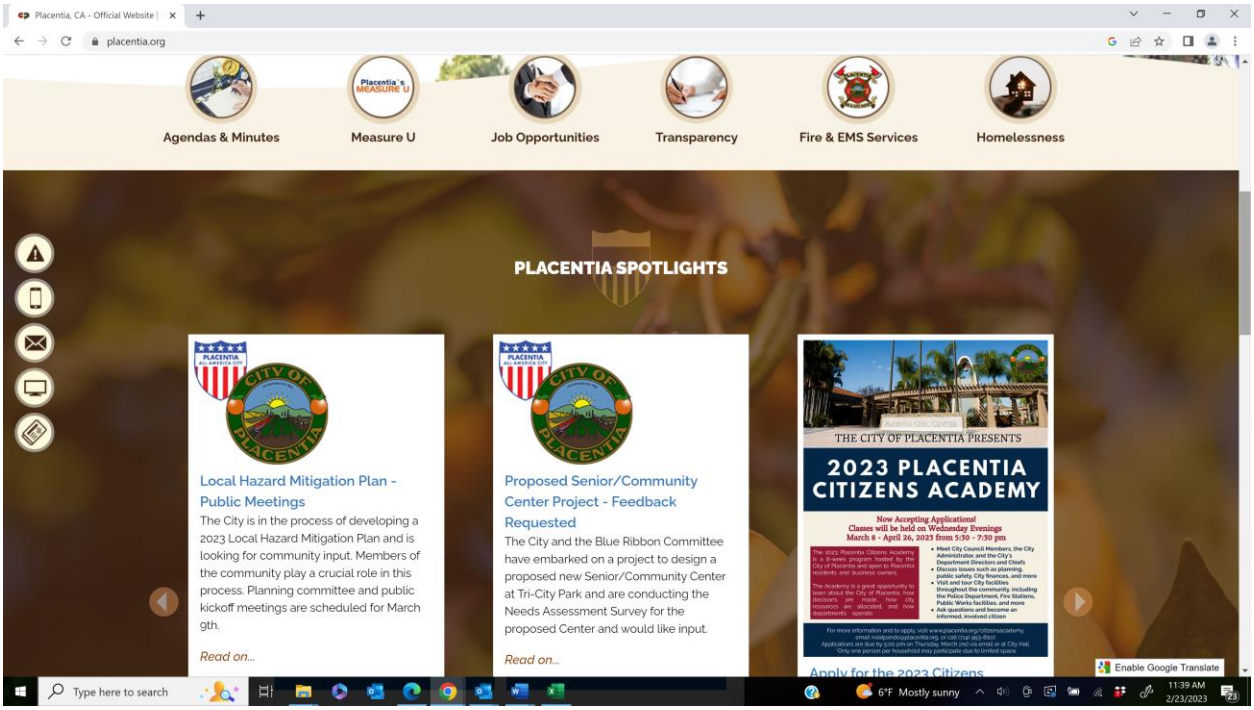
The City is in the process of developing a 2023 Local Hazard Mitigation Plan (LHMP) and is looking for community input. The LHMP is being developed by a Hazard Mitigation Planning Committee (HMPC) comprised of representatives from various City departments, neighboring jurisdictions, key federal, state, and local agency stakeholders, and the public. The LHMP will address hazards of concern to the City, assess the likely impacts of these hazards to the people and assets of the City of Placentia planning area, and establish goals and prioritize projects to reduce the impacts of future disasters on people and property as well as to critical facilities and infrastructure.

Members of the community play a crucial role in this process. Planning committee and public kickoff meetings are scheduled for Thursday, March 9, 2023. Please see the City's LHMP webpage at www.placentia.org/lhmp for more information on meeting times and locations. All interested stakeholders and members of the public are welcome to attend. For more information on this project and how to be involved, contact Patrick Powers at (714) 993-8214 or ppowers@placentia.org.

A.7.3. Public Meeting #1 Press Release on City Website

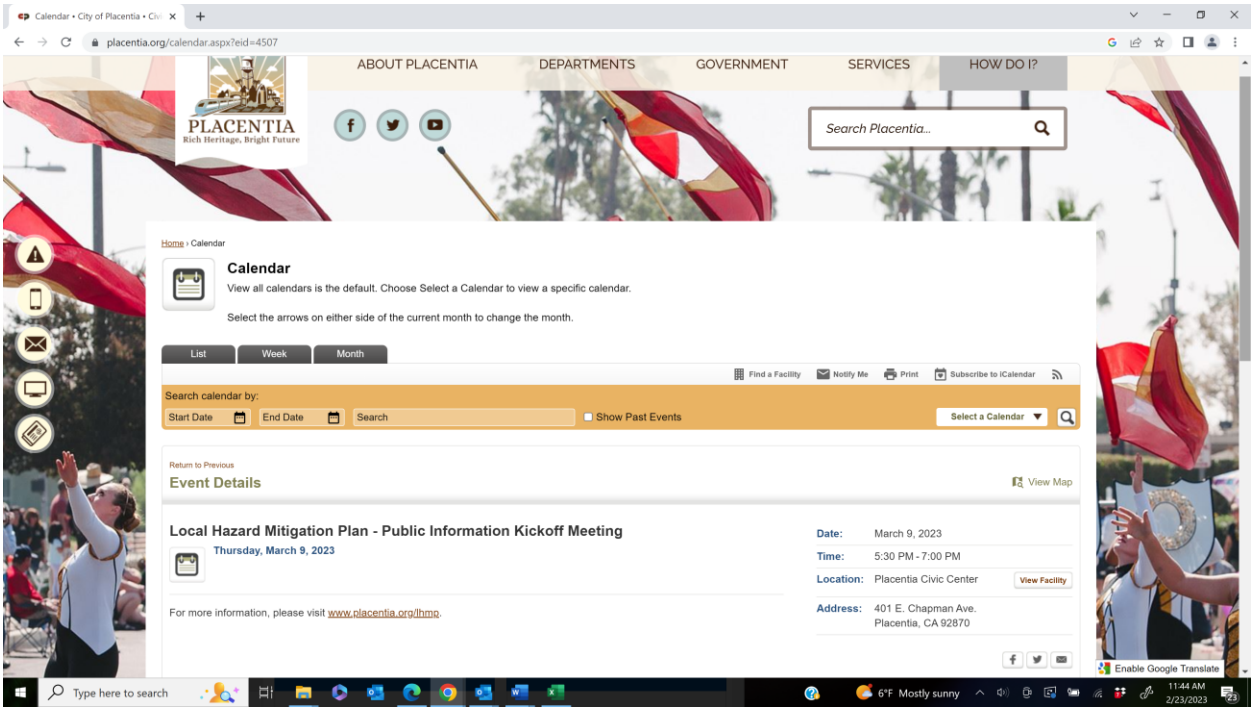


A.7.4. Public Meeting #1 Notice for LHMP Planning Process and Kickoff Meeting

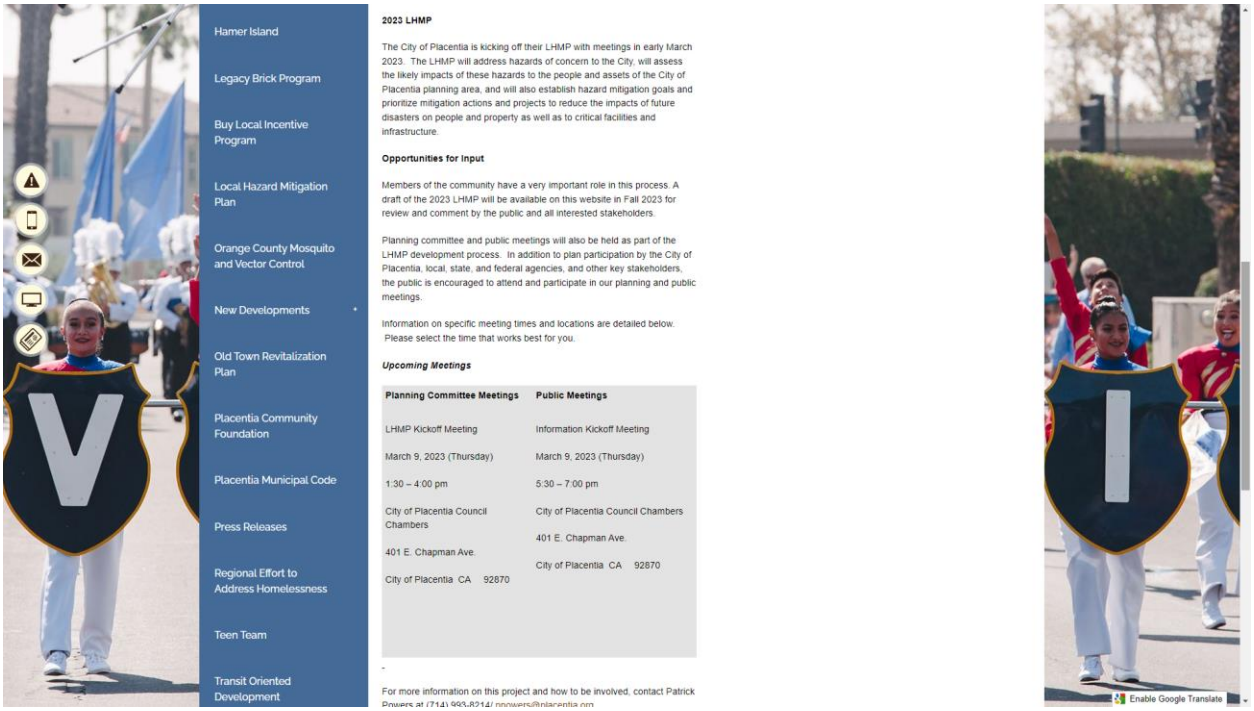


Source: City of Placentia website

A.7.5. Public Meeting #1 Notice on City Website Calendar

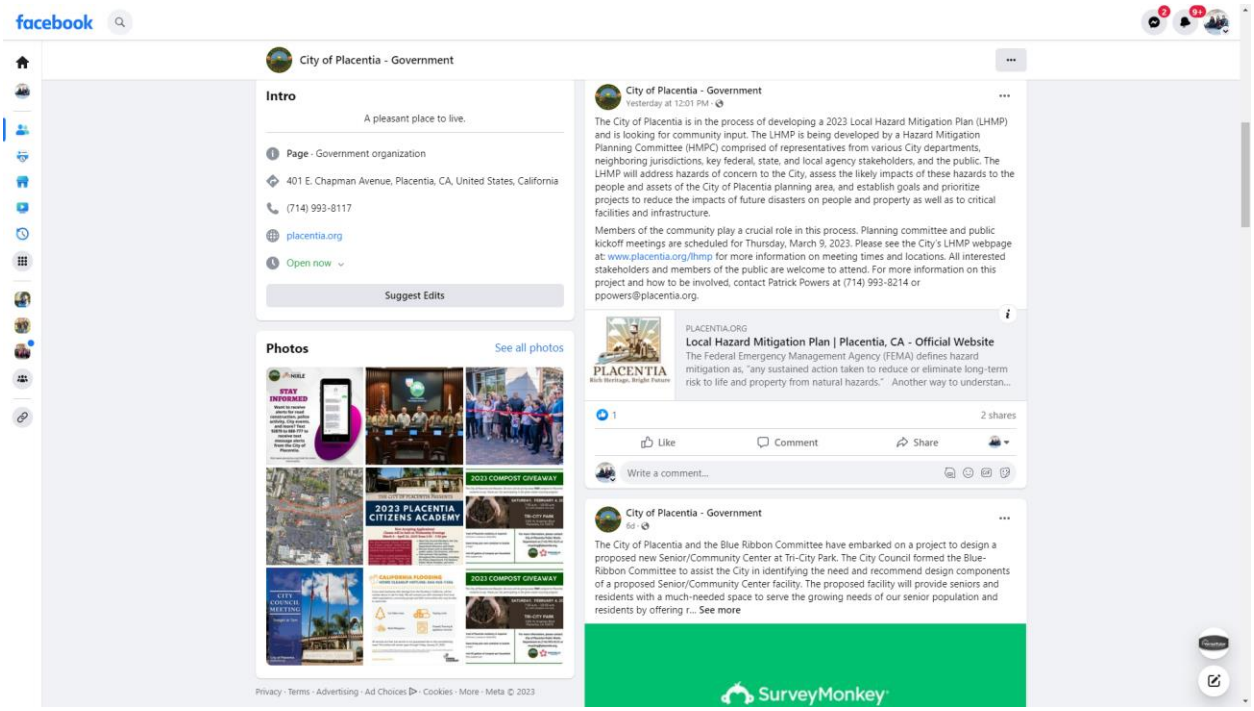


A.7.6. Public Meeting #1 Meeting Invite– City of Placentia Website



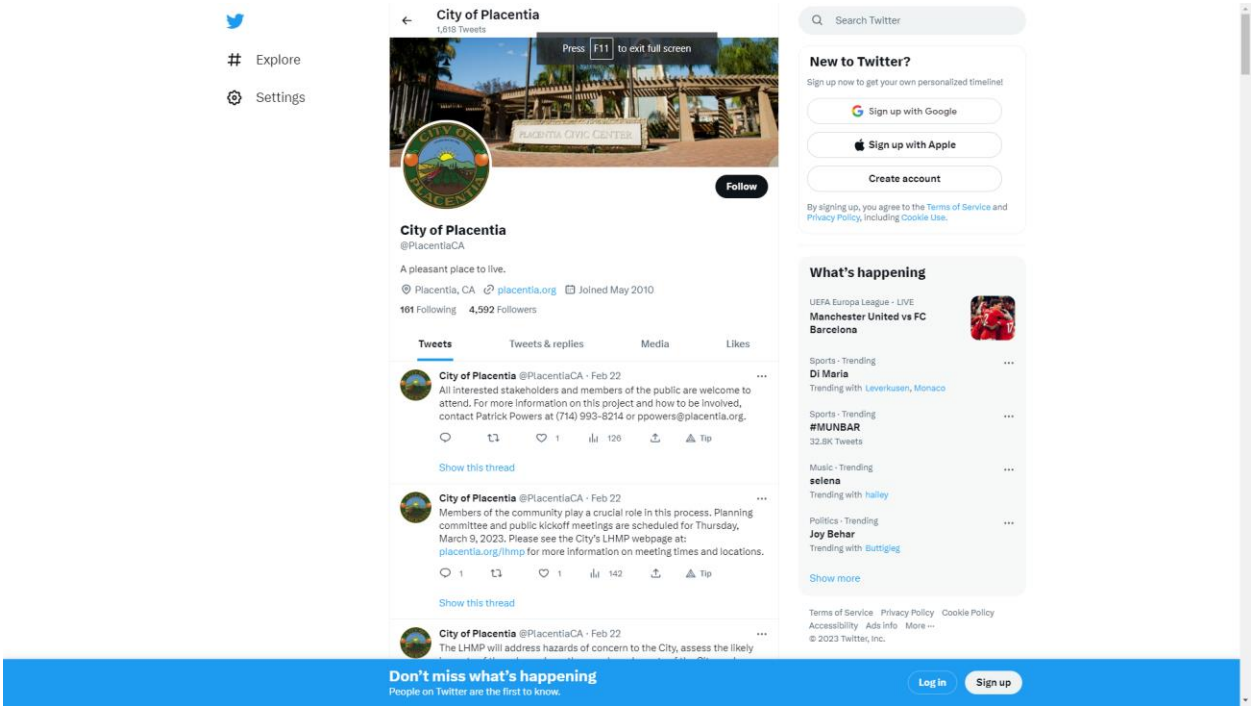
Source: City of Placentia website.

A.7.7. Public Meeting #1 Facebook Invite



Source: City of Placentia

A.7.8. Public Meeting #1 Twitter Notification



Source: City of Placentia

A.7.9. Public Meeting #1 Public Agenda

CITY OF PLACENTIA
LOCAL HAZARD MITIGATION PLAN (LHMP)
PUBLIC MEETING #1
MARCH 9, 2023

1. Introductions
2. Hazard Mitigation & the Disaster Mitigation Act Planning Requirements
3. Hazard Identification and Profiles
4. Opportunities for Public Participation and Input
5. Schedule
6. Questions and Answers

A.7.10. Public Meeting #1 Public Sign in Sheet

SIGN-IN SHEET
City of Placentia
LOCAL HAZARD MITIGATION PLANNING PROJECT
Public (Kickoff) Meeting #1
March 9, 2023

Name/Title	Email Address	Phone	Organization/ Affiliation
Edward Smith Mayor	eSmith @ PLACENTIA.ORG		City of Placentia
Patrick Powers Emerg Mgmt Mgr	ppowers@Placentia.org	714 458-7350	City of Placentia
Brennathwell	brenna@brennathwell.com	416 202-2935	Brennathwell
Jeanine Foster	jeanine.foster@fostermorrison.com	303 717-7171	Emergency Management Foster Morrison

A.7.11. Public Meeting #2 Press Release

City of Placentia
Local Hazard Mitigation Plan
Planning and Public Meeting #2 - Press Release

Get Involved!

HELP YOUR COMMUNITY BE HAZARD-READY!

Help the City of Placentia with the development of their 2023 Local Hazard Mitigation Plan.

Floods, earthquake, fire, and severe weather are just a few of the hazards of concern to our City. While natural hazards such as these cannot be prevented, a Local Hazard Mitigation Plan (LHMP) forms the foundation for a community's long-term strategy to reduce disaster losses by breaking the repeated cycle of disaster damage and reconstruction. Communities with a FEMA-approved LHMP are eligible to apply for both pre- and post-disaster mitigation grant funding and are better positioned to respond and recover when disasters occur.

Nationwide, taxpayers pay billions of dollars annually helping communities, organizations, businesses, and individuals recover from disasters. Some disasters are predictable and, in many cases, much of the damage can be reduced or even eliminated through hazard mitigation planning.

You are invited – to Public Meeting #2 on this project – the Risk Assessment Meeting.

During our second Planning and Public Meetings, we will be reviewing the risk assessment data developed to date for each hazard and are looking for your feedback in refining and adding to the in process Risk Assessment Chapter. We encourage attendance and participation from the general public at either our upcoming Planning Committee or Public Meetings; please select the time that works best for you:

Planning Committee Meeting
May 10, 2023 (Wednesday)
1:30 – 4:30 pm
Placentia Civic Center
401 E. Chapman Ave.
Placentia, CA 92870

Public Information Meeting
May 10, 2023 (Wednesday)
5:30 – 7:00 pm
Placentia Civic Center
401 E. Chapman Ave.
Placentia, CA 92870

For more information on this project go to https://www.placentia.org/1035/Local-Hazard-Mitigation-Plan or contact Patrick Powers at (714) 993-8214 or ppowers@placentia.org

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A.7.12. Public Meeting #2 in the City Administrator's Weekly Briefing – April 27, 2023

PLACENTIA, CA

City Administrator's
Weekly Briefing

"Rich Heritage, Bright Future"

From: *Damien R. Arrula* April 27, 2023

ADMINISTRATION DEPARTMENT

Tips and Tricks for Keeping Mosquitoes at Bay

The Aedes mosquito also known as the ankle biter, is an aggressive daytime biting mosquito. These mosquitoes are capable of transmitting certain diseases such as Dengue, Zika and Yellow fever. Unfortunately, the Aedes or Ankle biters are invading communities all over Orange County as they continue to expand and residents are being faced with a new normal in which they need:

- To be proactive in mosquito control
- Protect themselves from bites
- Adapt to a new way of enjoying the outdoors

The best method to reduce mosquito activity is to reduce water sources off of your property. These mosquitoes breed in backyard sources such as flower pot saucers, yard drains, water-holding plants, and other small containers on the property. Residents should check their property weekly for standing water and eliminate that water source. Click here for more information. Click here to view the Orange County Mosquito and Vector Control District March City Report for Placentia.

Local Hazard Mitigation Plan Community Meetings

Help the City develop the 2023 Local Hazard Mitigation Plan! Floods, earthquakes, fires, and severe weather are just a few of the hazards of concern to our City. While natural hazards such as these cannot be prevented, a Local Hazard Mitigation Plan (LHMP) forms the foundation for a community's long-term strategy to reduce disaster losses by breaking the repeated cycle of disaster damage and reconstruction. Communities with a FEMA-approved LHMP are eligible to apply for both pre- and post-disaster mitigation grant funding and are better positioned to respond and recover when disasters occur. During the second Planning and Public Meetings, we will be reviewing the risk assessment data developed to date for each hazard and are looking for your feedback in refining and adding to the Risk Assessment Chapter. We encourage attendance and participation from the general public at our upcoming Planning Committee or Public Meetings: **Planning Committee Meeting:** May 10th, 1:30 – 4:30 pm, City Council Chambers, 401 E. Chapman Avenue. **Public Information Meeting:** May 10th, 5:30 – 7:00 pm, City Council Chambers, 401 E. Chapman Avenue. For more information, visit www.placentia.org/lhmp or contact Patrick Powers at (714) 993-8214 or ppowers@placentia.org.

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Upcoming Meetings and Events

5/2/23	City Council Meeting
5/9/23	Planning Commission
5/10/23	LHMP Community Meetings
5/16/23	City Council Meeting
5/29/23	Memorial Day—City Facilities Closure

For additional information or questions about this Weekly Briefing, please email: CAWeekly@placentia.org

A.7.13. Public Meeting #2 in the City Administrator's Weekly Briefing – May 4, 2023

PLACENTIA, CA

City Administrator's
Weekly Briefing

From: *Damien R. Arrula*

May 4, 2023

"Rich Heritage, Bright Future"

ADMINISTRATION DEPARTMENT

Local Hazard Mitigation Plan—Public Outreach Survey

Help the City develop the 2023 Local Hazard Mitigation Plan! Floods, earthquakes, fires, and severe weather are just a few of the hazards of concern to our City. While natural hazards such as these cannot be prevented, a Local Hazard Mitigation Plan (LHMP) forms the foundation for a community's long-term strategy to reduce disaster losses by breaking the repeated cycle of disaster damage and reconstruction. Communities with a FEMA-approved LHMP are eligible to apply for both pre- and post-disaster mitigation grant funding and are better positioned to respond and recover when disasters occur.

The City of Placentia is conducting a public outreach survey to better understand our community as it pertains to hazards. We want to know which hazards our community is concerned about and the level of preparedness within our community. Please take a minute to complete the survey by visiting www.surveymonkey.com/r/RX9G9TV.

E-Waste Recycling Event

The Placentia Chamber is pleased to announce their upcoming e-Waste Recycling Event on Saturday, May 13th and Sunday, May 14th from 9:00 am—3:00 pm at the Placentia Town Center. All proceeds from the events go to the PYLUSD Grant Program to enhance the budgets of local Placentia/Yorba Linda classrooms. They will take anything with a screen or a cord. All computer components (printers, keyboard, mouse, etc.), laptop batteries, stereos, speakers, vacuums, satellite dish/boxes, small appliances. CDs, DVDs, lamps, ceiling fans, Christmas lights, power tools and their batteries, lawnmowers, and more. Most things that plug into an outlet will be accepted. Service charges for major appliances will include: $10 - Microwaves, Cooling Units (Water Dispensers, Air Conditioners, Personal Refrigerators) $20 - Water Heaters, Exercise Equipment (Treadmills, Stationary Bikes, Ellipticals) $30 - Washing Machines, Dryers, Dishwashers, Stoves. $40 - Refrigerators (Standard 2-3 doors). Light bulbs and household batteries will not be accepted.

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Upcoming Meetings and Events

5/9/23	Planning Commission
5/10/23	LHMP Community Meetings
5/16/23	City Council Meeting
5/29/23	Memorial Day—City Facilities Closure
6/6/23	City Council Meeting

For additional information or questions about this Weekly Briefing, please email: CAWeekly@placentia.org

A.7.14. Public Meeting #2 Agenda

AGENDA
CITY OF PLACENTIA
Local Hazard Mitigation Plan
Public Meeting #2 - Risk Assessment
May 10, 2023

1. Introductions
2. Status of the DMA Planning Process
3. Review of Risk Assessment (PowerPoint)
4. Next Steps

A.7.15. Public Meeting #2 Sign In Sheet

SIGN-IN SHEET
City of Placentia
LOCAL HAZARD MITIGATION PLANNING PROJECT
Public Meeting #2
May 10, 2023

Name/Title	Email Address	Phone	Organization/ Affiliation
Patricia Powers Emer Health	ppowers@placentia.org	714 993-8214	City of Placentia
Jeanine Foster	jeanine.foster@fostermiller.com	303 717-7171	Foster Miller

A.7.16. Press Release for Public Meeting #3

City of Placentia
Press Release

For Immediate Release
October 18, 2023

Contact: Damien R. Arrula
City of Placentia
(714) 993-8117
administration@placentia.org

PLACENTIA INVITES COMMENTS ON HAZARD MITIGATION PLAN

PLACENTIA, CA – A Local Hazard Mitigation Plan (LHMP) is being developed by the City of Placentia. Earthquakes, floods, fires, and severe weather are just a few hazards to the Placentia community. While threats such as these cannot be prevented, a Hazard Mitigation Plan forms the foundation for a community's long-term strategy to reduce disaster losses by breaking the repeated cycle of disaster damage and reconstruction. Additionally, only communities with a FEMA-approved LHMP can apply for pre- and post-disaster mitigation grant funding.

The process began in March 2023 by establishing a planning committee comprised of City departments and other key stakeholders. The LHMP is scheduled to be finalized and submitted to Cal OES and FEMA in November 2023.

Public Review Draft
The Public Review Draft of the LHMP is available online at www.placentia.org/lhmp. It is also available (in printed copy) at Placentia City Hall in the Deputy City Clerk's Office at 401 E. Chapman Avenue, Placentia, CA 92870.

Open Public and Planning Committee Meetings
Final public and planning committee meetings to review and provide comments on the Public Review Draft LHMP are scheduled as follows:
Public Meeting
November 1, 2023 (Wednesday) 5:30–7:00 pm; Placentia City Hall Front Community Room, 401 E. Chapman Ave.
Planning Committee Meeting
November 2, 2023 (Thursday) 9:00 – 11:30 am; Placentia City Hall Front Community Room, 401 E. Chapman Ave. Front Community Room

All interested stakeholders and members of the public are welcome to attend either of these meetings.

Comments on the Public Review Draft
There are several options for providing comments on the LHMP Public Review Draft:

- Email comments to Jeanine.foster@fostermorrison.com or ppowers@placentia.org
- Drop off written comments or send them by mail to City of Placentia Administration Department, Attn. Patrick Powers, 401 E. Chapman Ave. Placentia, CA 92870
- Bring comments to the public meeting.

All final comments on the Draft LHMP are due by November 9, 2023.

For more information, contact Patrick Powers at (714) 993-8214 or email at ppowers@placentia.org

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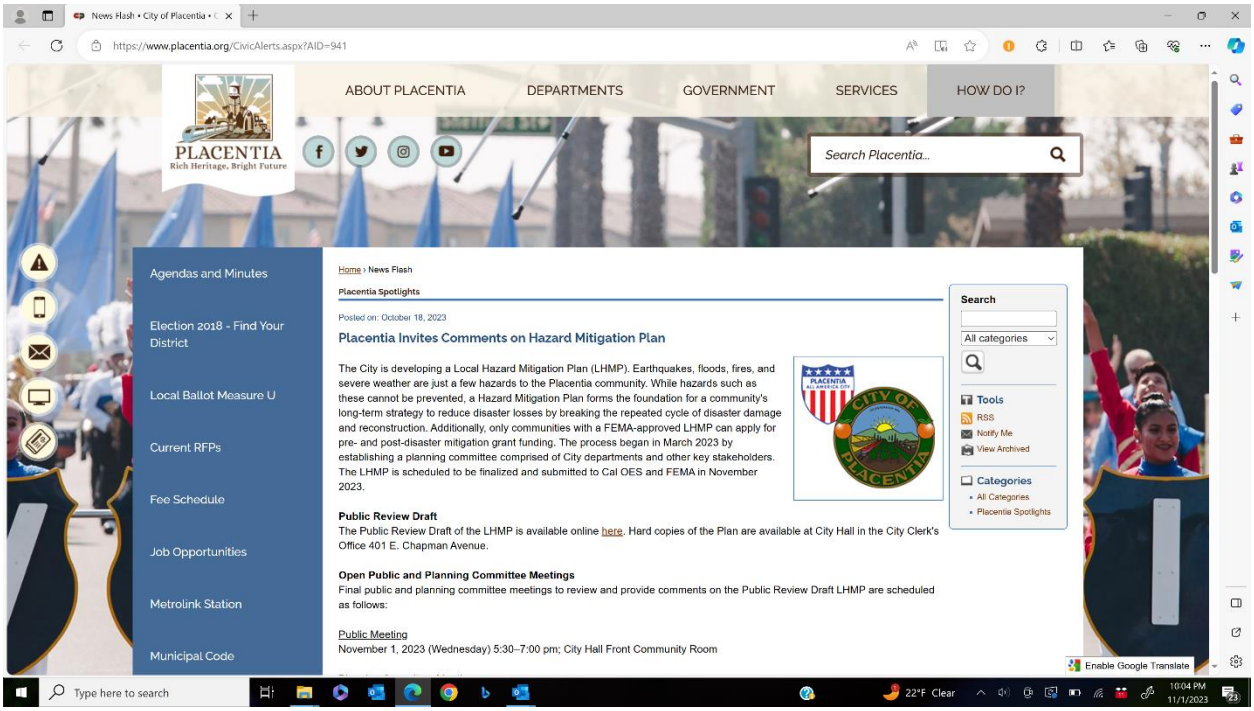
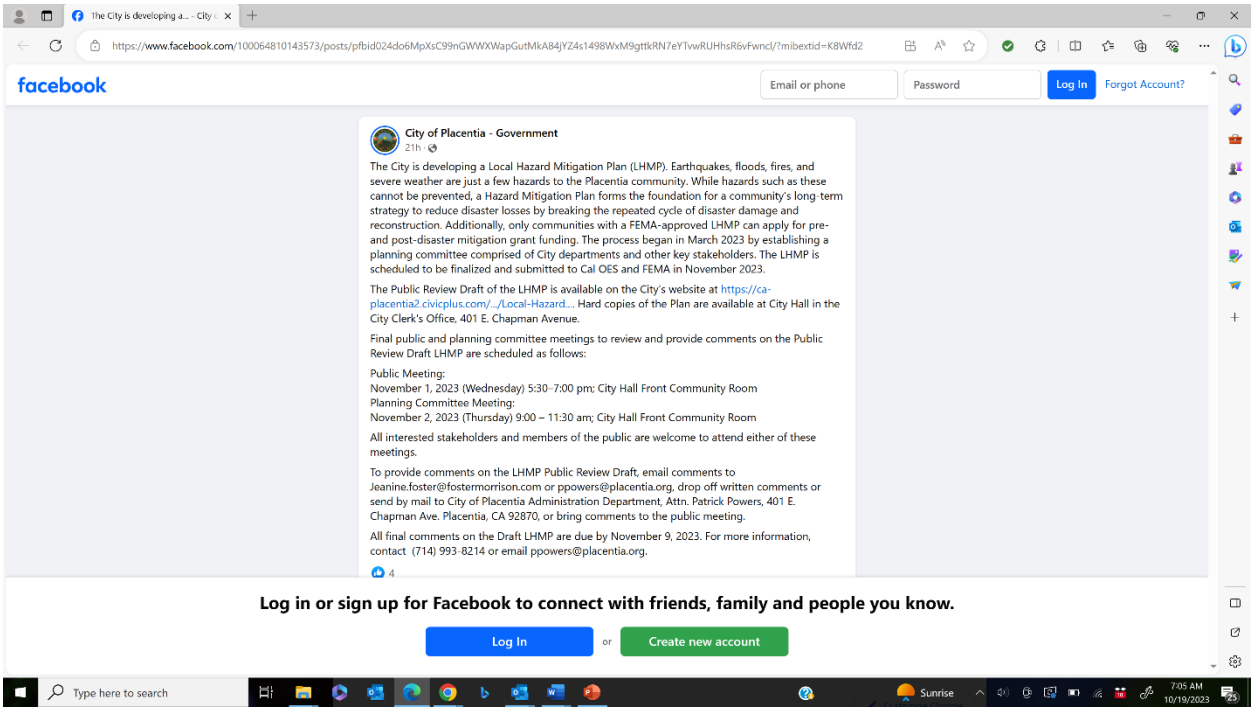
A.7.17. Public Meeting #3 Announcement on Website



A.7.18. Public Meeting #3 Announcement on City Facebook Page



A.7.19. Public Meeting #3 Agenda

CITY OF PLACENTIA
LOCAL HAZARD MITIGATION PLAN (LHMP) UPDATE
FINAL PUBLIC MEETING
NOVEMBER 1, 2023

1. Introductions
2. Overview of the LHMP Update Process
3. Overview of the City of Placentia 2023 LHMP Update
4. Public Comments/Input
5. Next Steps

A.7.20. Public Meeting #3 Sign in Sheet

SIGN-IN SHEET
City of Placentia
LOCAL HAZARD MITIGATION PLANNING PROJECT
Final Public Meeting #3
November 1, 2023

Name/Title	Email Address	Phone	Organization/ Affiliation
Patricia Powers	ppowers@placentia.org	714 993-8314	City of Placentia
Jeanine Foster	jeanine.foster@fostermorrison.com	303 717-7171	Foster Morrison

A.7.21. Public Comments

No public or other stakeholder comments were received during the 2023 LHMP Update development process.

A.8 Meeting Handouts

Below are the handouts for each meeting. Handouts specific to the Risk Assessment Meeting can be found in Appendix C.

A.8.1. Kickoff Meeting Handouts for both HMPC and Public Meeting

City of Placentia Hazard Identification and Profiles –2023

Disaster Declarations and National Weather Service Research

Orange County (Placentia) – Disaster Declarations 1950-2023

Year	Disaster Name	Disaster Type	Disaster Cause	Disaster #	State Declaration #	Federal Declaration #
2023	California Severe Winter Storms, Flooding, and Mudslides	Flood	Storms	EM-3591	–	1/9/2023
2022	California Coastal Fire	Fire	Fire	FM-5439	–	5/12/2022
2020	California Bond Fire	Fire	Fire	FM-5383	–	12/3/2020
2020	California Blue Ridge Fire	Fire	Fire	FM-5380	–	10/26/2020
2020	Covid-19	Pandemic	Pandemic	DR-4482	3/4/2020	1/20/2020
2020	Covid-19	Pandemic	Pandemic	EM-3428	3/4/2020	3/13/2020
2017	California Wildfires	Fire	Fire	DR-4344	10/9/2017	10/10/2017
2017	Canyon 2 Fire	Fire	Fire	FM-5223	–	10/9/2017
2017	Canyon Fire	Fire	Fire	FM-5213	–	9/26/2017
2017	California Severe Winter Storms, Flooding, and Mudslides	Flood	Storms	DR-4305	2/10/2017	3/16/2017
2014	California Drought	Drought	Drought	GP 2014-13	1/17/2014	–
2011	California Winter Storms, Flooding, and Debris and Mud Flows	Flood	Storms	DR-1952	12/21/2010, 12/23/2010, 12/24/2010, 12/30/2010	1/26/2011
2009	49er Fire	Fire	Fire	FM-2832	–	8/31/2009
2008	California Wildfires	Fire	Fire	DR-1810	–	11/18/2008
2008	Freeway Complex Fire	Fire	Fire	FM-2792	–	11/15/2008
2007	California Wildfires	Fire	Fire	DR-1731	–	10/24/2007
2007	California Wildfires	Fire	Fire	EM-3279	–	10/23/2007
2007	Santiago Fire	Fire	Fire	FM-2737	–	10/22/2007
2007	241 Fire	Fire	Fire	FM-2683	–	3/11/2007
2006	Sierra Fire	Fire	Fire	FM-2630	–	2/6/2006

Year	Disaster Name	Disaster Type	Disaster Cause	Disaster #	State Declaration #	Federal Declaration #
2005	Hurricane Katrina Evacuations	Economic	Hurricane	EM-3248 2005	–	9/13/2005
2005	California Severe Storms, Flooding, Landslides, and Mud and Debris Flows	Flood	Storms	DR-1585	3/16/2005	4/14/2005
2005	California Severe Storms, Flooding, Debris Flows, and Mudslides	Flood	Storms	DR-1577	1/12/2005	2/4/2005
2003	Exotic Newcastle Disease Epidemic	Agricultural	Disease	GP 2003	1/3/2003	–
2002	Antonio Fire	Fire	Fire	FSA-2405	–	5/14/2002
2001	Energy Emergency	Economic	Greed	GP-2001	1/1/2001	–
1998	1998 El Nino Floods	Flood	Storms	DR-1203	Proclaimed	2/19/1998
1997	Floods (Orange)	Flood	Storms	97-04	12/10/1997	–
1996	California Severe Fires	Fire	Fire	EM-3120	–	10/23/1996
1996	1996 Severe Fires	Fire	Fire	96-04	10/22/1996	–
1995	1995 Severe Winter Storms	Flood	Storms	DR-1046	1/6/95-3/14/95	3/12/1995
1995	1995 Severe Winter Storms	Flood	Storms	DR-1044	1/6/95-3/14/95	1/13/1995
1994	Northridge Earthquake	Earthquake	Earthquake	DR-1008	1/17/1994	1/17/1994
1993	California Fires, Mud & Landslides, Soil Erosion, Flooding	Post Fire Mud & Landslides, Soil Erosion, Flooding	Fires and Storms	DR-1005	10/27/93, 10/28/93	10/28/1993
1993	California Severe Storm, Winter Storm, Mud & Landslides, Flooding	Flood	Storms	DR-979	1/7/93 - 2/19/93	2/3/1993
1992	California Snow Storm, Heavy Rain, High Winds, Flooding, Mudslide	Flood	Storms	DR-935	2/12/92, 2/19/92	2/25/1992
1989	Mediterranean Fruit Fly	Agricultural	Insect Pest	GP 1989	11/20/1989	–
1988	California Severe Storms, High Tides, Flooding	Flood	Storms	DR-812	1/21/1988	2/5/1988
1987	California Earthquake and Aftershocks	Earthquake	Earthquake	DR-799	10/2/87 - 10/5/87	10/7/1987
1982	Winter Storms	Flood	Flood	DR-677	12/8/82-3/21/83	2/9/1983
1982	Dayton Hills Fire	Fire	Fire	GP	10/10/1982	–
1982	California Urban Fires	Fire	Fire	DR-657	4/21/1982	4/24/1982

Year	Disaster Name	Disaster Type	Disaster Cause	Disaster #	State Declaration #	Federal Declaration #
1980	California Burs, Timber Fires	Fire	Fire	DR-635	11/18/1980, 11/25/80	11/27/1980
1980	California Severe Storms, Mudslides, Flooding	Flood	Storms	DR-615	2/21/80, 2/7/80, 2/19/80	2/21/1980
1979	Gasoline Shortage	Economic	OPEC	–	5/8/79 - 11/13/79	–
1978	California Landslides	Landslides	Storms	DR-566	10/5/1978	10/9/1978
1978	California Coastal Storms, Mudslides, and Flooding	Flood	Storms	DR-547	3/9/78, 2/27,78, 2/13/78	2/15/1978
1974	Gasoline Shortage	Economic	OPEC	–	2/28/74, 3/4/74, 3/10/74	–
1972	Exotic Newcastle Disease	Agricultural	Disease	–	4/10/72, 5/22/72	–
1969	1969 Storms	Flood	Storms	DR-253	1/23/69-3/12/69	1/26/1969
1967	Woodson Fire	Fire	Fire	–	1/7/1967	–
1963	High Tides and Heavy Surf	Flood	High Tides	–	Unknown	–
1958	1958 April Storms and Floods	Flood	Storms	DR-82	4/5/1958	4/4/1958
1958	1958 February Storms and Floods	Flood	Storms	CDO 58-03	2/26/1958	–
1955	1955 Floods	Flood	Flood	DR-47	12/22/1955	12/23/1955
1950	1950 Floods	Flood	Flood	OCD 50-01	11/21/1950	–

Source: FEMA, Cal OES

Orange County (Placentia) Disaster Declaration Summary Table by Hazard 1950-2023

Disaster Type	State Declarations		Federal Declarations	
	Count	Years	Count	Years
Agricultural	3	1972, 1989, 2003	0	–
Drought	1	2014	0	–
Earthquake	2	1987, 1994	2	1987, 1994
Economic	3	1974, 1979, 2001	0	–
Fire	6	1967, 1980, 1982 (twice), 1996, 2017	18	1980, 1982, 1996, 2002, 2006, 2007 (four times), 2008 (twice), 2009, 2017 (three times), 2020 (twice), 2022

Disaster Type	State Declarations		Federal Declarations	
	Count	Years	Count	Years
Flood	19	1950, 1955, 1958 (twice), 1969, 1978, 1980, 1982, 1988, 1992, 1993, 1995 (twice), 1997, 1998, 2005 (twice), 2011, 2017	18	1955, 1958, 1969, 1978, 1980, 1982, 1983, 1988, 1992, 1993, 1995 (twice), 1998, 2005 (twice), 2011, 2017, 2023
High Tides	1	1963	0	
Hurricane	0	–	1	2005
Landslide	1	1978	1	1978
Pandemic	2	2020	2	2020
Post Fire Mud & Landslides, Soil Erosion, Flooding	1	1993	1	1993
Totals	**39**	–	**43**	–

Source: FEMA, Cal OES

Orange County (Placentia) NCDC Severe Weather Events 1950-10/31/2022

Event Type	Number of Events	Deaths	Deaths (indirect)	Injuries	Injuries (indirect)	Property Damage	Crop Damage
Coastal Flood	8	0	0	2	0	$75,000	$0
Debris Flow	11	1	0	0	1	$388,500	$0
Dense Fog	67	0	0	0	1	$0	$0
Drought	26	0	0	0	0	$0	$0
Dust Devil	1	0	0	0	0	$0	$0
Excessive Heat	28	0	0	0	0	$0	$0
Flash Flood	51	2	2	0	0	$64,730,000	$480,000
Flood	49	0	0	0	3	$40,735,000	$242,000
Frost/Freeze	3	0	0	0	0	$0	$0
Funnel Cloud	37	0	0	0	0	$0	$0
Hail	13	1	0	0	0	$80,600	$0
Heat	24	1	0	0	0	$0	$0
Heavy Rain	37	1	0	19	0	$36,820,000	$0
Heavy Snow	3	0	0	0	0	$30,000	$0
High Surf	54	1	0	7	0	$275,000	$0
High Wind	199	1	0	0	0	$633,000	$5,500
Lightning	4	0	0	0	0	$62,000	$0
Rip Current	26	14	0	18	0	$20,000	$0
Storm Surge/Tide	3	0	0	0	0	$242,500	$0
Strong Wind	23	0	0	0	0	$560,000	$15,000
Thunderstorm Wind	34	0	0	0	0	$1,246,000	$20,000

Event Type	Number of Events	Deaths	Deaths (indirect)	Injuries	Injuries (indirect)	Property Damage	Crop Damage
Tornado	31	0	0	13	0	$13,994,500	$0
Tsunami	2	0	0	0	0	$0	$0
Waterspout	13	0	0	0	0	$0	$0
Wildfire	38	0	0	30	3	$91,635,000	$100,000
Winter Storm	3	0	0	0	0	$0	$0
Winter Weather	2	0	0	0	0	$0	$0
Total	**790**	**22**	**2**	**89**	**8**	**$251,527,100**	**$862,500**

City of Placentia Hazards Comparison Summary

City of Placentia Safety Element	2021 Orange County Plan	2023 State of California Plan Applicable Hazards*	Proposed City of Placentia 2023 Hazards*
Climate Change	Climate Change	Climate Change and Related Hazards	Climate Change (as a stand alone and as it exacerbates other hazards)
Flood & Dam Inundation	Dam Failure	Dam Failure	Dam Failure
–	Drought	Drought and Water Shortage	Drought & Water Shortage
Geologic and Seismic Safety Concerns: Earthquake and Earthquake Liquefaction	Earthquake	Earthquake (with earthquake liquefaction)	Earthquake (and earthquake liquefaction)
–	Epidemic	Epidemic/Pandemic/Vector-Borne Disease	–
Flood & Dam Inundation	Flood-Storm	Riverine, Stream, and Alluvial Flood	Flood: 1%/0.2% annual chance
–	Flood-Storm	Riverine, Stream, and Alluvial Flood	Flood: Localized/Stormwater Flooding
Geologic and Seismic Safety Concerns: Landslide	Landslide	Landslide, Debris Flow, and other Mass Movements	Landslide
Flood & Dam Inundation	–	Levee Failure	Levee Failure
Hazardous Materials	–	Hazardous Materials Release	–
Geologic and Seismic Safety Concerns: Mining Activity, Oil and Gas Wells and Subsidence	–	Natural Gas Pipeline Hazards	Natural Gas Pipeline (alone or part of earthquake?)
Climate Change: Extreme Heat	–	Extreme Heat	Severe Weather: Extreme Heat

City of Placentia Safety Element	2021 Orange County Plan	2023 State of California Plan Applicable Hazards*	Proposed City of Placentia 2023 Hazards*
–	–	Severe Wind, Weather, and Storms	Severe Weather: Heavy Rain and Storms (with thunderstorm winds)
Geologic and Seismic Safety Concerns: Mining Activity, Oil and Gas Wells and Subsidence			Subsidence
–	Tsunami	Tsunami and Seiche	–
Urban Fires (with High Winds)	–	Severe Wind, Weather, and Storms	Severe Weather: High Wind & Tornado (not with storms)
Climate Change (wildfire air quality issues) Urban Fires (with High Winds)	Wildland and Urban Fire	Wildfire /Urban Structural Fires	Wildfire and Urban Fire (with smoke/ air quality)

*Other 2023 State HMP Natural Hazards: Extreme Cold and Freeze; Sea Level Rise, Coastal Flooding, and Erosion; Snow Avalanches; Tsunami and Seiche; Volcano.

City of Placentia Hazard Identification 2023

Hazard*	Geographic Extent	Probability of Future Occurrences	Magnitude/ Severity	Significance	Climate Change Influence
Climate Change	Extensive	Highly Likely	Limited (N-L?)	Medium	--
Dam Failure	Significant	Unlikely	Critical	High	Medium
Drought & Water Shortage	Extensive	Highly Likely	Limited	L-M?	High
Earthquake (and earthquake liquefaction)	Extensive	Likely	Catastrophic	High	Low
Flood: 1%/0.2% annual chance	Limited (S?)	Occasional/Unlikely	Limited	Medium	High
Flood: Localized/Stormwater Flooding	Extensive	Highly Likely	N-L?	L-M?	Medium
Haz Mat Transportation Release	Significant	Unlikely	L-C?	Medium	Low
Landslide	Limited	Likely	Limited (N?)	Low?	Medium
Levee Failure	Significant?	Unlikely	Critical	M-H?	Medium
Natural Gas Pipeline	Significant	Unlikely	Critical	High	Low
Pandemic	Extensive	Likely	Limited – C?	Medium	Low
Severe Weather: Extreme Heat	Extensive	Highly Likely	Limited	L-M?	High
Severe Weather: Heavy Rain and Storms (with thunderstorm winds)	Extensive	Highly Likely	Limited	Medium	High
Severe Weather: High Wind and Tornado	Extensive	Highly Likely	Limited	Medium - High	Medium
Subsidence	Limited	Unlikely?	Limited	Low?	Low
Urban Fire	Limited	Highly Likely	Limited	High	Low

Hazard*	Geographic Extent	Probability of Future Occurrences	Magnitude/ Severity	Significance	Climate Change Influence
Wildfire (with smoke/ air quality)	Limited/Ext	Highly Likely	Limited	L-M?	High

Geographic Extent
Limited: Less than 10% of planning area
Significant: 10-50% of planning area
Extensive: 50-100% of planning area

Probability of Future Occurrences
Highly Likely: Near 100% chance of occurrence in next year, or happens every year.
Likely: Between 10 and 100% chance of occurrence in next year, or has a recurrence interval of 10 years or less.
Occasional: Between 1 and 10% chance of occurrence in the next year, or has a recurrence interval of 11 to 100 years.
Unlikely: Less than 1% chance of occurrence in next 100 years, or has a recurrence interval of greater than every 100 years.

Magnitude/Severity
Catastrophic: More than 50 percent of property severely damaged; shutdown of facilities for more than 30 days; and/or multiple deaths
Critical: 25-50 percent of property severely damaged; shutdown of facilities for at least two weeks; and/or injuries and/or illnesses result in permanent disability
Limited: 10-25 percent of property severely damaged; shutdown of facilities for more than a week; and/or injuries/illnesses treatable do not result in permanent disability
Negligible: Less than 10 percent of property severely damaged, shutdown of facilities and services for less than 24 hours; and/or injuries/illnesses treatable with first aid

Significance
Low: minimal potential impact
Medium: moderate potential impact
High: widespread potential impact

Climate Change Influence
Low: minimal potential impact
Medium: moderate potential impact
High: widespread potential impact

*Power Loss will be addressed in the Vulnerability Section as a vulnerability/impact of multiple hazards.(Cal Edison)

A.8.2. Risk Assessment Meeting Handouts for HMPC Meeting

Status of the 2023 City of Placentia LHMP Project/Next Steps

LHMP Project Schedule/Key Dates

2023 LHMP Meetings

- **May 10** (Wednesday) HMPC Meeting #2 (Risk Assessment) (1:30 – 4:30)
- **May 10** (Wednesday) Public Meeting #2 (Risk Assessment) (5:30 – 7:00)
- ***June 6 (Tuesday) Internal Placentia Risk Assessment Meeting Follow up (9:00-10:30)***
- **July 11** (Tuesday) HMPC Meeting #3 (Mitigation Strategy: Goals Development) (1:30-4:30)
- **July 12** (Wednesday) HMPC Meetings #4 (Mitigation Strategy: Actions and Projects) (9:00-12:00)
- **November 1** (Wednesday) Public Meeting #3 (Draft Plan) (5:30 – 7:00)
- **November 2** (Thursday) HMPC Meeting #5 (Draft Plan) (9:00 – 11:30)

LHMP Document Drafts

- **August 31** (Thursday): HMPC (First) Draft LHMP to Placentia/HMPC
- **September 28** (Thursday): HMPC comments due on Draft Plan
- **October 12** (Thursday): Comments incorporated into Public Review (Second) Draft to Placentia/HMPC
- **October 18** (Wednesday): Public Review Draft on Placentia website

- **November 9** (Thursday**):** all HMPC and Public input to Foster Morrison
- **November 17-22:** Public and HMPC comments incorporated and LHMP submittal to Cal OES – November 2023

Table 1 City of Placentia Hazard Identification Table

Hazard*	Geographic Extent	Probability of Future Occurrences	Magnitude/ Severity	Significance	Climate Change Influence
Climate Change	Extensive	Highly Likely	Limited (N-L?)	Medium	--
Dam Failure	Significant	Unlikely	Critical	High	Medium
Drought & Water Shortage	Extensive	Highly Likely	Limited	L-M?	High
Earthquake (and earthquake liquefaction)	Extensive	Likely	Catastrophic	High	Low
Flood: 1%/0.2% annual chance	Limited (S?)	Occasional/Unlikely	Limited	Medium	High
Flood: Localized/Stormwater Flooding	Extensive	Highly Likely	N-L?	L-M?	Medium
Haz Mat Transportation Release	Significant	Unlikely	L-C?	Medium	Low
Landslide	Limited	Likely	Limited (N?)	Low?	Medium
Levee Failure	Significant?	Unlikely	Critical	M-H?	Medium
Natural Gas Pipeline	Significant	Unlikely	Critical	High	Low
Pandemic	Extensive	Likely	Limited – C?	Medium	Low
Severe Weather: Extreme Heat	Extensive	Highly Likely	Limited	L-M?	High
Severe Weather: Heavy Rain and Storms (with thunderstorm winds)	Extensive	Highly Likely	Limited	Medium	High
Severe Weather: High Wind and Tornado	Extensive	Highly Likely	Limited	Medium - High	Medium
Subsidence	Limited	Unlikely?	Limited	Low?	Low
Urban Fire	Limited	Highly Likely	Limited	High	Low
Wildfire (with smoke/ air quality)	Limited/Ext	Highly Likely	Limited	L-M?	High

Geographic Extent
Limited: Less than 10% of planning area
Significant: 10-50% of planning area
Extensive: 50-100% of planning area

Probability of Future Occurrences
Highly Likely: Near 100% chance of occurrence in next year, or happens every year.
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Magnitude/Severity
Catastrophic: More than 50 percent of property severely damaged; shutdown of facilities for more than 30 days; and/or multiple deaths
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Negligible: Less than 10 percent of property severely damaged, shutdown of facilities and services for less than 24 hours; and/or injuries/illnesses treatable with first aid

Significance
Low: minimal potential impact
Medium: moderate potential impact
High: widespread potential impact

Climate Change Influence
Low: minimal potential impact
Medium: moderate potential impact
High: widespread potential impact

Risk Assessment Methodology

Calculating Likelihood of Future Occurrence

The frequency of past events is used in this section to gauge the likelihood of future occurrences. Based on historical data, the likelihood of future occurrence is categorized into one of the following classifications:

- **Highly Likely**: Near 100% chance of occurrence in next year, or happens every year.
- **Likely**: Between 10 and 100% chance of occurrence in next year, or has a recurrence interval of 10 years or less.
- **Occasional**: Between 1 and 10% chance of occurrence in the next year, or has a recurrence interval of 11 to 100 years.
- **Unlikely**: Less than 1% chance of occurrence in next 100 years, or has a recurrence interval of greater than every 100 years.

Calculating Vulnerability

Vulnerability is measured in general, qualitative terms, and is a summary of the potential impact based on past occurrences, spatial extent, and damage and casualty potential:

- **Extremely Low**: The occurrence and potential cost of damage to life and property is very minimal to non-existent.
- **Low**: Minimal potential impact. The occurrence and potential cost of damage to life and property is minimal.
- **Medium**: Moderate potential impact. This ranking carries a moderate threat level to the general population and/or built environment. Here the potential damage is more isolated and less costly than a more widespread disaster.
- **High**: Widespread potential impact. This ranking carries a high threat to the general population and/or built environment. The potential for damage is widespread. Hazards in this category may have already occurred in the past.
- **Extremely High**: Very widespread and catastrophic impact.

Defining Significance (Priority) of a Hazard

Defining the significance or priority of a hazard to a community is based on a subjective analysis of several factors. This analysis is used to focus and prioritize hazards and associated mitigation measures for the plan. These factors include the following:

- **Past Occurrences**: Frequency, extent, and magnitude of historic hazard events.
- **Likelihood of Future Occurrences**: Based on past hazard events.
- **Ability to Reduce Losses through Implementation of Mitigation Measures**: This looks at both the ability to mitigate the risk of future occurrences as well as the ability to mitigate the vulnerability of a community to a given hazard event.

Risk Assessment Summary: City of Placentia

Climate Change

- The 2013, 2018, and 2023 State of California Hazard Mitigation Plan states that climate change is already affecting California. Sea levels have risen by as much as seven inches along the California coast over the last century, increasing erosion and pressure on the state's infrastructure, water supplies, and natural resources. The State has also seen increased average temperatures, more extreme hot days, fewer cold nights, a lengthening of the growing season, shifts in the water cycle with less winter precipitation falling as snow, and both snowmelt and rainwater running off sooner in the year. Severe storms (snow and precipitation) of 2022/2023 further demonstrate the impacts of Climate Change. Climate Change has the potential to alter the nature and frequency of most hazards.
- IS THE CITY WORKING ON OR CONSIDERING A CLIMATE ADAPTATION PLAN OR CLIMATE VULNERABILITY ASSESSMENT?
- HOW HAS THE CITY BEEN AFFECTED BY CLIMATE CHANGE?
- DOES ANYONE HAVE ANY CLIMATE CHANGE CONCERNS/ISSUES TO NOTE?
- Likelihood of Future Occurrence: Highly Likely
- Vulnerability: Medium
- Priority Hazard

Dam Failure

- There are 43 dams in Orange County constructed for flood control, storage, electrical generation, and recreational purposes. Of the 43 dams, 16 are rated as Extremely High, 22 are rated as High Hazard, 3 as Significant Hazard, and 2 as Low Hazard.
- Of these 43 Orange County dams, 4 dams are identified with an inundation area within Placentia: Carbon Canyon (HH), Deimer Reservoir (EH), Deimer Ozone Contact Basin (EH), and Yorba Dam (EH)
- 1 additional dam, the Prado Dam (HH) located in San Bernadino County also has the potential to impact Placentia.
- No disaster declarations or dam failures events were identified for any of these dams.
- ANY SPECIFIC DAM VULNERABILITIES/ISSUES/CONCERNS TO NOTE?
- Likelihood of Future Occurrence: Unlikely
- Vulnerability: High? to Extremely High?
- Priority Hazard

Drought and Water Shortage

- Historical drought data for the City of Placentia and region indicate there have been 5 significant multi-year droughts in the last 84 years.
- Orange County: 1 state disaster declaration in 2014; no federal disaster declarations. NCDC shows 26 drought events since 1950. Many of these likely affected Placentia.
- GSWC Placentia-Yorba Linda has reliable supplies to meet its retail customer demands in normal, single dry years, and five consecutive dry year conditions through 2045.
- Yorba Linda Water District is projected to meet full-service demands through 2045 due to diversified supply and conservation measures.

- HOW HAS THE CITY BEEN AFFECTED BY PAST DROUGHT EVENTS?
- WHAT HAS BEEN IMPACTED THE MOST? HOW HAS WATER SUPPLY BEEN AFFECTED IN THE CITY FROM THIS MOST RECENT DROUGHT? WHAT ARE THE MOST SIGNIFICANT CONCERNS MOVING FORWARD?
- Likelihood of Future Occurrence: Drought – Likely; Water Shortage – Occasional
- Vulnerability: Medium
- Priority Hazard

Earthquake

- Geological data indicates that Placentia is located within an area of relatively high seismic activity and is located within a fairly active fault area. Faults near the City include 8 active faults and 1 inactive fault. The City is not located in an Alquist Priolo zone, indicating no known potential for surface rupture from an underlying fault.
- There have been 2 disaster declarations in Orange County related to earthquake. These are the 1987 5.9 Whittier Narrows Earthquake and the 1994 6.7 Northridge Earthquake.
- USGS reports 120 earthquakes of 5.0 magnitude or greater within 90 miles of Placentia since 1850.
- WAS/HOW WAS THE CITY AFFECTED DURING THE TWO EARTHQUAKES RESULTING IN DISASTER DECLARATIONS?
- WHAT ARE THE MOST SIGNIFICANT ISSUES/CONCERNS RELATED TO EARTHQUAKE?
- THE CITY IDENTIFIES 12 (10 ON SANTE FE AND 2 ON SOUTH BRADFORD) UNREINFORCED MASONRY BUILDINGS IN THE CITY, BUILT BEFORE 1933 AND THEREFORE ARE AT RISK OF STRUCTURAL DAMAGE. ARE THEY CITY OWNED? ANY PLANS ON RETROFITTING THESE BUILDINGS?
- Likelihood of Future Occurrence: Occasional – large, damaging earthquake; Highly Likely – minor earthquake
- Vulnerability: Extremely High
- Priority Hazard

Earthquake Liquefaction

- Placentia has mapped liquefaction areas predominantly in the southern portion of the City.
- No data on past liquefaction events/issues in the City.
- ANY PAST INCIDENTS OF LIQUEFACTION OCCURING IN PLACENTIA?
- ANY UNIQUE VULNERABILITIES/ISSUES TO NOTE?
- Likelihood of Future Occurrence: Occasional – large, damaging earthquake; Highly Likely – minor earthquake (Liquefaction may occur during earthquake events)
- Vulnerability: Medium - High?
- Priority Hazard

Flood Hazards

1%/0.2% year

- Historically, portions of Placentia have always been at risk to flooding because of its annual percentage of rainfall and the waterways that traverse the City.

- There have been 20 state and 18 federal disaster declarations in Orange County related to flooding, heavy rains and storms. Many of these likely affected Placentia.
- The NCDC identifies 145 flooding and heavy rain events since 1996. Many of these also likely affected Placentia.
- 202 City parcels (94 acres) located in 1% annual chance and 1,886 parcels (764 acres) located in the 0.2% floodplain.
- DOES THE CITY HAVE INPUT ON HOW ANY OF THESE PAST FLOOD EVENTS AFFECTED THE CITY? PA CLAIMS? OTHER?
- WHAT ARE THE PRIMARY VULNERABILITIES/ISSUES/CONCERNS WITH FLOODING?
- Likelihood of Future Occurrence: 1%-Occasional; 0.2%-Unlikely
- Vulnerability: Medium
- Priority Hazard

Localized/Stormwater flooding

- Localized flooding occurs annually in the City during heavy storm events.
- WHERE ARE THE CITY'S PROBLEM AREAS?
- WHAT IS THE NATURE OF THE ISSUES THAT OCCUR?
- WHAT PAST EVENTS HAVE AFFECTED THE CITY? DATES? DAMAGES? ISSUES? JANUARY 2023? FEBRUARY 2023? 2017?
- Likelihood of Future Occurrence: Highly Likely
- Vulnerability: Medium
- Priority Hazard

Hazardous Materials Transportation Release

- Much of the hazardous materials transported through Placentia is carried by truck on the State Highways or by railway systems.
- State Roads 57, 91, and 55 are all routes that carry hazardous materials. The Atchison, Topeka, and Santa Fe Railway also transports hazardous materials.
- KEY AREAS OF CONCERN WITHIN THE CITY INCLUDE?
- WHAT ARE THE CITY'S PRIMARY ISSUES/VULNERABILIITIES/CONCERNS?
- The United States Department of Transportation Pipeline and Hazardous Materials Safety Administration's (PHMSA) Office of Hazardous Materials Safety tracks transportation incidents: 2 rail and roadway incidents have occurred since 1970. These were both miner and cleaned up without further issue.
- Likelihood of Future Occurrence: Unlikely
- Vulnerability: High
- Non-Priority Hazard?

Landslides

- There have been no disaster declarations associated with landslides in Orange County. The NCDC contains no records of landslides in the County. Based on information reviewed to date, no notable landslide events have occurred in Placentia.
- CAN THE CITY PROVIDE INFORMATION ON HISTORIC LANDSLIDE EVENTS?
- Likelihood of Future Occurrence: Unlikely

- Vulnerability: Low
- Non-Priority Hazard

Levee Failure

- FIS indicates the Santa Ana River Levee System protects properties in the Southeast portion of the City. 180 parcels (127 acres) located in the X-protected by levee flood zone.
- There have been no disaster declarations or NCDC events for levee failure in Orange County or associated with the Santa Ana River Levee System.
- DOES THE CITY HAVE ANY KNOWLEDGE OF HISTORIC OR CURRENT ISSUES RELATED TO THE SANTA ANA RIVER LEVEE SYSTEM?
- WHAT ARE THE MOST SIGNIFICANT CONCERNS/ISSUES WITH THE AREAS PROTECTED BY THE LEVEE?
- Likelihood of Future Occurrence: Unlikely
- Vulnerability: Medium
- Non-Priority Hazard?

Natural Gas Pipeline

- Southern California Gas owns the pressurized gas pipeline that extends through part of the City.
- There have been no disaster declarations or NCDC events associated with the natural gas pipeline in Orange County.
- According to information provided by SoCal Gas, they rigorously maintain and monitor their pipelines. Regulators have consistently found that they meet or exceed all federal and state requirements for safe pipeline operations and maintenance. SoCal Gas indicates there has not been any past issues with the gas pipeline in Placentia.
- HMPC - ANY ISSUES/PAST INCIDENTS ASSOCIATED WITH THE GAS PIPELINE IN PLACENTIA? IN NEARBY JURISDICTIONS?
- WHAT ARE THE MOST SIGNIFICANT CONCERNS/ISSUES WITH THE GAS PIPELINE?
- Likelihood of Future Occurrence: Unlikely
- Vulnerability: Medium?
- Non-Priority Hazard?

Pandemic

- The 20th Century had 3 Pandemics (WHO): 1918-1919 Influenza Pandemic (H1N1),1957-1958 Influenza Pandemic (H2N2), and the 1968 Influenza Pandemic (H3N2). The 21st Century had 2 Pandemics (WHO): 2009 Swine Flu (H1N1) and 2020 Covid-19.
- 2 2020 state and federal declarations for Covid-19; the NCDC does not track pandemics.
- HOW MANY CASES OF COVID WERE REPORTED FOR THE CITY? DEATHS?
- THE CITY DID REMAIN OPEN? TYPES OF RESTRICTIONS?
- WHAT ARE CITY'S BIGGEST COVID-19 IMPACTS/RESPONSE EFFORTS/PRIMARY ISSUES/CONCERNS?
- Likelihood of Future Occurrence: Likely
- Vulnerability: High
- Non-Priority Hazard?

Severe Weather

Extreme Heat

- Annual occurrences – it gets hot every summer. In Placentia, according to the WRCC, monthly average maximum temperatures in the warmest months (June through September) range from the upper-70s to the mid-80s. The highest recorded daily extreme was 112°F on June 14, 1917. In a typical year, maximum temperatures exceed 90°F on 24.8 days.
- The NCDC data shows 52 extreme heat incidents for Placentia since 1996.
- ANY NOTABLE EXTREME HEAT EVENTS? ANY EVENTS WHERE COOLING CENTERS WERE OPENED?
- BIGGEST ISSUES/CONCERNS?
- Climate change will affect this hazard in the future.
- Likelihood of Future Occurrence: Highly Likely
- Vulnerability: Medium
- Priority Hazard

Heavy Rains and Storms (Thunderstorms, Hail, Lightning)

- Significant City history: Average annual precipitation in the City is 13.69 inches per year. The highest recorded annual precipitation is 32.36 inches in 1941; the highest recorded precipitation for a 24-hour period is 4.69 inches on February 16, 1972. The lowest recorded annual precipitation was 3.55 inches in 1961. Lightning and damaging hail is rare in the City – TRUE?
- There have been 20 state and 18 federal disaster declarations in Orange County related to heavy rains and storms and associated flooding. Many of these likely affected Placentia.
- The NCDC identifies 145 heavy rain and flood events since 1996 including lightning, hail. Many of these likely affected Placentia. Severe storms/heavy rains are the primary cause of most major flooding.
- ANY NOTABLE HEAVY RAINS/STORM EVENTS THAT CAUSED DAMAGES? PAST PA CLAIMS? JANUARY 2023? FEBRUARY 2023? 2017?
- WHAT ARE THE CITIES GREATEST VULNERABILITIES/ISSUES/CONCERNS?
- Likelihood of Future Occurrence: Highly Likely
- Vulnerability: Medium
- Priority Hazard

High Winds and Tornadoes

- Annual occurrences of wind events
- There have been no past federal or state disaster declarations due to high winds or tornadoes in Orange County.
- The NCDC data recorded high wind (270) and tornado (31) incidents for Orange County since 1955. Many of these likely affected Placentia.
- ANY NOTABLE HIGH WINDS OR TORNADO EVENTS THAT CAUSED DAMAGES IN THE CITY? DATES? NATURE AND EXTENT OF DAMAGES?
- WHAT TYPE OF RED FLAG DAYS AND/OR PSPS EVENTS HAS THE CITY EXPERIENCED?
- WHAT ARE THE BIGGEST VULNERABILILITIES/ISSUES/CONCERNS?

- Likelihood of Future Occurrence: Highly Likely
- Vulnerability: Medium
- Priority Hazard?

Subsidence

- Subsidence can be caused by natural geologic processes or by human activity such as subsurface mining or pumping of oil or groundwater.
- In Placentia, the backfilling and settling of the ground over abandoned mine workings and oil and gas wells may create the potential for subsidence to occur.
- ARE THERE OTHER KNOWN CONCERNS CREATING SUBSIDENCE CONDITIONS IN THE CITY?
- THE SAFETY ELEMENT INCLUDED AN OIL AND GAS WELL MAP. ARE THERE SPECIFIC KNOWN AREAS PRONE TO SUBSIDENCE?
- CAN THE CITY PROVIDE INFORMATION ON PAST SUBSIDENCE ISSUES/EVENTS?
- Likelihood of Future Occurrence: Unlikely
- Vulnerability: Low
- Non-Priority Hazard

Urban Fire

- Urban fires occur on an annual basis in Placentia – TRUE?
- Any ignition has the potential to become an out of control fire.
- No disaster declarations or NCDC events for urban fires in the City.
- WE NEED DATA TO SUPPORT THIS HAZARD. HOW MANY FIRE RELATED CALLS OCCUR EACH YEAR FOR STRUCTURE OR OTHER FIRES? HOW MANY STRUCTURES BURN OR ARE DAMAGED EACH YEAR? DATES? DAMAGES?
- WHAT OTHER DATA DOES THE CITY HAVE TO SUPPORT THIS HAZARD?
- Likelihood of Future Occurrence: Highly Likely?
- Vulnerability: Medium?
- Priority Hazard

Wildfire

- There have been no recorded wildfires occurring within the City of Placentia
- Any ignition has the potential to become an out of control wildfire.
- 6 federal and 18 state disaster declarations in Orange County since 1950. 38 NCDC events.
- The City noted their biggest issues with nearby wildfires, especially in recent years, are associated with smoke and air quality issues.
- DOES THE CITY HAVE ANY DATA/RECORDS/REPORTS OF THE SMOKE/AIR QUALITY ISSUES IN RECENT YEARS?
- 2 residential parcels (1 acre) is located in a High Fire Hazard Severity Zone (FHSZ) (very upper northeast area of City). The rest of the City falls into the Urban Unzoned FHSZ. (FHSZ based on fuels, terrain, weather, and other relevant factors)
- 4 parcels in the High Threat, 4 in the Moderate Threat, and 3 in the Low Threat areas for wildfire. The rest of City parcels fall within a classification of No Threat. (Fire Threat a combination of fire frequency or the likelihood of a given area to burn, and potential fire behavior)

- Likelihood of Future Occurrence: Unlikely, Occasional?
- Vulnerability: Low?
- Non-Priority Hazard?

Data Needs

Review of Key Items

- Hazard-specific data: Historic Hazard Worksheets or list of past hazard occurrences and issues/ impacts/concerns/vulnerabilities to the City from hazards
- Risk Assessment Worksheet - to be addressed with internal City planning team June 6th (Zoom) 9:00 – 10:30 am
- Future Development – Need APNs associated with identified Future Development/Redevelopment areas
- Critical Facilities – need CF definition and GIS layer finalized – to be addressed with internal City staff May 22 (Zoom) 1:00 – 2:00 pm
- Photos, Photos, Photos

A.8.3. Public Meeting #2 Handouts

There were no handouts at this meeting. A PowerPoint presentation was used.

A.8.4. Mitigation Strategy Meeting Handouts

These can be found in Appendix C of this Plan.

A.8.5. Final Meeting Handouts for HMPC

No handouts were used at the final meeting.

A.8.6. Public Meeting #3 Handouts for Public

No handouts were used at the final public meeting.

Appendix B References

- 2019 City of Placentia General Plan
- 2019 City of Placentia Safety Element
- 2021 County of Orange and Orange County Fire Authority Hazard Mitigation Plan
- 2021-2029 City of Placentia Housing Element
- 2023 (Draft) State Hazard Mitigation Plan
- CA DWR Best Available Maps
- Cal Adapt – Extended Drought Scenarios
- CAL FIRE GIS datasets
- Cal OES
- Cal-Adapt
- Cal-Adapt – Annual Average of Acres Burned
- Cal-Adapt – Number of Extreme Heat Days by Year
- Cal-Adapt – Precipitation: Decadal Averages Map
- CalAtlas
- California Adaptation Planning Guide
- California Climate Adaptation Strategy (CAS) – 2021
- California Department of Finance
- California Department of Fish and Wildlife
- California Department of Parks and Recreation Office of Historic Preservation
- California Department of Water Resources
- California Department of Water Resources (CA DWR) Division of Safety of Dams
- California Department of Water Resources Best Available Maps
- California Department of Water Resources Division of Safety of Dams
- California Division of Mines and Geology
- California Geological Survey
- California Natural Diversity Database
- California Office of Emergency Services – Dam Inundation Data
- California's Drought of 2007-2009, An Overview. State of California Natural Resources Agency, California Department of Water Resources.
- City of Placentia GIS
- City of Placentia staff
- Climate Change and Health Profile Report – Orange County
- Existing plans and studies
- FEMA
- FEMA Disaster Declaration Database
- FEMA: Building Performance Assessment: Oklahoma and Kansas Tornadoes
- FEMA's HAZUS-MH 6.0 GIS-based inventory data
- Hazus MH 6.0
- HMPC input
- IPCC Fifth Assessment Synthesis Report (2014)
- Kenward, Alyson PhD, Adams-Smith, Dennis, and Raja, Urooj. Wildfires and Air Pollution – The Hidden Health Hazards of Climate Change. Climate Central. 2013.
- Levees in History: The Levee Challenge. Dr. Gerald E. Galloway, Jr., P.E., Ph.D., Water Policy Collaborative, University of Maryland, Visiting Scholar, USACE, IWR.

- Liu, J.C., Mickley, L.J., Sulprizio, M.P. et al. Climatic Change. 138: 655. doi:10.1007/s10584-016-1762-6. 2016.
- Multi-Hazard Identification and Risk Assessment, FEMA 1997
- National Drought Mitigation Center
- National Drought Mitigation Center – Drought Impact Reporter
- National Integrated Drought Information System
- National Levee Database
- National Oceanic and Atmospheric Administration (NOAA) National Climatic Data Center (NCDC) Storm Events Database
- National Weather Service
- Natural Resource and Conservation Service
- NOAA Storm Prediction Center
- Orange County Assessor Data
- Personal interviews with planning team members and staff from the City
- Proceedings of the National Academy of Sciences
- Public Health Alliance of Southern California
- Public Policy Institute of California
- Science Magazine
- Southern California Edison
- State of California Department of Conservation
- Statewide GIS datasets from other agencies such as Cal OES, FEMA, USGS, CGS, Cal Atlas, and others
- U.S. Census Bureau 2020 Household Population Estimates
- U.S. Fish and Wildlife Service
- U.S. Fish and Wildlife Service's National Wetlands Inventory maps
- U.S. Forest Service GIS datasets
- U.S. Geological Survey
- U.S. Occupational Safety and Health Administration
- United States Geological Survey Open File Report 2015-3009
- University of California
- US Army Corps of Engineers
- US Census Bureau
- US Fish and Wildlife Service
- USGS Bulletin 1847
- USGS National Earthquake Information Center
- USGS Publication 2014-3120
- Vaisala National Lightning Detection Network
- Western Regional Climate Center
- Written descriptions of inventory and risks provided by City staff

Appendix C Mitigation Strategy

City of Placentia
Local Hazard Mitigation Plan
HMPC Meetings #3 & #4 - Mitigation Strategy Meetings
July 11 & 12, 2023

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AGENDA

City of Placentia
Local Hazard Mitigation Plan (LHMP)
HMPC Meetings #3 & #4 - Mitigation Strategy Meetings
July 11 & 12, 2023

HMPC Meeting #3:

1. Introductions
2. LHMP Project Status and Next Steps/Timeline
3. Risk Assessment Summary Overview
4. Priority Hazards Review
5. Develop Plan Goals and Objectives
6. Introduction to HMPC Meeting #4: Mitigation Alternatives/Actions/Projects

HMPC Meeting #4:

1. Introductions
2. Review Mitigation Categories and Selection Criteria
3. Brainstorming of Mitigation Alternatives/Actions/Projects by Hazard
4. Prioritization of Mitigation Actions/Projects
5. Questions

Mitigation Strategy Meetings
July 11 & 12, 2023
Day 1
Status of the 2023 City of Placentia LHMP Project/Next Steps

FEMA's 4-Phase-10 Step DMA/CRS Planning Process

Phase I: Organize Resources

1) Get organized

2) Plan for public involvement

3) Coordinate with other departments and agencies

Phase II: Risk Assessment

4) Identify the hazard(s)

5) Assess the risks

Capability Assessment

Phase III: Mitigation Strategy

6) Set planning goals

7) Review mitigation alternatives

8) Draft and action plan

Phase IV: Adoption and Implementation

9) Adopt the plan

10) Implement the plan, evaluate its worth, and revise as needed

LHMP Project Schedule/Key Dates

2023 LHMP Update Meetings

- **July 11** (Tuesday) HMPC Meeting #3 (Mitigation Strategy: Goals Development) (1:30-4:30 pm)
- **July 12** (Wednesday) HMPC Meeting #4 (Mitigation Strategy: Actions and Projects) (9:00 am -12:00 pm)
- **November 1** (Wednesday) Public Meeting #3 (5:30-7:00 pm)
- **November 2** (Thursday) HMPC Meeting #5 (9:00-11:30 pm)

Mitigation Strategy Meetings - Follow up

- **July 19 (**Wednesday**)** Mitigation Strategy Actions and Projects processed and sent to City
- **August 18 (Friday)** Planning Team Mitigation Action (Project) Worksheets due to Foster Morrison

LHMP Document Drafts

- **August 31 (Friday):** HMPC (First) Draft LHMP to City
- **September 28** (Thursday): HMPC comments due on Draft Plan
- **October 12** (Thursday): Comments incorporated into Public Review (Second) Draft to City/HMPC
- **October 18** (Wednesday): Public Review Draft on City website
- **November 9** (Thursday**):** all City/HMPC and Public input to Foster Morrison
- **November 17-22:** City/HMPC and Public comments incorporated and LHMP submittal to Cal OES – November 2023

City of Placentia Hazard Identification & Profiles

Hazard*	Geographic Extent	Probability of Future Occurrences	Magnitude/ Severity	Significance	Climate Change Influence
Climate Change	Extensive	Highly Likely	Limited	Medium	--
Dam Failure	Significant	Unlikely	Critical	High	Medium
Drought & Water Shortage	Extensive	Highly Likely	Limited	Medium	High
Earthquake, Earthquake Liquefaction, and Earthquake Induced Landslides	Extensive	Likely	Catastrophic	High	Low
Flood: 1%/0.2% annual chance	Significant	Occasional/Unlikely	Limited	Medium	High
Flood: Localized/Stormwater Flooding	Extensive	Highly Likely	Limited	Medium	Medium
Haz Mat Transportation Release	Significant	Unlikely	Critical	Low	Low
Landslide	Limited	Likely	Limited	Low	Medium
Levee Failure	Significant	Unlikely	Limited	Low	Medium
Natural Gas Pipeline	Significant	Unlikely	Critical	Medium	Low
Pandemic	Extensive	Likely	Critical	Medium	Low
Severe Weather: Extreme Heat	Extensive	Highly Likely	Limited	Medium	High
Severe Weather: Heavy Rain and Storms (with thunderstorm winds)	Extensive	Highly Likely	Limited	Medium	High
Severe Weather: High Winds and Tornado	Extensive	Highly Likely	Limited	Low	Medium
Subsidence	Limited	Unlikely	Limited	Low	Low
Urban Fire	Limited	Highly Likely	Limited	High	Low
Wildfire (with smoke/ air quality)	Limited/Ext	Highly Likely	Limited	Low	High

Geographic Extent
Limited: Less than 10% of planning area
Significant: 10-50% of planning area
Extensive: 50-100% of planning area

Probability of Future Occurrences
Highly Likely: Near 100% chance of occurrence in next year, or happens every year.
Likely: Between 10 and 100% chance of occurrence in next year, or has a recurrence interval of 10 years or less.
Occasional: Between 1 and 10% chance of occurrence in the next year, or has a recurrence interval of 11 to 100 years.
Unlikely: Less than 1% chance of occurrence in next 100 years, or has a recurrence interval of greater than every 100 years.

Magnitude/Severity
Catastrophic: More than 50 percent of property severely damaged; shutdown of facilities for more than 30 days; and/or multiple deaths
Critical: 25-50 percent of property severely damaged; shutdown of facilities for at least two weeks; and/or injuries and/or illnesses result in permanent disability
Limited: 10-25 percent of property severely damaged; shutdown of facilities for more than a week; and/or injuries/illnesses treatable do not result in permanent disability
Negligible: Less than 10 percent of property severely damaged, shutdown of facilities and services for less than 24 hours; and/or injuries/illnesses treatable with first aid

Significance
Low: minimal potential impact
Medium: moderate potential impact
High: widespread potential impact

Climate Change Influence
Low: minimal potential impact
Medium: moderate potential impact
High: widespread potential impact

Risk Assessment Methodology

Calculating Likelihood of Future Occurrence

The frequency of past events is used in this section to gauge the likelihood of future occurrences. Based on historical data, the likelihood of future occurrence is categorized into one of the following classifications:

- **Highly Likely**: Near 100% chance of occurrence in next year, or happens every year.
- **Likely**: Between 10 and 90% chance of occurrence in next year, or has a recurrence interval of 10 years or less.
- **Occasional**: Between 1 and 10% chance of occurrence in the next year, or has a recurrence interval of 11 to 100 years.
- **Unlikely**: Less than 1% chance of occurrence in next 100 years, or has a recurrence interval of greater than every 100 years.

Calculating Vulnerability

Vulnerability is measured in general, qualitative terms, and is a summary of the potential impact based on past occurrences, spatial extent, and damage and casualty potential:

- **Extremely Low**: The occurrence and potential cost of damage to life and property is very minimal to non-existent.
- **Low**: Minimal potential impact. The occurrence and potential cost of damage to life and property is minimal.
- **Medium**: Moderate potential impact. This ranking carries a moderate threat level to the general population and/or built environment. Here the potential damage is more isolated and less costly than a more widespread disaster.
- **High**: Widespread potential impact. This ranking carries a high threat to the general population and/or built environment. The potential for damage is widespread. Hazards in this category may have already occurred in the past.
- **Extremely High**: Very widespread and catastrophic impact.

Defining Significance (Priority) of a Hazard

Defining the significance or priority of a hazard to a community is based on a subjective analysis of several factors. This analysis is used to focus and prioritize hazards and associated mitigation measures for the plan. These factors include the following:

- **Past Occurrences**: Frequency, extent, and magnitude of historic hazard events.
- **Likelihood of Future Occurrences**: Based on past hazard events.
- **Ability to Reduce Losses through Implementation of Mitigation Measures**: This looks at both the ability to mitigate the risk of future occurrences as well as the ability to mitigate the vulnerability of a community to a given hazard event.

Risk Assessment Summary: City of Placentia

Climate Change

- The 2013, 2018, and 2023 State of California Hazard Mitigation Plan states that climate change is already affecting California. Sea levels have risen by as much as seven inches along the California coast over the last century, increasing erosion and pressure on the state's infrastructure, water supplies, and natural resources. The State has also seen increased average temperatures, more extreme hot days, fewer cold nights, a lengthening of the growing season, shifts in the water cycle with less winter precipitation falling as snow, and both snowmelt and rainwater running off sooner in the year. Severe storms (snow and precipitation) of 2022/2023 further demonstrate the impacts of Climate Change. Climate Change has the potential to alter the nature and frequency of most hazards.
- Likelihood of Future Occurrence: Highly Likely
- Vulnerability: Medium
- Priority Hazard

Dam Failure

- There are 43 dams in Orange County constructed for flood control, storage, electrical generation, and recreational purposes. Of the 43 dams, 16 are rated as Extremely High, 22 are rated as High Hazard, 3 as Significant Hazard, and 2 as Low Hazard.
- Of these 43 Orange County dams, 4 dams are identified with an inundation area within Placentia: Carbon Canyon (HH), Deimer Reservoir (EH), Deimer Ozone Contact Basin (EH), and Yorba Dam (EH)
- 1 additional dam, the Prado Dam (HH) located in San Bernadino County also has the potential to impact Placentia.
- No disaster declarations or dam failures events were identified for any of these dams.
- Likelihood of Future Occurrence: Unlikely
- Vulnerability: High
- Priority Hazard

Drought and Water Shortage

- Historical drought data for the City of Placentia and region indicate there have been 5 significant multi-year droughts in the last 84 years.
- Orange County: 1 state disaster declaration in 2014; no federal disaster declarations. NCDC shows 26 drought events since 1950. Many of these likely affected Placentia.
- GSWC Placentia-Yorba Linda has reliable supplies to meet its retail customer demands in normal, single dry years, and five consecutive dry year conditions through 2045.
- Yorba Linda Water District is projected to meet full-service demands through 2045 due to diversified supply and conservation measures.
- Likelihood of Future Occurrence: Drought – Likely; Water Shortage – Occasional
- Vulnerability: Medium
- Priority Hazard

Earthquake

- Geological data indicates that Placentia is located within an area of relatively high seismic activity and is located within a fairly active fault area. Faults near the City include 8 active faults and 1 inactive fault. The City is not located in an Alquist Priolo zone, indicating no known potential for surface rupture from an underlying fault.

- There have been 2 disaster declarations in Orange County related to earthquake. These are the 1987 5.9 Whittier Narrows Earthquake and the 1994 6.7 Northridge Earthquake.
- USGS reports 120 earthquakes of 5.0 magnitude or greater within 90 miles of Placentia since 1850.
- Likelihood of Future Occurrence: Occasional – large, damaging earthquake; Highly Likely – minor earthquake
- Vulnerability: Extremely High
- Priority Hazard

Earthquake Liquefaction

- Placentia has mapped liquefaction areas predominantly in the southern portion of the City.
- No data on past liquefaction events/issues in the City.
- Likelihood of Future Occurrence: Occasional – large, damaging earthquake; Highly Likely – minor earthquake (Liquefaction may occur during earthquake events)
- Vulnerability: Medium
- Priority Hazard

Flood Hazards

1%/0.2% year

- Historically, portions of Placentia have always been at risk to flooding because of its annual percentage of rainfall and the waterways that traverse the City.
- There have been 20 state and 18 federal disaster declarations in Orange County related to flooding, heavy rains and storms. Some of these likely affected Placentia.
- The NCDC identifies 145 flooding and heavy rain events since 1996. Some of these also likely affected Placentia.
- 202 City parcels (94 acres) located in 1% annual chance and 1,886 parcels (764 acres) located in the 0.2% floodplain.
- Likelihood of Future Occurrence: 1%-Occasional; 0.2%-Unlikely
- Vulnerability: Medium
- Priority Hazard

Localized/Stormwater flooding

- Localized flooding occurs annually in the City during heavy storm events.
- Likelihood of Future Occurrence: Highly Likely
- Vulnerability: Medium
- Priority Hazard

Hazardous Materials Transportation Release

- Much of the hazardous materials transported through Placentia is carried by truck on the State Highways or by railway systems.
- State Roads 57, 91, and 55 are all routes that carry hazardous materials. The Atchison, Topeka, and Santa Fe Railway also transports hazardous materials.
- The United States Department of Transportation Pipeline and Hazardous Materials Safety Administration's (PHMSA) Office of Hazardous Materials Safety tracks transportation incidents: 2 rail and roadway incidents have occurred since 1970. These were both miner and cleaned up without further issue.
- Likelihood of Future Occurrence: Unlikely

- Vulnerability: High
- Non-Priority Hazard

Landslides

- There have been no disaster declarations associated with landslides in Orange County. The NCDC contains no records of landslides in the County. Based on information reviewed to date, no notable landslide events have occurred in Placentia.
- Likelihood of Future Occurrence: Unlikely
- Vulnerability: Low
- Non-Priority Hazard

Levee Failure

- FIS indicates the Santa Ana River Levee System protects properties in the Southeast portion of the City. 180 parcels (127 acres) located in the X-protected by levee flood zone.
- There have been no disaster declarations or NCDC events for levee failure in Orange County or associated with the Santa Ana River Levee System.
- Likelihood of Future Occurrence: Unlikely
- Vulnerability: Low
- Non-Priority Hazard

Natural Gas Pipeline

- Southern California Gas owns the pressurized gas pipeline that extends through part of the City.
- There have been no disaster declarations or NCDC events associated with the natural gas pipeline in Orange County.
- According to information provided by SoCal Gas, they rigorously maintain and monitor their pipelines. Regulators have consistently found that they meet or exceed all federal and state requirements for safe pipeline operations and maintenance. SoCal Gas indicates there has not been any past issues with the gas pipeline in Placentia.
- Likelihood of Future Occurrence: Unlikely
- Vulnerability: Medium
- Non-Priority Hazard

Pandemic

- The 20th Century had 3 Pandemics (WHO): 1918-1919 Influenza Pandemic (H1N1),1957-1958 Influenza Pandemic (H2N2), and the 1968 Influenza Pandemic (H3N2). The 21st Century had 2 Pandemics (WHO): 2009 Swine Flu (H1N1) and 2020 Covid-19.
- 2 2020 state and federal declarations for Covid-19; the NCDC does not track pandemics.
- Likelihood of Future Occurrence: Likely
- Vulnerability: High
- Priority Hazard

Severe Weather

Extreme Heat

- Annual occurrences – it gets hot every summer. In Placentia, according to the WRCC, monthly average maximum temperatures in the warmest months (June through September) range from the upper-70s to

the mid-80s. The highest recorded daily extreme was 112°F on June 14, 1917. In a typical year, maximum temperatures exceed 90°F on 24.8 days.

- The NCDC data shows 52 extreme heat incidents for Orange County/Placentia since 1996.
- Climate change will affect this hazard in the future.
- Likelihood of Future Occurrence: Highly Likely
- Vulnerability: Medium
- Priority Hazard

Heavy Rains and Storms (Thunderstorms, Hail, Lightning)

- Significant City history: Average annual precipitation in the City is 13.69 inches per year. The highest recorded annual precipitation is 32.36 inches in 1941; the highest recorded precipitation for a 24-hour period is 4.69 inches on February 16, 1972. The lowest recorded annual precipitation was 3.55 inches in 1961. Lightning and damaging hail is rare in the City.
- There have been 20 state and 18 federal disaster declarations in Orange County related to heavy rains and storms and associated flooding. Many of these likely affected Placentia.
- The NCDC identifies 145 heavy rain and flood events since 1996 including lightning, hail. Many of these likely affected Placentia. Severe storms/heavy rains are the primary cause of most major flooding.
- Likelihood of Future Occurrence: Highly Likely
- Vulnerability: Medium
- Priority Hazard

High Winds and Tornadoes

- Annual occurrences of wind events
- There have been no past federal or state disaster declarations due to high winds or tornadoes in Orange County.
- The NCDC data recorded high wind (270) and tornado (31) incidents for Orange County since 1955. Many of these likely affected Placentia.
- Likelihood of Future Occurrence: Highly Likely
- Vulnerability: Medium
- Non-Priority Hazard

Subsidence

- Subsidence can be caused by natural geologic processes or by human activity such as subsurface mining or pumping of oil or groundwater.
- In Placentia, the backfilling and settling of the ground over abandoned mine workings and oil and gas wells may create the potential for subsidence to occur.
- Likelihood of Future Occurrence: Unlikely
- Vulnerability: Low
- Non-Priority Hazard

Urban Fire

- Urban fires occur on an annual basis in Placentia.
- Any ignition has the potential to become an out of control fire.
- No disaster declarations or NCDC events for urban fires in the City.
- Likelihood of Future Occurrence: Highly Likely
- Vulnerability: Medium

- Priority Hazard

Wildfire

- There have been no recorded wildfires occurring within the City of Placentia
- Any ignition has the potential to become an out of control wildfire.
- 6 federal and 18 state disaster declarations in Orange County since 1950. 38 NCDC events.
- The City noted their biggest issues with nearby wildfires, especially in recent years, are associated with smoke and air quality issues.
- 2 residential parcels (1 acre) is located in a High Fire Hazard Severity Zone (FHSZ) (very upper northeast area of City). The rest of the City falls into the Urban Unzoned FHSZ. (FHSZ based on fuels, terrain, weather, and other relevant factors)
- 4 parcels in the High Threat, 4 in the Moderate Threat, and 3 in the Low Threat areas for wildfire. The rest of City parcels fall within a classification of No Threat. (Fire Threat a combination of fire frequency or the likelihood of a given area to burn, and potential fire behavior)
- Likelihood of Future Occurrence: Unlikely
- Vulnerability: Low
- Non-Priority Hazard

City of Placentia Priority Hazards

- Climate Change
- Dam Failure
- Drought & Water Shortage
- Earthquake/Earthquake Liquefaction
- Flood: 1%/0.2% annual chance
- Flood: Localized/Stormwater
- Pandemic
- Severe Weather: Extreme Heat
- Severe Weather: Heavy Rains and Storms
- Urban Fire

Non-Priority Hazards:

- Hazardous Materials Transportation
- Landslides
- Levee Failure
- Natural Gas Pipeline
- High Winds and Tornadoes
- Subsidence
- Wildfire

Data Needs

Review of Key Items to Date

- Risk Assessment Worksheet
- Critical Facility GIS data

Other Data Items

- Photos, Photos, Photos
- Mitigation Action Worksheets due **by August 18**

Mitigation Strategy: Goals

The most important element of the LHMP is the resulting mitigation strategy which serves as the long-term blueprint for reducing the potential losses identified in the risk assessment. The mitigation strategy is comprised of three components:

6. Mitigation Goals
7. Mitigation Actions
8. Mitigation Action (Implementation) Plan

Mitigation Goals

Up to now, the HMPC has been involved in collecting and providing data for the Placentia Local Hazard Mitigation Plan. From this information, a Risk Assessment has been developed that describes the risk and vulnerability of the Placentia Planning Area to identified hazards and includes an assessment of the area's current capabilities for countering these threats through existing policies, regulations, programs, and projects.

This analysis identifies areas where improvements could or should be made. Formulating Goals will lead to incorporating these improvements into the Mitigation Strategy portion of the LHMP. Our planning goals should provide direction for what loss reduction activities can be undertaken to make the City Planning Area more disaster resistant.

Mitigation Goals are general guidelines that represent the community's vision for reducing or avoiding losses from identified hazards. Goals are stated without regard for achievement, that is, implementation, cost, schedule, and means are not considered.

Goals are public policy statements that:

- **Represent basic desires of the jurisdiction;**
- **Encompass all aspects of planning area, public and private;**
- **Are nonspecific, in that they refer to the quality (not the quantity) of the outcome;**
- **Are future-oriented, in that they are achievable in the future; and**
- **Are time-independent, in that they are not scheduled events.**

  - ***While goals are not specific (quantitative), they should not be so general as to be meaningless or unachievable.***

  - ***Goal statements may form the basis for objectives. They should be stated in such a way as to develop one or more objectives related to each goal.***

  - ***The key point in writing goals is to remember that they must deal with results, not the activities that produce those results.***

  - ***Consider other planning area goals from other regional/county/city programs, plans and priorities.***

Types/Sources of other area mitigation plans/ programs include:

- General Plans
- Stormwater Program and Plans
- Flood/Watershed Management Plans and Studies
- Drought Plans, Urban/Integrated Regional Water Management Plan
- Community Wildfire Protection Plans
- Strategic Fire Plans
- Dam Emergency Action Plans
- Emergency Operations Plans
- Climate Adaptation Plans
- Others?

2018 California State Hazard Mitigation Plan Goals

1. Significantly reduce life loss and injuries.

2. Minimize damage to structures and property, as well as minimizing interruption of essential services and activities.

3. Protect the environment.

4. Promote community resilience through integration of hazard mitigation with public policy and standard business practices.

2023 (Draft) State Hazard Mitigation Plan Goals

GOAL 1—Significantly reduce risk to life, community lifelines, the environment, property, and infrastructure by planning and implementing whole-community risk reduction and resilience strategies.

GOAL 2—Build capacity and capabilities to increase disaster resilience among historically underserved populations, individuals with access and functional needs, and communities disproportionately impacted by disasters and climate change.

GOAL 3—Incorporate equity metrics, tools, and strategies into all mitigation planning, policy, funding, outreach, and implementation efforts.

GOAL 4—Apply the best available science and authoritative data to design, implement, and prioritize projects that enhance resilience to natural hazards and climate change impacts.

GOAL 5—Integrate mitigation principles into laws, regulations, policies, and guidance to support equitable outcomes to benefit the whole community.

GOAL 6— Significantly reduce barriers to timely, efficient, and effective hazard mitigation planning and action.

2019 City of Placentia General Plan Safety Element Goals

Geologic and Seismic Hazards

GOAL SAF - 1 Minimize the risk to public health and safety and disruptions to vital services, economic vitality, and social order resulting from seismic and geologic activities.

Urban Fire Hazards

GOAL SAF - 2 Protect the lives and property and minimize the exposure of residents, businesses owners, and visitors from the hazards of urban fires.

Flood & Dam Inundation Hazards

GOAL SAF - 3 Reduce, to the greatest extent possible, the risk to life, property, and public investment by flood hazards.

Hazardous Materials and Waste

GOAL SAF - 4 Decrease the risk of exposure for life, property and the environment to hazardous materials and hazardous waste.

Climate Change

GOAL SAF - 5 Increase Placentia's ability to adapt and become resilient to the effects of climate change, including extreme heat and poor air quality, while achieving other health and environmental benefits.

Police and Law Enforcement

GOAL SAF - 6 Maintain law and order in the City for the safety of the community through programs that promote positive partnerships between neighbors and the Police Department.

Disaster Preparedness, Response and Recovery

GOAL SAF - 7 Minimize the risk to life and property through emergency preparedness and public awareness.

Other Example Goal Statements

- Minimize risk and vulnerability from natural hazards
- Increase communities' awareness of vulnerability to hazards
- Increase the use of shared resources
- Improve communities' capabilities to mitigate losses
- Maintain coordination of disaster plans with changing DHS/FEMA needs
- Maintain FEMA eligibility/position jurisdictions for grant funding
- Maintain/enhance the flood mitigation program to provide 200/500-year flood protection
- Maintain current service levels
- Provide protection for existing buildings from hazards
- Provide protection for future development from hazards
- Provide protection for natural and cultural resources from hazard impacts
- Provide protection for people's lives from hazards
- Provide protection for public health
- Provide protection for critical services (fire, police, etc.) from hazard impacts
- Provide protection for critical lifeline utilities from hazard impacts
- Reduce exposure to hazard related losses
- Reduce the number of emergency incidents
- Make better use of technology

General Recommendation for Categories of Goals

- Reduce Losses/Protection of Life, Property, Public Health, and the Environment from all Hazards
- Reduce Losses/Protection of Critical Facilities and Infrastructure from all Hazards
- Public Education
- Increase County Capabilities to all Hazards
- Any Hazard-specific goals

Goals Development

The purpose of goal's development is to reach a consensus on goals for the Placentia 2023 LHMP. Provided above are example goals for this LHMP. ***You may reword those above or develop your own goals.*** These goal statements should serve as examples. It is vital that our Hazard Mitigation Planning Committee establish its own goals.

You will each be given 3 sticky notes. On each note you will write what you think the goals for this mitigation planning effort should be. Use one note card for each goal.

When done, we will:

- Pin/tape them to the wall/easel-chart and arrange them by category
- Combine and reword them into 3-5 goals for the plan and send them out to the HMPC for further review and refinement.

Mitigation Strategy Meetings
July 11 & 12, 2023
Day 2
Mitigation Strategy Action Development: Ground Rules

Rule 1: The City MUST have a Mitigation Action/Project to address each of their Priority Hazards (those rated as a high or medium significance in their Hazard Identification table).

Rule 2: Every Mitigation Action/Project MUST be supported by Risk Assessment Data contained within Chap 4 of the Base Plan. Note: this might necessitate backfilling the hazard risk assessment data.

Rule 3: The Mitigation Actions/Projects for this 2023 LHMP should reflect the City's WISH LIST for mitigation, regardless of funding source.

Rule 4: Any Mitigation Action/Project that might be considered for FEMA mitigation grant funding over the next 5-years covered by this LHMP MUST be included in this 2023 LHMP.

Rule 5: While the updated Mitigation Strategy should include all potential Mitigation Actions/Projects for the City (regardless of funding source), keep in mind that the City is not nobligated to implement ANY of the identified Mitigation Actions/Projects – all are always subject to funding and changing priorities.

Rule 6: Each Mitigation Action/Project to be included in this LHMP MUST have a Mitigation Action Worksheet completed by the owning Department or Agency.

Rule 7: The City CAN LATER include Mitigation Actions/Projects that might not get identified during this Mitigation Action/Project Prioritization process – the key is to complete a Mitigation Action Worksheet for any project to be included in the LHMP prior to submittal to Cal OES/FEMA.

REMEMBER: Having a FEMA approved LHMP for your Jurisdiction is a prerequisite for being eligible to apply for FEMA pre and post mitigation funding.

Mitigation Strategy: Actions

Mitigation Actions are specific projects and activities that help achieve the goals and accomplish risk reduction in the community.

Categories of Mitigation Actions

PREVENTION: Preventive measures are designed to keep the problem from occurring or getting worse. Their objective is to ensure that future development is not exposed to damage and does not increase damage to other properties.

- Planning
- Zoning
- Open Space Preservation
- Land Development Regulations
  - ✓ Subdivision regulations
  - ✓ Building Codes
    - Fire-Wise Construction
  - ✓ Floodplain development regulations
  - ✓ Geologic Hazard Areas development regulations (for roads too!)
- Storm Water Management
- Fuels Management, Fire-Breaks

EMERGENCY SERVICES: protect people during and after a disaster. A good emergency services program addresses all hazards. Measures include:

- Warning (flooding, tornadoes, winter storms, geologic hazards, fire)
  - ✓ NOAA Weather Radio
  - ✓ Sirens
  - ✓ "Reverse 911" (Emergency Notification System)
- Emergency Response
  - ✓ Evacuation & Sheltering
  - ✓ Communications
  - ✓ Backup power supply/generators
  - ✓ Emergency Planning
    - Activating the EOC (emergency management)
    - Closing streets or bridges (police or public works)
    - Shutting off power to threatened areas (utility company)
    - Holding/releasing children at school (school district)
    - Ordering an evacuation (mayor)
    - Opening emergency shelters (Red Cross)
    - Monitoring water levels (engineering)
    - Security and other protection measures (police)
- Critical Facilities Protection (Buildings or locations vital to the response and recovery effort, such as police/fire stations, hospitals, sewage treatment plants/lift stations, power substations)

- ✓ Buildings or locations that, if damaged, would create secondary disasters, such as hazardous materials facilities and nursing homes
- ✓ Lifeline Utilities Protection

➢ Post-Disaster Mitigation

➢ Building Inspections
- ✓ ID mitigation opportunities & funding before reconstruction

PROPERTY PROTECTION: Property protection measures are used to modify buildings subject to damage rather than to keep the hazard away. A community may find these to be inexpensive measures because often they are implemented by or cost-shared with property owners. Many of the measures do not affect the appearance or use of a building, which makes them particularly appropriate for historical sites and landmarks.

➢ Retrofitting/disaster proofing
- ✓ Floods
  - Wet/Dry floodproofing (barriers, shields, backflow valves)
  - Relocation/Elevation
  - Acquisition
  - Retrofitting
- ✓ High Winds/Tornadoes
  - Safe Rooms
  - Securing roofs and foundations with fasteners and tie-downs
  - Strengthening garage doors and other large openings
- ✓ Winter Storms
  - Immediate snow/ice removal from roofs, tree limbs
  - "Living" snow fences
- ✓ Geologic Hazards (Landslides, earthquakes, sinkholes)
  - Anchoring, bracing, shear walls
  - Dewatering sites, agricultural practices
  - Catch basins
- ✓ Drought
  - Improve water supply (transport/storage/conservation)
  - Remove moisture competitive plants (Tamarisk/Salt Cedar)
  - Water Restrictions/Water Saver Sprinklers/Appliances
  - Grazing on CRP lands (no overgrazing-see Noxious Weeds)
  - Create incentives to consolidate/connect water services
  - Recycled wastewater on golf courses
- ✓ Wildfire, Grassfires
  - Replacing building components with fireproof materials
  - Roofing, screening
  - Create "Defensible Space"
  - Installing spark arrestors
  - Fuels Modification
- ✓ Noxious Weeds/Insects

- Mowing
- Spraying
- Replacement planting
- Stop overgrazing
- Introduce natural predators

- Insurance

NATURAL RESOURCE PROTECTION: Natural resource protection activities are generally aimed at preserving (or in some cases restoring) natural areas. In so doing, these activities enable the naturally beneficial functions of floodplains and watersheds to be better realized. These natural and beneficial floodplain functions include the following:

- storage of floodwaters
- absorption of flood energy
- reduction in flood scour
- infiltration that absorbs overland flood flow
- groundwater recharge
- removal/filtering of excess nutrients, pollutants, and sediments from floodwaters
- habitat for flora and fauna
- recreational and aesthetic opportunities

Methods of protecting natural resources include:

- Wetlands Protection
- Riparian Area/Habitat Protection/Threatened-Endangered Species
- Erosion & Sediment Control
- Best Management Practices

Best management practices ("BMPs") are measures that reduce nonpoint source pollutants that enter the waterways. Nonpoint source pollutants come from non-specific locations. Examples of nonpoint source pollutants are lawn fertilizers, pesticides, and other farm chemicals, animal wastes, oils from street surfaces and industrial areas and sediment from agriculture, construction, mining and forestry. These pollutants are washed off the ground's surface by stormwater and flushed into receiving storm sewers, ditches and streams. BMPs can be implemented during construction and as part of a project's design to permanently address nonpoint source pollutants. There are three general categories of BMPs:

9. Avoidance: setting construction projects back from the stream.
10. Reduction: Preventing runoff that conveys sediment and other water-borne pollutants, such as planting proper vegetation and conservation tillage.
11. Cleanse: Stopping pollutants after they are en route to a stream, such as using grass drainageways that filter the water and retention and detention basins that let pollutants settle to the bottom before they are drained:

- Dumping Regulations
- Set-back regulations/buffers
- Fuels Management
- Water Use Restrictions

- Landscape Management
- Weather Modification

STRUCTURAL: Projects that have traditionally been used by communities to control flows and water surface elevations. Structural projects keep flood waters away from an area. They are usually designed by engineers and managed or maintained by public works staff. These measures are popular with many because they "stop" flooding problems. However, structural projects have several important shortcomings that need to be kept in mind when considering them for flood hazard mitigation:

- They are expensive, sometimes requiring capital bond issues and/or cost sharing with Federal agencies, such as the U.S. Army Corps of Engineers or the Natural Resources Conservation Service.
- They disturb the land and disrupt natural water flows, often destroying habitats or requiring Environmental Assessments.
- They are built to a certain flood protection level that can be exceeded by a larger flood, causing extensive damage.
- They can create a false sense of security when people protected by a structure believe that no flood can ever reach them.
- They require regular maintenance to ensure that they continue to provide their design protection level.

Structural measures include:

- Detention/Retention structures
- Erosion and Sediment Control
- Basins/Low-head Weirs
- Channel Modifications
- Culvert resizing/replacement/Maintenance
- Levees and Floodwalls
- Anchoring, grading, debris basins (for landslides)
- Fencing (for snow, sand, wind)
- Drainage System Maintenance
- Reservoirs (for flood control, water storage, recreation, agriculture)
- Diversions
- Storm Sewers

PUBLIC INFORMATION: A successful hazard mitigation program involves both the public and private sectors. Public information activities advise property owners, renters, businesses, and local officials about hazards and ways to protect people and property from these hazards. These activities can motivate people to take protection:

- Hazard Maps and Data
- Outreach Projects (mailings, media, web, speakers, displays)
- Library Resources
- Real Estate Disclosure
- Environmental Education

Mitigation Strategy: Action (Implementation) Plan

The mitigation action plan describes how the mitigation actions will be implemented, including how those actions will be prioritized, administered, and incorporated into the community's existing planning mechanism. Each participating jurisdiction must have a mitigation action(s) and an action plan specific to that jurisdiction and its priority hazards and vulnerabilities.

Mitigation Criteria

For use in selecting and prioritizing Proposed Mitigation Measures

1. STAPLEE

Social: Does the measure treat people fairly? (different groups, different generations)

- Community Acceptance
- Effect on Segment of Population
- Social Benefits

Technical: Will it work? (Does it solve the problem? Is it feasible?)

- Technical Feasibility
- Reduce Community Risk
- Long Term Solution/Sustainable
- Secondary Impacts

Administrative: Do you have the capacity to implement & manage project?

- Staffing
- Funding Allocated
- Maintenance/Operations

Political: Who are the stakeholders? Did they get to participate? Is there public support? Is political leadership willing to support?

- Political Support
- Local Champion
- Public Support
- Achieves Multiple Objectives
- Supported by a broad array of Stakeholders

Legal: Does your organization have the authority to implement? Is it legal? Are there liability implications?

- Existing Local Authority
- State Authority
- Potential Legal Challenges

Economic: Is it cost-beneficial? Is there funding? Does it contribute to the local economy or economic development?

- Benefit of Action
- Cost of Action
- Cost Effective/Economic Benefits
- Economically Viable
- Outside Funding Required

Environmental: Does it comply with Environmental regulations?

- Effect on Land/Water
- Effect on Endangered Species
- Effect on Cultural Resources
- Effect on Hazmat sites
- Consistent with Community Environmental Goals
- Consistent with Environmental Laws
- Environmental Benefits

2. SUSTAINABLE DISASTER RECOVERY

- Quality of Life
- Social Equity
- Hazard Mitigation
- Economic Development
- Environmental Protection/Enhancement
- Community Participation

3. SMART GROWTH PRINCIPLES

- Infill versus Sprawl
- Efficient Use of Land Resources
- Full Use of Urban Resources
- Mixed Uses of Land
- Transportation Options
- Detailed, Human-Scale Design

4. OTHER

- Does measure address area with highest risk?
- Does measure protect …
  - ✓ The largest # of people exposed to risk?
  - ✓ The largest # of buildings?
  - ✓ The largest # of jobs?
  - ✓ The largest tax income?
  - ✓ The largest average annual loss potential?
  - ✓ The area impacted most frequently?
  - ✓ Critical Infrastructure (access, power, water, gas, telecommunications)
- Timing of Available funding
- Visibility of Project
- Community Credibility

Mitigation Action Prioritization Instructions

The committee's brainstormed list of mitigation actions and projects are organized by hazard and posted on flip-chart paper around the room.

You each have 3 sets of colored dots:

- 3 red dots
- 3 blue dots
- 3 green dots

The red dots are for high priority (5 points each)

The blue dots are for medium priority (3 points each)

The green dots are for low priority (1 point each)

Place your dots on the recommendations, using the different colors to indicate your priority. You may use as many of your dots, of any color, on any recommendation --- or you may spread them out using as few of your dots as you wish. The dots will indicate the consensus of the Hazard Mitigation Planning Committee.

Use the list of mitigation selection criteria (above) to help you make your determinations.

Your votes will indicate the consensus of the team.

After the totals are counted, we will discuss them further to confirm or modify any of the results as necessary to best meet the goals of this LHMP.

City of Placentia
Mitigation Action Worksheet

Jurisdiction:	
Mitigation Action/Project Title:	
Hazards Addressed:	
Issue/Background:	
Project Description:	
Other Alternatives:	
Existing Planning Mechanism(s) through which Action Will Be Implemented:	
Responsible Office/Partners:	
Cost Estimate:	
Benefits (Losses Avoided):	
Potential Funding:	
Timeline:	
Project Priority (H, M, L):	

Worksheet completed by:	
Name and Title:	
Phone:	

Mitigation Strategy Meetings – Action Prioritization

Actions sorted by Vote Totals

Agency/ Department	Mitigation Action Title	Hazards Addressed	Votes (Points)
FM	1. Public Information Education and Outreach Program for all Hazards	Multi-Hazard	110
	2. Emergency Management Planning/ Alert and Warning Coordination with Dam owner agencies	Dam Failure	58
	3. Develop Severe Weather EOP Annex(es) – Severe Weather: Heat and Heavy Rains Storms	Multi-Hazard	44
	4. Powell Building Retrofit	Earthquake	35
	5. Local Flood Ordinance Revision to meet California Building Code Requirements/ NFIP	Flood 1%;0.2%, Localized Flooding	33
	6. Public Education Support to Golden State Water and Water Districts	Drought and Water Shortage	30
	7. Continued Implementation of Urban Tree Management Plan and Program	Drought and Water Shortage, Extreme Heat, Heavy Rain and Storms	28
	8. Continued implementation of Water Conservation Program	Drought and Water Shortage	25
	9. Continue to adopt and enforce California Fire Code by reference with local code amendments	Urban Fire	25
	10. EOP Update	Multi-Hazard	21
	11. Back up Power Projects for Critical Facilities	Multi-Hazard	19
	12. Review and Update of all hazard related Current Building Codes and Local Ordinances (with local amendments)	Multi-Hazard	16
	13. Alert and Warning System Enhancements	Multi-Hazard	16
FM	14. Storm Ready Program Participation	Flood 1%;0.2%, Localized Flooding, Heavy Rains and Storms	15
	15. Coordination/Planning Animal Response Annex for Animals	Multi-Hazard	15
	16. Develop Climate Action Plan/Climate Vulnerability Assessment	Climate Change	15
	17. Finalize/implement recommendations/projects in Stormwater Master Plan	Flood 1%;0.2%	14
	18. Tri City Lake pump/generator project	Flood 1%;0.2%	14
	19. Review Permitting and Code Enforcement Practices for all hazards	Multi-Hazard	13
	20. HVAC/Air Scrubbers Project (improve city facility HVAC) and purchase air scrubbers for distribution in an emergency	Pandemic	13

Agency/ Department	Mitigation Action Title	Hazards Addressed	Votes (Points)
	21. Public Safety Facility New Construction	Multi-Hazard	9
	22. Establish and Update Cooling Center Protocols and Procedures	Severe Weather: Heat	9
	23. Implementation of Diversity, Equity and Inclusion in all Projects; Disadvantaged Communities	Multi-Hazard	9
	24. Evaluate CRS program Participation	Flood 1%;0.2%, Localized Flooding	7
	25. Establish Automatic Aid and Mutual Aid Agreements	Urban Fire	7
	26. County/City Coordination on Point of Dispensing Program (POD)	Pandemic	7
	27. Continue to enforce undergrounding of Utilities with All New Construction	Severe Weather: Heavy Rains and Storms	6
	28. URM Inventory Update and Identification of Retrofit Projects	Earthquake	6
	29. Establish new wells for water supply	Climate Change, Drought and Water Shortage	6
	30. City Greening/Planting Projects including urban planting on Hwys 57 & 91	Climate Change	6
	31. Develop Pandemic Response Plan with OC EM	Pandemic	6
	32. Implement Cool Infrastructure Projects	Climate Change	5
	33. Evacuation Planning	Multi-Hazard	*
FM	34. Integrate (incorporate by reference) the LHMP into the Safety Element of the General Plan	Multi-Hazard	*

*Not part of voting exercise; added after meetings

Appendix D Adoption Resolution

Sample Adoption Resolution

(LOCAL GOVERNMENT: City)

RESOLUTION NO.

A RESOLUTION OF (LOCAL GOVERNMENT) ADOPTING THE (TITLE AND DATE OF MITIGATION PLAN).

WHEREAS the (local governing body) recognizes the threat that natural hazards pose to people and property within (local government); and

WHEREAS the (local government) has prepared a multi-hazard mitigation plan, hereby known as (title and date of mitigation plan) in accordance with federal laws, including the Robert T. Stafford Disaster Relief and Emergency Assistance Act, as amended; the National Flood Insurance Act of 1968, as amended; and the National Dam Safety Program Act, as amended; and

WHEREAS (title and date of mitigation plan) identifies mitigation goals and actions to reduce or eliminate long-term risk to people and property in (local government) from the impacts of future hazards and disasters; and

WHEREAS adoption by the (local governing body) demonstrates its commitment to hazard mitigation and achieving the goals outlined in the (title and date of mitigation plan).

WHEREAS, the (local governing body) seeking FEMA approval of hazard mitigation plan desires to comply with the requirements of the Disaster Mitigation Act and to augment its emergency planning efforts by formally adopting the (title and date of mitigation plan) by reference into the Safety Element of the General Plan in accordance with the requirements of AB 2140; and

NOW THEREFORE, BE IT RESOLVED BY THE (LOCAL GOVERNMENT), (STATE), THAT:

In accordance with (local rule for adopting resolutions), the (local governing body) adopts the (title and date of mitigation plan). *(While content related to (local government) may require revisions to meet the plan approval requirements, changes occurring after adoption will not require (local government) to re-adopt any further iterations of the plan. Subsequent plan updates following the approval period for this plan will require separate adoption resolutions.)*

BE IT RESOLVED, that the (Name of Government/District/Organization seeking FEMA approval of hazard mitigation plan) adopts the (title and date of mitigation plan) by reference into the safety element of their general plan in accordance with the requirements of AB 2140; and

BE IT FURTHER RESOLVED, the (local governing body) will submit this adoption resolution to the California Office of Emergency Services and FEMA Region IX officials to enable the plan's final approval in accordance with the requirements of the Disaster Mitigation Act of 2000 and to establish conformance with the requirement of AB 2140.

ADOPTED by a vote of ____ in favor and ____ against, and ____ abstaining, this _____ day of _____, _____.

By: _____ (print name)

ATTEST: By: _____ (print name)

APPROVED AS TO FORM: By: _____ (print name)

Appendix E Threatened and Endangered Species

Table E–1 Special Status Species in and around the City of Placentia

Scientific Name	Common Name	Federal Status	State Status	CDFW Status	CA Rare Plant Rank
Animals – Amphibians					
Anaxyrus californicus	arroyo toad	Endangered	None	SSC	–
Taricha torosa	Coast Range newt	None	None	SSC	–
Spea hammondii	western spadefoot	None	None	SSC	–
Animals – Birds					
Accipiter cooperii	Coopers hawk	None	None	WL	–
Accipiter striatus	sharp-shinned hawk	None	None	WL	–
Aquila chrysaetos	golden eagle	None	None	FP /WL	
Buteo regalis	ferruginous hawk	None	None	WL	
Buteo swainsoni	Swainsons hawk	None	Threatened	–	
Circus hudsonius	northern harrier	None	None	SSC	
Elanus leucurus	white-tailed kite	None	None	FP	
Haliaeetus leucocephalus	bald eagle	Delisted	Endangered	FP	
Eremophila alpestris actia	California horned lark	None	None	WL	
Synthliboramphus scrippsi	Scrippss murrelet	None	Threatened	–	–
Aythya americana	redhead	None	None	SSC	–
Bucephala islandica	Barrows goldeneye	None	None	SSC	–
Chaetura vauxi	Vauxs swift	None	None	SSC	–
Cypseloides niger	black swift	None	None	SSC	–
Ardea alba	great egret	None	None	–	–
Ardea herodias	great blue heron	None	None	–	–
Botaurus lentiginosus	American bittern	None	None	–	–
Egretta thula	snowy egret	None	None	–	–
Ixobrychus exilis	least bittern	None	None	SSC	–
Nycticorax nycticorax	black-crowned night heron	None	None	–	–
Cardinalis cardinalis	northern cardinal	None	None	WL	–
Piranga rubra	summer tanager	None	None	SSC	–
Charadrius montanus	mountain plover	None	None	SSC	–
Charadrius nivosus nivosus	western snowy plover	Threatened	None	SSC	–
Coccyzus americanus occidentalis	western yellow-billed cuckoo	Threatened	Endangered	–	–
Falco columbarius	merlin	None	None	WL	–

Scientific Name	Common Name	Federal Status	State Status	CDFW Status	CA Rare Plant Rank
Falco mexicanus	prairie falcon	None	None	WL	–
Falco peregrinus anatum	American peregrine falcon	Delisted	Delisted	FP	–
Spinus lawrencei	Lawrences goldfinch	None	None	–	–
Gavia immer	common loon	None	None	SSC	–
Antigone canadensis canadensis	lesser sandhill crane	None	None	SSC	–
Progne subis	purple martin	None	None	SSC	–
Riparia riparia	bank swallow	None	Threatened	–	–
Agelaius tricolor	tricolored blackbird	None	Threatened	SSC	–
Xanthocephalus xanthocephalus	yellow-headed blackbird	None	None	SSC	–
Icteria virens	yellow-breasted chat	None	None	SSC	–
Lanius ludovicianus	loggerhead shrike	None	None	SSC	–
Hydroprogne caspia	Caspian tern	None	None	–	–
Larus californicus	California gull	None	None	WL	–
Rynchops niger	black skimmer	None	None	SSC	–
Sternula antillarum browni	California least tern	Endangered	Endangered	FP	–
Thalasseus elegans	elegant tern	None	None	WL	–
Toxostoma crissale	Crissal thrasher	None	None	SSC	–
Pandion haliaetus	osprey	None	None	WL	–
Leiothlypis luciae	Lucys warbler	None	None	SSC	–
Setophaga petechia	yellow warbler	None	None	SSC	–
Aimophila ruficeps canescens	southern California rufous-crowned sparrow	None	None	WL	–
Ammodramus savannarum	grasshopper sparrow	None	None	SSC	–
Artemisiospiza belli belli	Bells sparrow	None	None	WL	–
Passerculus sandwichensis beldingi	Beldings savannah sparrow	None	Endangered	–	–
Passerculus sandwichensis rostratus	large-billed savannah sparrow	None	None	SSC	–
Pelecanus erythrorhynchos	American white pelican	None	None	SSC	–
Pelecanus occidentalis californicus	California brown pelican	Delisted	Delisted	FP	–
Nannopterum auritum	double-crested cormorant	None	None	WL	–
Sphyrapicus ruber	red-breasted sapsucker	None	None	-	–
Polioptila californica californica	coastal California gnatcatcher	Threatened	None	SSC	–
Polioptila melanura	black-tailed gnatcatcher	None	None	WL	–
Coturnicops noveboracensis	yellow rail	None	None	SSC	–
Laterallus jamaicensis coturniculus	California black rail	None	Threatened	FP	–
Rallus obsoletus levipes	light-footed Ridgways rail	Endangered	Endangered	FP	–

Scientific Name	Common Name	Federal Status	State Status	CDFW Status	CA Rare Plant Rank
Rallus obsoletus obsoletus	California Ridgways rail	Endangered	Endangered	FP	–
Numenius americanus	long-billed curlew	None	None	WL	–
Asio flammeus	short-eared owl	None	None	SSC	–
Asio otus	long-eared owl	None	None	SSC	–
Athene cunicularia	burrowing owl	None	None	SSC	–
Strix occidentalis occidentalis	California Spotted Owl	None	None	SSC	–
Plegadis chihi	white-faced ibis	None	None	WL	–
Calypte costae	Costas hummingbird	None	None	–	–
Selasphorus rufus	rufous hummingbird	None	None	–	–
Campylorhynchus brunneicapillus sandiegensis	coastal cactus wren	None	None	SSC	–
Cistothorus palustris clarkae	Clarks marsh wren	None	None	SSC	–
Contopus cooperi	olive-sided flycatcher	None	None	SSC	–
Empidonax traillii	willow flycatcher	None	Endangered	–	–
Empidonax traillii brewsteri	little willow flycatcher	None	Endangered	–	–
Empidonax traillii extimus	southwestern willow flycatcher	Endangered	Endangered	–	–
Pyrocephalus rubinus	vermilion flycatcher	None	None	SSC	–
Vireo bellii pusillus	least Bells vireo	Endangered	Endangered	–	–
Vireo huttoni unitti	Catalina Huttons vireo	None	None	SSC	–
Animals – Crustaceans					
Branchinecta sandiegonensis	San Diego fairy shrimp	Endangered	None	–	–
Streptocephalus woottoni	Riverside fairy shrimp	Endangered	None	–	–
Animals – Fish					
Catostomus santaanae	Santa Ana sucker	Threatened	None	–	Catostomus santaanae
Gila orcuttii	arroyo chub	None	None	SSC	Gila orcuttii
Rhinichthys osculus ssp. 8	Santa Ana speckled dace	None	None	SSC	Rhinichthys osculus ssp. 8
Gasterosteus aculeatus microcephalus	resident threespine stickleback	None	None	–	Gasterosteus aculeatus microcephalus
Eucyclogobius newberryi	tidewater goby	Endangered	None	–	Eucyclogobius newberryi
Oncorhynchus mykiss irideus pop. 10	steelhead - southern California DPS	Endangered	Candidate Endangered	–	Oncorhynchus mykiss irideus pop. 10

Scientific Name	Common Name	Federal Status	State Status	CDFW Status	CA Rare Plant Rank
Animals – Insects					
Bombus crotchii	Crotch bumble bee	None	Candidate Endangered	–	–
Bombus pensylvanicus	American bumble bee	None	None	–	–
Cicindela hirticollis gravida	sandy beach tiger beetle	None	None	–	–
Cicindela latesignata	western beach tiger beetle	None	None	–	–
Cicindela senilis frosti	senile tiger beetle	None	None	–	–
Cicindela tranquebarica viridissima	greenest tiger beetle	None	None	–	–
Habroscelimorpha gabbii	western tidal-flat tiger beetle	None	None	–	–
Trigonoscuta dorothea dorothea	Dorothys El Segundo Dune weevil	None	None	–	–
Euphyes vestris harbisoni	dun skipper	None	None	–	–
Panoquina errans	wandering (=saltmarsh) skipper	None	None	–	–
Danaus plexippus plexippus pop. 1	monarch - California overwintering population	Candidate	None	–	–
Euphydryas editha quino	quino checkerspot butterfly	Endangered	None	–	–
Coelus globosus	globose dune beetle	None	None	–	–
Animals – Mammals					
Microtus californicus stephensi	south coast marsh vole	None	None	SSC	–
Neotoma lepida intermedia	San Diego desert woodrat	None	None	SSC	–
Onychomys torridus ramona	southern grasshopper mouse	None	None	SSC	–
Chaetodipus californicus femoralis	Dulzura pocket mouse	None	None	SSC	–
Chaetodipus fallax fallax	northwestern San Diego pocket mouse	None	None	SSC	–
Dipodomys simulans	Dulzura kangaroo rat	None	None	–	–
Perognathus longimembris brevinasus	Los Angeles pocket mouse	None	None	SSC	–
Perognathus longimembris pacificus	Pacific pocket mouse	Endangered	None	SSC	–
Lepus californicus bennettii	San Diego black-tailed jackrabbit	None	None	–	–
Eumops perotis californicus	western mastiff bat	None	None	SSC	–
Nyctinomops femorosaccus	pocketed free-tailed bat	None	None	SSC	–
Nyctinomops macrotis	big free-tailed bat	None	None	SSC	–
Enhydra lutris nereis	southern sea otter	Threatened	None	FP	–
Taxidea taxus	American badger	None	None	SSC	–

Scientific Name	Common Name	Federal Status	State Status	CDFW Status	CA Rare Plant Rank
Choeronycteris mexicana	Mexican long-tongued bat	None	None	SSC	–
Sorex ornatus salicornicus	southern California saltmarsh shrew	None	None	SSC	–
Antrozous pallidus	pallid bat	None	None	SSC	–
Corynorhinus townsendii	Townsends big-eared bat	None	None	SSC	–
Lasiurus cinereus	hoary bat	None	None	–	–
Lasiurus frantzii	western red bat	None	None	SSC	–
Lasiurus xanthinus	western yellow bat	None	None	SSC	–
Myotis ciliolabrum	western small-footed myotis	None	None	–	–
Myotis yumanensis	Yuma myotis	None	None	–	–
Animals – Mollusks					
Haliotis fulgens	green abalone	None	None	–	–
Haliotis kamtschatkana	pinto abalone	None	None	–	–
Haliotis sorenseni	white abalone	Endangered	None	–	–
Helminthoglypta fontiphila	Soledad shoulderband	None	None	–	–
Tryonia imitator	mimic tryonia (=California brackishwater snail)	None	None	–	–
Glyptostoma gabrielense	San Gabriel chestnut	None	None	–	–
Animals – Reptiles					
Anniella stebbinsi	Southern California legless lizard	None	None	SSC	–
Chelonia mydas	green turtle	Threatened	None	–	–
Arizona elegans occidentalis	California glossy snake	None	None	SSC	–
Diadophis punctatus modestus	San Bernardino ringneck snake	None	None	–	–
Diadophis punctatus similis	San Diego ringneck snake	None	None	–	–
Salvadora hexalepis virgultea	coast patch-nosed snake	None	None	SSC	–
Emys marmorata	western pond turtle	None	None	SSC	–
Thamnophis hammondii	two-striped gartersnake	None	None	SSC	–
Phrynosoma blainvillii	coast horned lizard	None	None	SSC	–
Aspidoscelis hyperythra	orange-throated whiptail	None	None	WL	–
Aspidoscelis tigris stejnegeri	coastal whiptail	None	None	SSC	–
Crotalus ruber	red-diamond rattlesnake	None	None	SSC	–
Community – Aquatic					
Southern California Arroyo Chub/Santa Ana Sucker Stream	Southern California Arroyo Chub/Santa Ana Sucker Stream	None	None	–	–

Scientific Name	Common Name	Federal Status	State Status	CDFW Status	CA Rare Plant Rank
Community – Terrestrial					
California Walnut Woodland	California Walnut Woodland	None	None	–	–
Canyon Live Oak Ravine Forest	Canyon Live Oak Ravine Forest	None	None	–	–
Riversidian Alluvial Fan Sage Scrub	Riversidian Alluvial Fan Sage Scrub	None	None	–	–
Southern Coast Live Oak Riparian Forest	Southern Coast Live Oak Riparian Forest	None	None	–	–
Southern Coastal Salt Marsh	Southern Coastal Salt Marsh	None	None	–	–
Southern Cottonwood Willow Riparian Forest	Southern Cottonwood Willow Riparian Forest	None	None	–	–
Southern Dune Scrub	Southern Dune Scrub	None	None	–	–
Southern Foredunes	Southern Foredunes	None	None	–	–
Southern Interior Cypress Forest	Southern Interior Cypress Forest	None	None	–	–
Southern Mixed Riparian Forest	Southern Mixed Riparian Forest	None	None	–	–
Southern Riparian Scrub	Southern Riparian Scrub	None	None	–	–
Southern Sycamore Alder Riparian Woodland	Southern Sycamore Alder Riparian Woodland	None	None	–	–
Southern Willow Scrub	Southern Willow Scrub	None	None	–	–
Valley Needlegrass Grassland	Valley Needlegrass Grassland	None	None	–	–
Plants – Vascular					
Sagittaria sanfordii	Sanfords arrowhead	None	None	-	1B.2
Allium marvinii	Yucaipa onion	None	None	-	1B.2
Eryngium aristulatum var. parishii	San Diego button-celery	Endangered	Endangered	-	1B.1
Asplenium vespertinum	western spleenwort	None	None	-	4.2
Baccharis malibuensis	Malibu baccharis	None	None	-	1B.1
Centromadia parryi ssp. australis	southern tarplant	None	None	-	1B.1
Chaenactis glabriuscula var. orcuttiana	Orcutts pincushion	None	None	-	1B.1
Deinandra paniculata	paniculate tarplant	None	None	-	4.2
Helianthus nuttallii ssp. parishii	Los Angeles sunflower	None	None	-	1A
Holocarpha virgata ssp. elongata	curving tarplant	None	None	-	4.2
Isocoma menziesii var. decumbens	decumbent goldenbush	None	None	-	1B.2

Scientific Name	Common Name	Federal Status	State Status	CDFW Status	CA Rare Plant Rank
Lasthenia glabrata ssp. coulteri	Coulters goldfields	None	None	-	1B.1
Malacothrix saxatilis var. saxatilis	cliff malacothrix	None	None	-	4.2
Microseris douglasii ssp. platycarpha	small-flowered microseris	None	None	-	4.2
Pentachaeta aurea ssp. allenii	Allens pentachaeta	None	None	-	1B.1
Pentachaeta aurea ssp. aurea	golden-rayed pentachaeta	None	None	-	4.2
Pseudognaphalium leucocephalum	white rabbit-tobacco	None	None	-	2B.2
Senecio aphanactis	chaparral ragwort	None	None	-	2B.2
Symphyotrichum defoliatum	San Bernardino aster	None	None	-	1B.2
Verbesina dissita	big-leaved crownbeard	Threatened	Threatened	-	1B.1
Viguiera laciniata	San Diego County viguiera	None	None	-	4.3
Harpagonella palmeri	Palmers grapplinghook	None	None	-	4.2
Caulanthus simulans	Paysons jewelflower	None	None	-	4.2
Lepidium virginicum var. robinsonii	Robinsons pepper-grass	None	None	-	4.3
Nasturtium gambelii	Gambels water cress	Endangered	Threatened	-	1B.1
Aphanisma blitoides	aphanisma	None	None	-	1B.2
Atriplex coulteri	Coulters saltbush	None	None	-	1B.2
Atriplex pacifica	south coast saltscale	None	None	-	1B.2
Atriplex parishii	Parishs brittlescale	None	None	-	1B.1
Atriplex serenana var. davidsonii	Davidsons saltscale	None	None	-	1B.2
Suaeda esteroa	estuary seablite	None	None	-	1B.2
Suaeda taxifolia	woolly seablite	None	None	-	4.2
Convolvulus simulans	small-flowered morning-glory	None	None	-	4.2
Dichondra occidentalis	western dichondra	None	None	-	4.2
Dudleya blochmaniae ssp. blochmaniae	Blochmans dudleya	None	None	-	1B.1
Dudleya cymosa ssp. ovatifolia	Santa Monica dudleya	Threatened	None	-	1B.1
Dudleya multicaulis	many-stemmed dudleya	None	None	-	1B.2
Dudleya stolonifera	Laguna Beach dudleya	Threatened	Threatened	-	1B.1
Dudleya viscida	sticky dudleya	None	None	-	1B.2
Hesperocyparis forbesii	Tecate cypress	None	None	-	1B.1
Hesperocyparis goveniana	Gowen cypress	Threatened	None	-	1B.2
Eleocharis parvula	small spikerush	None	None	-	4.3
Comarostaphylis diversifolia ssp. diversifolia	summer holly	None	None	-	1B.2

Scientific Name	Common Name	Federal Status	State Status	CDFW Status	CA Rare Plant Rank
Euphorbia misera	cliff spurge	None	None	-	2B.2
Tetracoccus dioicus	Parrys tetracoccus	None	None	-	1B.2
Astragalus brauntonii	Brauntons milk-vetch	Endangered	None	-	1B.1
Astragalus hornii var. hornii	Horns milk-vetch	None	None	-	1B.1
Astragalus pycnostachyus var. lanosissimus	Ventura Marsh milk-vetch	Endangered	Endangered	-	1B.1
Quercus dumosa	Nuttalls scrub oak	None	None	-	1B.1
Quercus engelmannii	Engelmann oak	None	None	-	4.2
Phacelia hubbyi	Hubbys phacelia	None	None	-	4.2
Phacelia keckii	Santiago Peak phacelia	None	None	-	1B.3
Phacelia ramosissima var. austrolitoralis	south coast branching phacelia	None	None	-	3.2
Phacelia stellaris	Brands star phacelia	None	None	-	1B.1
Juglans californica	southern California black walnut	None	None	-	4.2
Juncus acutus ssp. leopoldii	southwestern spiny rush	None	None	-	4.2
Clinopodium chandleri	San Miguel savory	None	None	-	1B.2
Lepechinia cardiophylla	heart-leaved pitcher sage	None	None	-	1B.2
Monardella hypoleuca ssp. intermedia	intermediate monardella	None	None	-	1B.3
Monardella macrantha ssp. hallii	Halls monardella	None	None	-	1B.3
Calochortus catalinae	Catalina mariposa-lily	None	None	-	4.2
Calochortus plummerae	Plummers mariposa-lily	None	None	-	4.2
Calochortus weedii var. intermedius	intermediate mariposa-lily	None	None	-	1B.2
Lilium humboldtii ssp. ocellatum	ocellated humboldt lily	None	None	-	4.2
Sidalcea neomexicana	salt spring checkerbloom	None	None	-	2B.2
Calandrinia breweri	Brewers calandrinia	None	None	-	4.2
Cistanthe maritima	seaside cistanthe	None	None	-	4.2
Nama stenocarpa	mud nama	None	None	-	2B.2
Abronia maritima	red sand-verbena	None	None	-	4.2
Abronia villosa var. aurita	chaparral sand-verbena	None	None	-	1B.1
Camissoniopsis lewisii	Lewis evening-primrose	None	None	-	3
Piperia cooperi	chaparral rein orchid	None	None	-	4.2
Piperia leptopetala	narrow-petaled rein orchid	None	None	-	4.3
Chloropyron maritimum ssp. maritimum	salt marsh birds-beak	Endangered	Endangered	-	1B.2
Romneya coulteri	Coulters matilija poppy	None	None	-	4.2

Scientific Name	Common Name	Federal Status	State Status	CDFW Status	CA Rare Plant Rank
Diplacus clevelandii	Clevelands bush monkeyflower	None	None	-	4.2
Erythranthe diffusa	Palomar monkeyflower	None	None	-	4.3
Penstemon californicus	California beardtongue	None	None	-	1B.2
Hordeum intercedens	vernal barley	None	None	-	3.2
Imperata brevifolia	California satintail	None	None	-	2B.1
Orcuttia californica	California Orcutt grass	Endangered	Endangered	-	1B.1
Collomia diversifolia	serpentine collomia	None	None	-	4.3
Eriastrum densifolium ssp. sanctorum	Santa Ana River woollystar	Endangered	Endangered	-	1B.1
Navarretia prostrata	prostrate vernal pool navarretia	None	None	-	1B.2
Polygala cornuta var. fishiae	Fishs milkwort	None	None	-	4.3
Chorizanthe parryi var. fernandina	San Fernando Valley spineflower	None	Endangered	-	1B.1
Chorizanthe polygonoides var. longispina	long-spined spineflower	None	None	-	1B.2
Nemacaulis denudata var. denudata	coast woolly-heads	None	None	-	1B.2
Horkelia cuneata var. puberula	mesa horkelia	None	None	-	1B.1
Nolina cismontana	chaparral nolina	None	None	-	1B.2
Lycium brevipes var. hassei	Santa Catalina Island desert-thorn	None	None	-	3.1
Lycium californicum	California box-thorn	None	None	-	4.2
Brodiaea filifolia	thread-leaved brodiaea	Threatened	Endangered	-	1B.1

Sources: California Natural Diversity Database BIOS Viewer Tool, retrieved 2/10/2023

Federal Status

Endangered: The classification provided to an animal or plant in danger of extinction within the foreseeable future throughout all or a significant portion of its range.

Threatened: The classification provided to an animal or plant which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

Proposed Endangered: The classification provided to an animal or plant that is proposed for federal listing as Endangered in the Federal Register under Section 4 of the Endangered Species Act.

Proposed Threatened: The classification provided to an animal or plant that is proposed for federal listing as Threatened in the Federal Register under Section 4 of the Endangered Species Act.

Candidate: The classification provided to an animal or plant that has been studied by the United States Fish and Wildlife Service, and the Service has concluded that it should be proposed for addition to the Federal Endangered and Threatened species list.

None: The plant or animal has no federal status.

Delisted: The plant or animal was previously listed as Endangered or Threatened, but is no longer listed on the Federal Endangered and Threatened species list.

CDFW Status

FP: Fully Protected: This classification was the State of California's initial effort to identify and provide additional protection to those animals that were rare or faced possible extinction.

SSC: Species of Special Concern: To this end, the Department has designated certain vertebrate species as "Species of Special Concern" because declining population levels, limited ranges, and/or continuing threats have made them vulnerable to extinction.

The goal of designating species as "Species of Special Concern" is to halt or reverse their decline by calling attention to their plight and addressing the issues of concern early enough to secure their long–term viability.

WL: Watch List: Species that were previously designated as "Species of Special Concern" but no longer merit that status, or which do not yet meet SSC criteria, but for which there is concern and a need for additional information to clarify status.

CA Rare Plant Rank

1A: Plants presumed extinct in California and rare/extinct elsewhere

1B.1: Plants rare, threatened, or endangered in California and elsewhere; seriously threatened in California

1B.2: Plants rare, threatened, or endangered in California and elsewhere; fairly threatened in California

1B.3: Plants rare, threatened, or endangered in California and elsewhere; not very threatened in California

2A: Plants presumed extirpated in California, but more common elsewhere

2B.1: Plants rare, threatened, or endangered in California, but more common elsewhere; seriously threatened in California

2B.2: Plants rare, threatened, or endangered in California, but more common elsewhere; fairly threatened in California

2B.3: Plants rare, threatened, or endangered in California, but more common elsewhere; not very threatened in California

3.1: Plants about which we need more information; seriously threatened in California

3.2: Plants about which we need more information; fairly threatened in California

3.3: Plants about which we need more information; not very threatened in California

4.1: Plants of limited distribution; seriously threatened in California

4.2: Plants of limited distribution; fairly threatened in California

4.3: Plants of limited distribution; not very threatened in California

Appendix F Critical Facilities

This appendix contains two tables:

- Table F-1 contains the critical facilities sorted by category and type. It shows the critical facilities in the Dam Inundation Areas, DFIRM flood zones, and Deep Seated Landslide Classes. It should be noted that the DFIRM flood zones include the X Protected by Levee flood zones.
- Table F-2 contains the critical facilities sorted by category and type. It shows the critical facilities in the FHSZ, Fire Threat Zones, Hazardous Materials Routes, and Potential Liquefaction Areas. It should be noted that there are no critical facilities in the Earthquake Induced Landslide areas; as such there is no column for those areas in the tables below.

Table F-1 City of Placentia Critical Facilities in Dam Inundation areas and DFIRM Flood Zones

Category	Name	Type	TYPE2	Inside High Hazard Dam Inundation	Inside Extremely High Hazard Dam Inundation	Inside Prado Dam Inundation	Inside Carbon Canyon Dam Inundation	Inside Yorba Linda Dam Inundation	DFIRM Flood Zone	DFIRM Flood Zone Subtype 1	DFIRM Flood Zone Subtype 2	Deep Seated Landslide Class
At Risk Population Facilities	PYLUSD-Melrose State Preschool	DayCare Center	Childcare Facilities	High Dam Inundation Area		Prado	Carbon Canyon		Zone AE		1% Annual Chance Flood Hazard	0
At Risk Population Facilities	Placentia Head Start/Placentia Early Head Start	DayCare Center	Childcare Facilities	High Dam Inundation Area		Prado	Carbon Canyon		Zone X (shaded)	0.2% Annual Chance Flood Hazard	0.2% Annual Chance Flood Hazard	0
At Risk Population Facilities	Calvary Baptist Church-Ikids Preschool	DayCare Center	Childcare Facilities	High Dam Inundation Area			Carbon Canyon		Zone X (unshaded)	Area Of Minimal Flood Hazard	Other Areas	0
At Risk Population Facilities	St Joseph Preschool	DayCare Center	Childcare Facilities						Zone X (unshaded)	Area Of Minimal Flood Hazard	Other Areas	0
At Risk Population Facilities	PYLUSD-Ruby Drive State Preschool/Ruby Drive Early Head Start	DayCare Center	Childcare Facilities						Zone X (shaded)	0.2% Annual Chance Flood Hazard	0.2% Annual Chance Flood Hazard	0

Category	Name	Type	TYPE2	Inside High Hazard Dam Inundation	Inside Extremely High Hazard Dam Inundation	Inside Prado Dam Inundation	Inside Carbon Canyon Dam Inundation	Inside Yorba Linda Dam Inundation	DFIRM Flood Zone	DFIRM Flood Zone Subtype 1	DFIRM Flood Zone Subtype 2	Deep Seated Landslide Class
At Risk Population Facilities	Towne and Country Early Education Center	DayCare Center	Childcare Facilities						Zone X (unshaded)	Area Of Minimal Flood Hazard	Other Areas	0
At Risk Population Facilities	Blessed Sacrament Children's Learning Center	DayCare Center	Childcare Facilities						Zone X (unshaded)	Area Of Minimal Flood Hazard	Other Areas	0
At Risk Population Facilities	Wagner Preschool	DayCare Center	Childcare Facilities	High Dam Inundation Area			Carbon Canyon		Zone X (unshaded)	Area Of Minimal Flood Hazard	Other Areas	0
At Risk Population Facilities	Kindercare Learning Center	DayCare Center	Childcare Facilities	High Dam Inundation Area			Carbon Canyon		Zone X (unshaded)	Area Of Minimal Flood Hazard	Other Areas	0
At Risk Population Facilities	Melrose Elementary School	Primary/Secondary School	Schools	High Dam Inundation Area		Prado	Carbon Canyon		Zone AE		1% Annual Chance Flood Hazard	0
At Risk Population Facilities	Valadez Middle School	Primary/Secondary School	Schools	High Dam Inundation Area		Prado	Carbon Canyon		Zone X (shaded)	0.2% Annual Chance Flood Hazard	0.2% Annual Chance Flood Hazard	0
At Risk Population Facilities	El Camino Real High School	Primary/Secondary School	Schools	High Dam Inundation Area	Extremely High Dam Inundation Area	Prado			Zone A		1% Annual Chance Flood Hazard	0
At Risk Population Facilities	John Tynes Elementary School	Primary/Secondary School	Schools	High Dam Inundation Area			Carbon Canyon		Zone X (unshaded)	Area Of Minimal Flood Hazard	Other Areas	0
At Risk Population Facilities	Kraemer Junior High School	Primary/Secondary School	Schools						Zone X (unshaded)	Area Of Minimal Flood Hazard	Other Areas	0
At Risk Population Facilities	Valencia High School	Primary/Secondary School	Schools						Zone X (unshaded)	Area Of Minimal Flood Hazard	Other Areas	0

Category	Name	Type	TYPE2	Inside High Hazard Dam Inundation	Inside Extremely High Hazard Dam Inundation	Inside Prado Dam Inundation	Inside Carbon Canyon Dam Inundation	Inside Yorba Linda Dam Inundation	DFIRM Flood Zone	DFIRM Flood Zone Subtype 1	DFIRM Flood Zone Subtype 2	Deep Seated Landslide Class
At Risk Population Facilities	St Joseph Catholic School	Primary/Secondary School	Schools						Zone X (unshaded)	Area Of Minimal Flood Hazard	Other Areas	0
At Risk Population Facilities	Ruby Drive Elementary School	Primary/Secondary School	Schools						Zone X (shaded)	0.2% Annual Chance Flood Hazard	0.2% Annual Chance Flood Hazard	0
At Risk Population Facilities	Van Buren Elementary School	Primary/Secondary School	Schools						Zone X (unshaded)	Area Of Minimal Flood Hazard	Other Areas	0
At Risk Population Facilities	Morse Avenue Elementary School	Primary/Secondary School	Schools	High Dam Inundation Area			Carbon Canyon		Zone X (unshaded)	Area Of Minimal Flood Hazard	Other Areas	0
At Risk Population Facilities	Wagner Elementary School	Primary/Secondary School	Schools	High Dam Inundation Area			Carbon Canyon		Zone X (unshaded)	Area Of Minimal Flood Hazard	Other Areas	0
At Risk Population Facilities	El Dorado High School	Primary/Secondary School	Schools						Zone X (unshaded)	Area Of Minimal Flood Hazard	Other Areas	0
At Risk Population Facilities	Brookhaven Elementary School	Primary/Secondary School	Schools						Zone X (unshaded)	Area Of Minimal Flood Hazard	Other Areas	0
At Risk Population Facilities	Sierra Vista Elementary School	Primary/Secondary School	Schools						Zone X (unshaded)	Area Of Minimal Flood Hazard	Other Areas	0
At Risk Population Facilities	Col. J.K. Tuffree Middle School	Primary/Secondary School	Schools						Zone X (shaded)	0.2% Annual Chance Flood Hazard	0.2% Annual Chance Flood Hazard	0
At Risk Population Facilities	Golden Elementary School	Primary/Secondary School	Schools	High Dam Inundation Area			Carbon Canyon		Zone X (unshaded)	Area Of Minimal Flood Hazard	Other Areas	0
At Risk Population Facilities	George Key School	Primary/Secondary School	Schools	High Dam Inundation Area			Carbon Canyon		Zone X (unshaded)	Area Of Minimal Flood Hazard	Other Areas	0

Category	Name	Type	TYPE2	Inside High Hazard Dam Inundation	Inside Extremely High Hazard Dam Inundation	Inside Prado Dam Inundation	Inside Carbon Canyon Dam Inundation	Inside Yorba Linda Dam Inundation	DFIRM Flood Zone	DFIRM Flood Zone Subtype 1	DFIRM Flood Zone Subtype 2	Deep Seated Landslide Class
At Risk Population Facilities	Interface Rehabilitation Center	Rehabiliation Center	Medical Facilities	High Dam Inundation Area		Prado	Carbon Canyon		Zone X (shaded)	0.2% Annual Chance Flood Hazard	0.2% Annual Chance Flood Hazard	0
At Risk Population Facilities	Emerald Isle Senior Apartment	Senior Apartment	Senior Facilities	High Dam Inundation Area			Carbon Canyon		Zone X (unshaded)	Area Of Minimal Flood Hazard	Other Areas	0
At Risk Population Facilities	Bradford Terrace Senior Apartment	Senior Apartment	Senior Facilities						Zone X (unshaded)	Area Of Minimal Flood Hazard	Other Areas	0
At Risk Population Facilities	Ivy Park at Bradford	Senior Assisted Living	Senior Facilities						Zone X (unshaded)	Area Of Minimal Flood Hazard	Other Areas	7
At Risk Population Facilities	Crescendo Senior Living	Senior Assisted Living	Senior Facilities						Zone X (unshaded)	Area Of Minimal Flood Hazard	Other Areas	0
At Risk Population Facilities	Brookdale Hospice	Senior Hospice	Senior Facilities	High Dam Inundation Area		Prado	Carbon Canyon		Zone X (shaded)	0.2% Annual Chance Flood Hazard	0.2% Annual Chance Flood Hazard	0
Essential Services Facilities	Carbon Creek Channel	Bridge	Transportation Lifeline Systems	High Dam Inundation Area		Prado	Carbon Canyon		Zone A		1% Annual Chance Flood Hazard	0
Essential Services Facilities	Placentia Storm Channel	Bridge	Transportation Lifeline Systems	High Dam Inundation Area		Prado	Carbon Canyon		Zone X (shaded)	0.2% Annual Chance Flood Hazard	0.2% Annual Chance Flood Hazard	0
Essential Services Facilities	Placentia Storm Channel	Bridge	Transportation Lifeline Systems	High Dam Inundation Area		Prado	Carbon Canyon		Zone X (shaded)	0.2% Annual Chance Flood Hazard	0.2% Annual Chance Flood Hazard	0
Essential Services Facilities	Atwood Channel	Bridge	Transportation Lifeline Systems	High Dam Inundation Area	Extremely High Dam Inundation Area	Prado		Yorba	Zone A		1% Annual Chance Flood Hazard	0

Category	Name	Type	TYPE2	Inside High Hazard Dam Inundation	Inside Extremely High Hazard Dam Inundation	Inside Prado Dam Inundation	Inside Carbon Canyon Dam Inundation	Inside Yorba Linda Dam Inundation	DFIRM Flood Zone	DFIRM Flood Zone Subtype 1	DFIRM Flood Zone Subtype 2	Deep Seated Landslide Class
Essential Services Facilities	Cabron Creek Channel	Bridge	Transportation Lifeline Systems	High Dam Inundation Area	Extremely High Dam Inundation Area	Prado		Yorba	Zone A		1% Annual Chance Flood Hazard	0
Essential Services Facilities	Placentia Storm Channel	Bridge	Transportation Lifeline Systems	High Dam Inundation Area		Prado			Zone X (unshaded)	Area Of Minimal Flood Hazard	Other Areas	0
Essential Services Facilities	Carbon Creek Channel	Bridge	Transportation Lifeline Systems	High Dam Inundation Area	Extremely High Dam Inundation Area	Prado		Yorba	Zone AE Floodway	Floodway	1% Annual Chance Flood Hazard	0
Essential Services Facilities	Atwood Channel	Bridge	Transportation Lifeline Systems	High Dam Inundation Area	Extremely High Dam Inundation Area	Prado		Yorba	Zone AE Floodway	Floodway	1% Annual Chance Flood Hazard	0
Essential Services Facilities	Rose Drive Oh	Bridge	Transportation Lifeline Systems	High Dam Inundation Area	Extremely High Dam Inundation Area	Prado			Zone X (shaded)	0.2% Annual Chance Flood Hazard	0.2% Annual Chance Flood Hazard	0
Essential Services Facilities	Richfield Channel (E05)	Bridge	Transportation Lifeline Systems	High Dam Inundation Area	Extremely High Dam Inundation Area	Prado		Yorba	Zone A		1% Annual Chance Flood Hazard	0
Essential Services Facilities	Melrose Street Underpass	Bridge	Transportation Lifeline Systems	High Dam Inundation Area		Prado			Zone X (unshaded)	Area Of Minimal Flood Hazard	Other Areas	0
Essential Services Facilities	Richfield Channel	Bridge	Transportation Lifeline Systems	High Dam Inundation Area	Extremely High Dam Inundation Area	Prado		Yorba	Zone A		1% Annual Chance Flood Hazard	0
Essential Services Facilities	Carbon Canyon Channel	Bridge	Transportation Lifeline Systems	High Dam Inundation Area		Prado	Carbon Canyon		Zone X (shaded)	0.2% Annual Chance Flood Hazard	0.2% Annual Chance Flood Hazard	0

Category	Name	Type	TYPE2	Inside High Hazard Dam Inundation	Inside Extremely High Hazard Dam Inundation	Inside Prado Dam Inundation	Inside Carbon Canyon Dam Inundation	Inside Yorba Linda Dam Inundation	DFIRM Flood Zone	DFIRM Flood Zone Subtype 1	DFIRM Flood Zone Subtype 2	Deep Seated Landslide Class
Essential Services Facilities	Richfield Channel	Bridge	Transportation Lifeline Systems	High Dam Inundation Area	Extremely High Dam Inundation Area	Prado			Zone A		1% Annual Chance Flood Hazard	0
Essential Services Facilities	Carbon Canyon Channel	Bridge	Transportation Lifeline Systems	High Dam Inundation Area			Carbon Canyon		Zone X (shaded)	0.2% Annual Chance Flood Hazard	0.2% Annual Chance Flood Hazard	0
Essential Services Facilities	Carbon Canyon Channel	Bridge	Transportation Lifeline Systems	High Dam Inundation Area			Carbon Canyon		Zone X (shaded)	0.2% Annual Chance Flood Hazard	0.2% Annual Chance Flood Hazard	0
Essential Services Facilities	Carbon Canyon Channel	Bridge	Transportation Lifeline Systems	High Dam Inundation Area			Carbon Canyon		Zone A		1% Annual Chance Flood Hazard	0
Essential Services Facilities	Carbon Canyon Channel	Bridge	Transportation Lifeline Systems	High Dam Inundation Area			Carbon Canyon		Zone A		1% Annual Chance Flood Hazard	0
Essential Services Facilities	Oberle Gymnasium	City Facility	Designated Emergency Shelters	High Dam Inundation Area		Prado	Carbon Canyon		Zone X (shaded)	0.2% Annual Chance Flood Hazard	0.2% Annual Chance Flood Hazard	0
Essential Services Facilities	Neighborhood Services/Whitten Community Center	City Facility	Designated Emergency Shelters	High Dam Inundation Area		Prado	Carbon Canyon		Zone X (shaded)	0.2% Annual Chance Flood Hazard	0.2% Annual Chance Flood Hazard	0
Essential Services Facilities	City Yard	City Facility	Essential Government Operations	High Dam Inundation Area		Prado	Carbon Canyon		Zone X (shaded)	0.2% Annual Chance Flood Hazard	0.2% Annual Chance Flood Hazard	0
Essential Services Facilities	Gomez Community Center	City Facility	Designated Emergency Shelters	High Dam Inundation Area		Prado			Zone X (shaded)	0.2% Annual Chance Flood Hazard	0.2% Annual Chance Flood Hazard	0
Essential Services Facilities	Edwin T. Powell Building/Cathy Torrez L.C.	City Facility	Essential Government Operations	High Dam Inundation Area		Prado			Zone X (unshaded)	Area Of Minimal Flood Hazard	Other Areas	5

Category	Name	Type	TYPE2	Inside High Hazard Dam Inundation	Inside Extremely High Hazard Dam Inundation	Inside Prado Dam Inundation	Inside Carbon Canyon Dam Inundation	Inside Yorba Linda Dam Inundation	DFIRM Flood Zone	DFIRM Flood Zone Subtype 1	DFIRM Flood Zone Subtype 2	Deep Seated Landslide Class
Essential Services Facilities	Placentia Library	City Facility	Designated Emergency Shelters	High Dam Inundation Area		Prado	Carbon Canyon		Zone X (unshaded)	Area Of Minimal Flood Hazard	Other Areas	0
Essential Services Facilities	Placentia Civic Center	City Facility	Essential Government Operations	High Dam Inundation Area		Prado	Carbon Canyon		Zone X (unshaded)	Area Of Minimal Flood Hazard	Other Areas	0
Essential Services Facilities	Kraemer Clubhouse	City Facility	Designated Emergency Shelters						Zone X (unshaded)	Area Of Minimal Flood Hazard	Other Areas	0
Essential Services Facilities	Backs Community Building	City Facility	Essential Government Operations						Zone X (unshaded)	Area Of Minimal Flood Hazard	Other Areas	8
Essential Services Facilities	Aguirre Building	City Facility	Essential Government Operations						Zone X (unshaded)	Area Of Minimal Flood Hazard	Other Areas	0
Essential Services Facilities	Snack Shack at Champions Sports Complex	City Facility	Designated Emergency Shelters						Zone X (unshaded)	Area Of Minimal Flood Hazard	Other Areas	5
Essential Services Facilities	Bradford House	City Facility	Essential Government Operations						Zone X (unshaded)	Area Of Minimal Flood Hazard	Other Areas	0
Essential Services Facilities	Tynes Gym	City Facility	Designated Emergency Shelters						Zone X (unshaded)	Area Of Minimal Flood Hazard	Other Areas	0
Essential Services Facilities	Koch Recreation Center	City Facility	Designated Emergency Shelters	High Dam Inundation Area			Carbon Canyon		Zone X (unshaded)	Area Of Minimal Flood Hazard	Other Areas	0
Essential Services Facilities	SCE Placentia Substation	Electric Substation	Public Utility Plant Facilities						Zone X (shaded)	0.2% Annual Chance Flood Hazard	0.2% Annual Chance Flood Hazard	0
Essential Services Facilities	Placentia Fire Station #1	Fire Station	Public Safety	High Dam Inundation Area		Prado			Zone X (unshaded)	Area Of Minimal Flood Hazard	Other Areas	0

Category	Name	Type	TYPE2	Inside High Hazard Dam Inundation	Inside Extremely High Hazard Dam Inundation	Inside Prado Dam Inundation	Inside Carbon Canyon Dam Inundation	Inside Yorba Linda Dam Inundation	DFIRM Flood Zone	DFIRM Flood Zone Subtype 1	DFIRM Flood Zone Subtype 2	Deep Seated Landslide Class
Essential Services Facilities	Placentia Fire Station # 2	Fire Station	Public Safety	High Dam Inundation Area			Carbon Canyon		Zone X (unshaded)	Area Of Minimal Flood Hazard	Other Areas	0
Essential Services Facilities	Placentia Linda Hospital	Hospital	Public Safety	High Dam Inundation Area			Carbon Canyon		Zone X (unshaded)	Area Of Minimal Flood Hazard	Other Areas	0
Essential Services Facilities	Placentia Station 25	Police Station	Public Safety	High Dam Inundation Area		Prado	Carbon Canyon		Zone X (unshaded)	Area Of Minimal Flood Hazard	Other Areas	0
Essential Services Facilities	Golden State Water Company	Water Facilities	Public Utility Plant Facilities						Zone X (unshaded)	Area Of Minimal Flood Hazard	Other Areas	0
Essential Services Facilities	Golden State Water Company	Water Facilities	Public Utility Plant Facilities						Zone X (shaded)	0.2% Annual Chance Flood Hazard	0.2% Annual Chance Flood Hazard	0
Essential Services Facilities	Yorba Linda Water District	Water Treatment Facilities	Public Utility Plant Facilities	High Dam Inundation Area	Extremely High Dam Inundation Area	Prado		Yorba	X Protected by Levee	Area With Reduced Flood Risk Due To Levee	0.2% Annual Chance Flood Hazard	0
Hazardous Material Facilities	First Element Fuel	Gas Station	Hazardous Material Facilities	High Dam Inundation Area		Prado	Carbon Canyon		Zone X (shaded)	0.2% Annual Chance Flood Hazard	0.2% Annual Chance Flood Hazard	0
Hazardous Material Facilities	G&M Oil Co.	Gas Station	Hazardous Material Facilities	High Dam Inundation Area		Prado	Carbon Canyon		Zone X (shaded)	0.2% Annual Chance Flood Hazard	0.2% Annual Chance Flood Hazard	0
Hazardous Material Facilities	Nickey Petroleum	Gas Station	Hazardous Material Facilities	High Dam Inundation Area	Extremely High Dam Inundation Area	Prado		Yorba	X Protected by Levee	Area With Reduced Flood Risk Due To Levee	0.2% Annual Chance Flood Hazard	0
Hazardous Material Facilities	ARCO AMPM #5213	Gas Station	Hazardous Material Facilities						Zone X (unshaded)	Area Of Minimal Flood Hazard	Other Areas	0

Category	Name	Type	TYPE2	Inside High Hazard Dam Inundation	Inside Extremely High Hazard Dam Inundation	Inside Prado Dam Inundation	Inside Carbon Canyon Dam Inundation	Inside Yorba Linda Dam Inundation	DFIRM Flood Zone	DFIRM Flood Zone Subtype 1	DFIRM Flood Zone Subtype 2	Deep Seated Landslide Class
Hazardous Material Facilities	ARCO AMPM #82539	Gas Station	Hazardous Material Facilities	High Dam Inundation Area			Carbon Canyon		Zone X (unshaded)	Area Of Minimal Flood Hazard	Other Areas	0
Hazardous Material Facilities	Andres Technical Plating	Hazardous Material Business	Hazardous Material Facilities	High Dam Inundation Area		Prado	Carbon Canyon		Zone X (shaded)	0.2% Annual Chance Flood Hazard	0.2% Annual Chance Flood Hazard	0
Hazardous Material Facilities	AIRGAS US, LLC	Hazardous Material Business	Hazardous Material Facilities	High Dam Inundation Area		Prado	Carbon Canyon		Zone X (shaded)	0.2% Annual Chance Flood Hazard	0.2% Annual Chance Flood Hazard	0
Hazardous Material Facilities	A C Products Inc.	Hazardous Material Business	Hazardous Material Facilities	High Dam Inundation Area		Prado	Carbon Canyon		Zone X (shaded)	0.2% Annual Chance Flood Hazard	0.2% Annual Chance Flood Hazard	0
Hazardous Material Facilities	Singer Electric Motors	Hazardous Material Business	Hazardous Material Facilities	High Dam Inundation Area		Prado	Carbon Canyon		Zone X (shaded)	0.2% Annual Chance Flood Hazard	0.2% Annual Chance Flood Hazard	0
Hazardous Material Facilities	U-Haul Repair Shop Placentia RERS	Hazardous Material Business	Hazardous Material Facilities	High Dam Inundation Area		Prado	Carbon Canyon		Zone X (shaded)	0.2% Annual Chance Flood Hazard	0.2% Annual Chance Flood Hazard	0
Hazardous Material Facilities	Vita-Herb Nutriceuticals Inc.	Hazardous Material Business	Hazardous Material Facilities	High Dam Inundation Area		Prado	Carbon Canyon		Zone X (shaded)	0.2% Annual Chance Flood Hazard	0.2% Annual Chance Flood Hazard	0
Hazardous Material Facilities	Superior Processing	Hazardous Material Business	Hazardous Material Facilities	High Dam Inundation Area		Prado			X Protected by Levee	Area With Reduced Flood Risk Due To Levee	0.2% Annual Chance Flood Hazard	0
Hazardous Material Facilities	Stocker Industries	Hazardous Material Business	Hazardous Material Facilities	High Dam Inundation Area		Prado	Carbon Canyon		Zone X (shaded)	0.2% Annual Chance Flood Hazard	0.2% Annual Chance Flood Hazard	0
Hazardous Material Facilities	Onyx Concrete Coating	Hazardous Material Business	Hazardous Material Facilities	High Dam Inundation Area		Prado			X Protected by Levee	Area With Reduced Flood Risk Due To Levee	0.2% Annual Chance Flood Hazard	0

Category	Name	Type	TYPE2	Inside High Hazard Dam Inundation	Inside Extremely High Hazard Dam Inundation	Inside Prado Dam Inundation	Inside Carbon Canyon Dam Inundation	Inside Yorba Linda Dam Inundation	DFIRM Flood Zone	DFIRM Flood Zone Subtype 1	DFIRM Flood Zone Subtype 2	Deep Seated Landslide Class
Hazardous Material Facilities	APCT Inc.	Hazardous Material Business	Hazardous Material Facilities	High Dam Inundation Area	Extremely High Dam Inundation Area	Prado		Yorba	X Protected by Levee	Area With Reduced Flood Risk Due To Levee	0.2% Annual Chance Flood Hazard	0
Hazardous Material Facilities	Alva Manufacturing Inc.	Hazardous Material Business	Hazardous Material Facilities	High Dam Inundation Area		Prado	Carbon Canyon		Zone X (shaded)	0.2% Annual Chance Flood Hazard	0.2% Annual Chance Flood Hazard	0
Hazardous Material Facilities	Service King Paint & Body, LLC	Hazardous Material Business	Hazardous Material Facilities	High Dam Inundation Area		Prado	Carbon Canyon		Zone X (shaded)	0.2% Annual Chance Flood Hazard	0.2% Annual Chance Flood Hazard	0
Hazardous Material Facilities	Hartwell Corporation	Hazardous Material Business	Hazardous Material Facilities	High Dam Inundation Area		Prado			X Protected by Levee	Area With Reduced Flood Risk Due To Levee	0.2% Annual Chance Flood Hazard	0
Hazardous Material Facilities	Amparo Medical Inc.	Hazardous Material Business	Hazardous Material Facilities	High Dam Inundation Area		Prado			X Protected by Levee	Area With Reduced Flood Risk Due To Levee	0.2% Annual Chance Flood Hazard	0
Hazardous Material Facilities	Raptor Wireless Services	Hazardous Material Business	Hazardous Material Facilities	High Dam Inundation Area		Prado	Carbon Canyon		Zone X (shaded)	0.2% Annual Chance Flood Hazard	0.2% Annual Chance Flood Hazard	0
Hazardous Material Facilities	Nalco Water Pretreatment Solutions LLC	Hazardous Material Business	Hazardous Material Facilities	High Dam Inundation Area		Prado			X Protected by Levee	Area With Reduced Flood Risk Due To Levee	0.2% Annual Chance Flood Hazard	0
Hazardous Material Facilities	Pacific Metal Cutting	Hazardous Material Business	Hazardous Material Facilities	High Dam Inundation Area		Prado	Carbon Canyon		Zone X (shaded)	0.2% Annual Chance Flood Hazard	0.2% Annual Chance Flood Hazard	0
Hazardous Material Facilities	Cleanroom Film and Bags	Hazardous Material Business	Hazardous Material Facilities	High Dam Inundation Area		Prado			X Protected by Levee	Area With Reduced Flood Risk Due To Levee	0.2% Annual Chance Flood Hazard	0

Category	Name	Type	TYPE2	Inside High Hazard Dam Inundation	Inside Extremely High Hazard Dam Inundation	Inside Prado Dam Inundation	Inside Carbon Canyon Dam Inundation	Inside Yorba Linda Dam Inundation	DFIRM Flood Zone	DFIRM Flood Zone Subtype 1	DFIRM Flood Zone Subtype 2	Deep Seated Landslide Class
Hazardous Material Facilities	Schorr Metal Inc.	Hazardous Material Business	Hazardous Material Facilities	High Dam Inundation Area		Prado	Carbon Canyon		Zone X (shaded)	0.2% Annual Chance Flood Hazard	0.2% Annual Chance Flood Hazard	0
Hazardous Material Facilities	Concrete Restoration System Inc.	Hazardous Material Business	Hazardous Material Facilities	High Dam Inundation Area		Prado			X Protected by Levee	Area With Reduced Flood Risk Due To Levee	0.2% Annual Chance Flood Hazard	0
Hazardous Material Facilities	Fruth Custom Plastics Inc.	Hazardous Material Business	Hazardous Material Facilities	High Dam Inundation Area		Prado			X Protected by Levee	Area With Reduced Flood Risk Due To Levee	0.2% Annual Chance Flood Hazard	0
Hazardous Material Facilities	Vitrax Corporation	Hazardous Material Business	Hazardous Material Facilities	High Dam Inundation Area		Prado			Zone AE		1% Annual Chance Flood Hazard	0
Hazardous Material Facilities	Cardinal Health 414, LLC Nuclear Pharmacy Services	Hazardous Material Business	Hazardous Material Facilities	High Dam Inundation Area		Prado			Zone AE		1% Annual Chance Flood Hazard	0
Hazardous Material Facilities	Apro LLC	Hazardous Material Business	Hazardous Material Facilities	High Dam Inundation Area		Prado	Carbon Canyon		Zone X (shaded)	0.2% Annual Chance Flood Hazard	0.2% Annual Chance Flood Hazard	0
Hazardous Material Facilities	Ride Wright Wheels Inc.	Hazardous Material Business	Hazardous Material Facilities	High Dam Inundation Area		Prado			X Protected by Levee	Area With Reduced Flood Risk Due To Levee	0.2% Annual Chance Flood Hazard	0
Hazardous Material Facilities	Arlon Graphics LLC	Hazardous Material Business	Hazardous Material Facilities	High Dam Inundation Area		Prado	Carbon Canyon		Zone X (unshaded)	Area Of Minimal Flood Hazard	Other Areas	5
Hazardous Material Facilities	Coast Southwest	Hazardous Material Business	Hazardous Material Facilities	High Dam Inundation Area		Prado			Zone X (unshaded)	Area Of Minimal Flood Hazard	Other Areas	0
Hazardous Material Facilities	West Coast Metal Stamping Inc.	Hazardous Material Business	Hazardous Material Facilities	High Dam Inundation Area		Prado			Zone X (unshaded)	Area Of Minimal Flood Hazard	Other Areas	0

Category	Name	Type	TYPE2	Inside High Hazard Dam Inundation	Inside Extremely High Hazard Dam Inundation	Inside Prado Dam Inundation	Inside Carbon Canyon Dam Inundation	Inside Yorba Linda Dam Inundation	DFIRM Flood Zone	DFIRM Flood Zone Subtype 1	DFIRM Flood Zone Subtype 2	Deep Seated Landslide Class
Hazardous Material Facilities	Vanderveer Industrial Plastics LLC	Hazardous Material Business	Hazardous Material Facilities	High Dam Inundation Area		Prado			Zone X (unshaded)	Area Of Minimal Flood Hazard	Other Areas	0
Hazardous Material Facilities	Coast Southwest	Hazardous Material Business	Hazardous Material Facilities	High Dam Inundation Area		Prado			Zone X (unshaded)	Area Of Minimal Flood Hazard	Other Areas	0
Hazardous Material Facilities	Apro LLC	Hazardous Material Business	Hazardous Material Facilities	High Dam Inundation Area		Prado			Zone X (shaded)	0.2% Annual Chance Flood Hazard	0.2% Annual Chance Flood Hazard	0
Hazardous Material Facilities	Auger Industries	Hazardous Material Business	Hazardous Material Facilities	High Dam Inundation Area		Prado	Carbon Canyon		Zone X (shaded)	0.2% Annual Chance Flood Hazard	0.2% Annual Chance Flood Hazard	0
Hazardous Material Facilities	Apro LLC	Hazardous Material Business	Hazardous Material Facilities	High Dam Inundation Area			Carbon Canyon		Zone X (unshaded)	Area Of Minimal Flood Hazard	Other Areas	0
Hazardous Material Facilities	Sherwin-Williams Company	Hazardous Material Business	Hazardous Material Facilities						Zone X (unshaded)	Area Of Minimal Flood Hazard	Other Areas	0
Hazardous Material Facilities	Dunn-Edwards Corporation	Hazardous Material Business	Hazardous Material Facilities						Zone X (unshaded)	Area Of Minimal Flood Hazard	Other Areas	0
Hazardous Material Facilities	Placentia Linda Hospital	Hospital	Hazardous Material Facilities	High Dam Inundation Area			Carbon Canyon		Zone X (unshaded)	Area Of Minimal Flood Hazard	Other Areas	0
Hazardous Material Facilities	Placentia Linda Hospital (The Center for Wound Care)	Hospital	Hazardous Material Facilities	High Dam Inundation Area			Carbon Canyon		Zone X (unshaded)	Area Of Minimal Flood Hazard	Other Areas	7
Hazardous Material Facilities	Plegel Oil Company Inc.	Oil Tank Farm	Hazardous Material Facilities						Zone X (unshaded)	Area Of Minimal Flood Hazard	Other Areas	0

Category	Name	Type	TYPE2	Inside High Hazard Dam Inundation	Inside Extremely High Hazard Dam Inundation	Inside Prado Dam Inundation	Inside Carbon Canyon Dam Inundation	Inside Yorba Linda Dam Inundation	DFIRM Flood Zone	DFIRM Flood Zone Subtype 1	DFIRM Flood Zone Subtype 2	Deep Seated Landslide Class
Hazardous Material Facilities	Suburban Propane/LMTD. PRTNRSHP	Propane Tank Facility	Hazardous Material Facilities	High Dam Inundation Area		Prado	Carbon Canyon		Zone X (unshaded)	Area Of Minimal Flood Hazard	Other Areas	0
Hazardous Material Facilities	Yorba Linda Water District	Water Utilities	Hazardous Material Facilities	High Dam Inundation Area	Extremely High Dam Inundation Area	Prado		Yorba	X Protected by Levee	Area With Reduced Flood Risk Due To Levee	0.2% Annual Chance Flood Hazard	0
Hazardous Material Facilities	Golden State Water Company	Water Utilities	Hazardous Material Facilities						Zone X (unshaded)	Area Of Minimal Flood Hazard	Other Areas	0
Hazardous Material Facilities	Golden State Water Company	Water Utilities	Hazardous Material Facilities						Zone X (shaded)	0.2% Annual Chance Flood Hazard	0.2% Annual Chance Flood Hazard	0

Source: City of Placentia GIS

Table F-2 City of Placentia Critical Facilities in FHSZ, Fire Threat Zones, Hazardous Materials Routes, and Potential Liquefaction Areas

Category	Name	Type	TYPE2	FHSZ	Fire Threat Class	Hazardous Material Route Railroad	Hazardous Material Route 57	Hazardous Material Route 91	Hazardous Material Route 90	Hazardous Material Route 142	Multiple Hazardous Materials Routes	Potential Liquefaction Area
At Risk Population Facilities	PYLUSD-Melrose State Preschool	DayCare Center	Childcare Facilities	Urban Unzoned	No Threat	AT & SF Railroad	HWY 57	HWY 91			HWY 57, HWY 91, and AT & SF Railroad	Outside of Potential Liquefaction Hazard Zone
At Risk Population Facilities	Placentia Head Start/Placentia Early Head Start	DayCare Center	Childcare Facilities	Urban Unzoned	No Threat	AT & SF Railroad	HWY 57	HWY 91			HWY 57, HWY 91, and AT & SF Railroad	Outside of Potential Liquefaction Hazard Zone
At Risk Population Facilities	Calvary Baptist Church-Ikids Preschool	DayCare Center	Childcare Facilities	Urban Unzoned	No Threat	AT & SF Railroad					AT & SF Railroad	Outside of Potential Liquefaction Hazard Zone
At Risk Population Facilities	St Joseph Preschool	DayCare Center	Childcare Facilities	Urban Unzoned	No Threat	AT & SF Railroad	HWY 57				HWY 57 and AT & SF Railroad	Outside of Potential Liquefaction Hazard Zone
At Risk Population Facilities	PYLUSD-Ruby Drive State Preschool/Ruby Drive Early Head Start	DayCare Center	Childcare Facilities	Urban Unzoned	No Threat	AT & SF Railroad	HWY 57				HWY 57 and AT & SF Railroad	Outside of Potential Liquefaction Hazard Zone
At Risk Population Facilities	Towne and Country Early Education Center	DayCare Center	Childcare Facilities	Urban Unzoned	No Threat	AT & SF Railroad	HWY 57				HWY 57 and AT & SF Railroad	Outside of Potential Liquefaction Hazard Zone
At Risk Population Facilities	Blessed Sacrament Children's Learning Center	DayCare Center	Childcare Facilities	Urban Unzoned	No Threat						No Hazardous Materials Routes	Outside of Potential Liquefaction Hazard Zone
At Risk Population Facilities	Wagner Preschool	DayCare Center	Childcare Facilities	Urban Unzoned	No Threat						No Hazardous Materials Routes	Outside of Potential Liquefaction Hazard Zone

Category	Name	Type	TYPE2	FHSZ	Fire Threat Class	Hazardous Material Route Railroad	Hazardous Material Route 57	Hazardous Material Route 91	Hazardous Material Route 90	Hazardous Material Route 142	Multiple Hazardous Materials Routes	Potential Liquefaction Area
At Risk Population Facilities	Kindercare Learning Center	DayCare Center	Childcare Facilities	Urban Unzoned	No Threat				HWY 90	HWY 142	HWY 90 and HWY 142	Potential Liquefaction Hazard Zone
At Risk Population Facilities	Melrose Elementary School	Primary/Secondary School	Schools	Urban Unzoned	No Threat	AT & SF Railroad	HWY 57	HWY 91			HWY 57, HWY 91, and AT & SF Railroad	Outside of Potential Liquefaction Hazard Zone
At Risk Population Facilities	Valadez Middle School	Primary/Secondary School	Schools	Urban Unzoned	No Threat	AT & SF Railroad	HWY 57	HWY 91			HWY 57, HWY 91, and AT & SF Railroad	Outside of Potential Liquefaction Hazard Zone
At Risk Population Facilities	El Camino Real High School	Primary/Secondary School	Schools	Urban Unzoned	No Threat	AT & SF Railroad					AT & SF Railroad	Potential Liquefaction Hazard Zone
At Risk Population Facilities	John Tynes Elementary School	Primary/Secondary School	Schools	Urban Unzoned	No Threat	AT & SF Railroad					AT & SF Railroad	Outside of Potential Liquefaction Hazard Zone
At Risk Population Facilities	Kraemer Junior High School	Primary/Secondary School	Schools	Urban Unzoned	No Threat	AT & SF Railroad	HWY 57				HWY 57 and AT & SF Railroad	Outside of Potential Liquefaction Hazard Zone
At Risk Population Facilities	Valencia High School	Primary/Secondary School	Schools	Urban Unzoned	No Threat	AT & SF Railroad	HWY 57				HWY 57 and AT & SF Railroad	Outside of Potential Liquefaction Hazard Zone
At Risk Population Facilities	St Joseph Catholic School	Primary/Secondary School	Schools	Urban Unzoned	No Threat	AT & SF Railroad	HWY 57				HWY 57 and AT & SF Railroad	Outside of Potential Liquefaction Hazard Zone
At Risk Population Facilities	Ruby Drive Elementary School	Primary/Secondary School	Schools	Urban Unzoned	No Threat	AT & SF Railroad	HWY 57				HWY 57 and AT & SF Railroad	Outside of Potential Liquefaction Hazard Zone

Category	Name	Type	TYPE2	FHSZ	Fire Threat Class	Hazardous Material Route Railroad	Hazardous Material Route 57	Hazardous Material Route 91	Hazardous Material Route 90	Hazardous Material Route 142	Multiple Hazardous Materials Routes	Potential Liquefaction Area
At Risk Population Facilities	Van Buren Elementary School	Primary/Secondary School	Schools	Urban Unzoned	No Threat				HWY 90		HWY 90	Outside of Potential Liquefaction Hazard Zone
At Risk Population Facilities	Morse Avenue Elementary School	Primary/Secondary School	Schools	Urban Unzoned	No Threat						No Hazardous Materials Routes	Outside of Potential Liquefaction Hazard Zone
At Risk Population Facilities	Wagner Elementary School	Primary/Secondary School	Schools	Urban Unzoned	No Threat						No Hazardous Materials Routes	Outside of Potential Liquefaction Hazard Zone
At Risk Population Facilities	El Dorado High School	Primary/Secondary School	Schools	Urban Unzoned	No Threat						No Hazardous Materials Routes	Outside of Potential Liquefaction Hazard Zone
At Risk Population Facilities	Brookhaven Elementary School	Primary/Secondary School	Schools	Urban Unzoned	No Threat						No Hazardous Materials Routes	Outside of Potential Liquefaction Hazard Zone
At Risk Population Facilities	Sierra Vista Elementary School	Primary/Secondary School	Schools	Urban Unzoned	No Threat		HWY 57				HWY 57	Outside of Potential Liquefaction Hazard Zone
At Risk Population Facilities	Col. J.K. Tuffree Middle School	Primary/Secondary School	Schools	Urban Unzoned	No Threat		HWY 57		HWY 90		HWY 57 and HWY 90	Outside of Potential Liquefaction Hazard Zone
At Risk Population Facilities	Golden Elementary School	Primary/Secondary School	Schools	Urban Unzoned	No Threat				HWY 90	HWY 142	HWY 90 and HWY 142	Outside of Potential Liquefaction Hazard Zone
At Risk Population Facilities	George Key School	Primary/Secondary School	Schools	Urban Unzoned	No Threat				HWY 90	HWY 142	HWY 90 and HWY 142	Outside of Potential Liquefaction Hazard Zone

Category	Name	Type	TYPE2	FHSZ	Fire Threat Class	Hazardous Material Route Railroad	Hazardous Material Route 57	Hazardous Material Route 91	Hazardous Material Route 90	Hazardous Material Route 142	Multiple Hazardous Materials Routes	Potential Liquefaction Area
At Risk Population Facilities	Interface Rehabilitation Center	Rehabiliation Center	Medical Facilities	Urban Unzoned	No Threat	AT & SF Railroad	HWY 57	HWY 91			HWY 57, HWY 91, and AT & SF Railroad	Outside of Potential Liquefaction Hazard Zone
At Risk Population Facilities	Emerald Isle Senior Apartment	Senior Apartment	Senior Facilities	Urban Unzoned	Low	AT & SF Railroad					AT & SF Railroad	Outside of Potential Liquefaction Hazard Zone
At Risk Population Facilities	Bradford Terrace Senior Apartment	Senior Apartment	Senior Facilities	Urban Unzoned	No Threat	AT & SF Railroad	HWY 57				HWY 57 and AT & SF Railroad	Outside of Potential Liquefaction Hazard Zone
At Risk Population Facilities	Ivy Park at Bradford	Senior Assisted Living	Senior Facilities	Urban Unzoned	No Threat		HWY 57				HWY 57	Outside of Potential Liquefaction Hazard Zone
At Risk Population Facilities	Crescendo Senior Living	Senior Assisted Living	Senior Facilities	Urban Unzoned	No Threat						No Hazardous Materials Routes	Outside of Potential Liquefaction Hazard Zone
At Risk Population Facilities	Brookdale Hospice	Senior Hospice	Senior Facilities	Urban Unzoned	No Threat	AT & SF Railroad	HWY 57	HWY 91			HWY 57, HWY 91, and AT & SF Railroad	Outside of Potential Liquefaction Hazard Zone
Essential Services Facilities	Carbon Creek Channel	Bridge	Transportation Lifeline Systems	Urban Unzoned	No Threat	AT & SF Railroad	HWY 57	HWY 91			HWY 57, HWY 91, and AT & SF Railroad	Outside of Potential Liquefaction Hazard Zone
Essential Services Facilities	Placentia Storm Channel	Bridge	Transportation Lifeline Systems	Urban Unzoned	No Threat	AT & SF Railroad	HWY 57	HWY 91			HWY 57, HWY 91, and AT & SF Railroad	Outside of Potential Liquefaction Hazard Zone
Essential Services Facilities	Placentia Storm Channel	Bridge	Transportation Lifeline Systems	Urban Unzoned	No Threat	AT & SF Railroad	HWY 57	HWY 91			HWY 57, HWY 91, and AT & SF Railroad	Outside of Potential Liquefaction Hazard Zone

Category	Name	Type	TYPE2	FHSZ	Fire Threat Class	Hazardous Material Route Railroad	Hazardous Material Route 57	Hazardous Material Route 91	Hazardous Material Route 90	Hazardous Material Route 142	Multiple Hazardous Materials Routes	Potential Liquefaction Area
Essential Services Facilities	Atwood Channel	Bridge	Transportation Lifeline Systems	Urban Unzoned	No Threat	AT & SF Railroad					AT & SF Railroad	Potential Liquefaction Hazard Zone
Essential Services Facilities	Cabron Creek Channel	Bridge	Transportation Lifeline Systems	Urban Unzoned	No Threat	AT & SF Railroad					AT & SF Railroad	Potential Liquefaction Hazard Zone
Essential Services Facilities	Placentia Storm Channel	Bridge	Transportation Lifeline Systems	Urban Unzoned	No Threat	AT & SF Railroad	HWY 57	HWY 91			HWY 57, HWY 91, and AT & SF Railroad	Outside of Potential Liquefaction Hazard Zone
Essential Services Facilities	Carbon Creek Channel	Bridge	Transportation Lifeline Systems	Urban Unzoned	No Threat	AT & SF Railroad					AT & SF Railroad	Potential Liquefaction Hazard Zone
Essential Services Facilities	Atwood Channel	Bridge	Transportation Lifeline Systems	Urban Unzoned	No Threat	AT & SF Railroad					AT & SF Railroad	Potential Liquefaction Hazard Zone
Essential Services Facilities	Rose Drive Oh	Bridge	Transportation Lifeline Systems	Urban Unzoned	No Threat	AT & SF Railroad					AT & SF Railroad	Outside of Potential Liquefaction Hazard Zone
Essential Services Facilities	Richfield Channel (E05)	Bridge	Transportation Lifeline Systems	Urban Unzoned	No Threat	AT & SF Railroad					AT & SF Railroad	Potential Liquefaction Hazard Zone
Essential Services Facilities	Melrose Street Underpass	Bridge	Transportation Lifeline Systems	Urban Unzoned	No Threat	AT & SF Railroad	HWY 57				HWY 57 and AT & SF Railroad	Outside of Potential Liquefaction Hazard Zone
Essential Services Facilities	Richfield Channel	Bridge	Transportation Lifeline Systems	Urban Unzoned	No Threat	AT & SF Railroad					AT & SF Railroad	Potential Liquefaction Hazard Zone
Essential Services Facilities	Carbon Canyon Channel	Bridge	Transportation Lifeline Systems	Urban Unzoned	No Threat	AT & SF Railroad					AT & SF Railroad	Potential Liquefaction Hazard Zone

Category	Name	Type	TYPE2	FHSZ	Fire Threat Class	Hazardous Material Route Railroad	Hazardous Material Route 57	Hazardous Material Route 91	Hazardous Material Route 90	Hazardous Material Route 142	Multiple Hazardous Materials Routes	Potential Liquefaction Area
Essential Services Facilities	Richfield Channel	Bridge	Transportation Lifeline Systems	Urban Unzoned	No Threat	AT & SF Railroad					AT & SF Railroad	Potential Liquefaction Hazard Zone
Essential Services Facilities	Carbon Canyon Channel	Bridge	Transportation Lifeline Systems	Urban Unzoned	No Threat	AT & SF Railroad					AT & SF Railroad	Potential Liquefaction Hazard Zone
Essential Services Facilities	Carbon Canyon Channel	Bridge	Transportation Lifeline Systems	Urban Unzoned	No Threat						No Hazardous Materials Routes	Potential Liquefaction Hazard Zone
Essential Services Facilities	Carbon Canyon Channel	Bridge	Transportation Lifeline Systems	Urban Unzoned	No Threat				HWY 90		HWY 90	Potential Liquefaction Hazard Zone
Essential Services Facilities	Carbon Canyon Channel	Bridge	Transportation Lifeline Systems	Urban Unzoned	No Threat				HWY 90	HWY 142	HWY 90 and HWY 142	Potential Liquefaction Hazard Zone
Essential Services Facilities	Oberle Gymnasium	City Facility	Designated Emergency Shelters	Urban Unzoned	No Threat	AT & SF Railroad	HWY 57	HWY 91			HWY 57, HWY 91, and AT & SF Railroad	Outside of Potential Liquefaction Hazard Zone
Essential Services Facilities	Neighborhood Services/Whitten Community Center	City Facility	Designated Emergency Shelters	Urban Unzoned	No Threat	AT & SF Railroad	HWY 57	HWY 91			HWY 57, HWY 91, and AT & SF Railroad	Outside of Potential Liquefaction Hazard Zone
Essential Services Facilities	City Yard	City Facility	Essential Government Operations	Urban Unzoned	No Threat	AT & SF Railroad	HWY 57				HWY 57 and AT & SF Railroad	Potential Liquefaction Hazard Zone
Essential Services Facilities	Gomez Community Center	City Facility	Designated Emergency Shelters	Urban Unzoned	No Threat	AT & SF Railroad					AT & SF Railroad	Potential Liquefaction Hazard Zone
Essential Services Facilities	Edwin T. Powell Building/Cathy Torrez L.C.	City Facility	Essential Government Operations	Urban Unzoned	No Threat	AT & SF Railroad	HWY 57				HWY 57 and AT & SF Railroad	Outside of Potential Liquefaction Hazard Zone

Category	Name	Type	TYPE2	FHSZ	Fire Threat Class	Hazardous Material Route Railroad	Hazardous Material Route 57	Hazardous Material Route 91	Hazardous Material Route 90	Hazardous Material Route 142	Multiple Hazardous Materials Routes	Potential Liquefaction Area
Essential Services Facilities	Placentia Library	City Facility	Designated Emergency Shelters	Urban Unzoned	No Threat	AT & SF Railroad					AT & SF Railroad	Potential Liquefaction Hazard Zone
Essential Services Facilities	Placentia Civic Center	City Facility	Essential Government Operations	Urban Unzoned	No Threat	AT & SF Railroad					AT & SF Railroad	Potential Liquefaction Hazard Zone
Essential Services Facilities	Kraemer Clubhouse	City Facility	Designated Emergency Shelters	Urban Unzoned	No Threat	AT & SF Railroad	HWY 57				HWY 57 and AT & SF Railroad	Outside of Potential Liquefaction Hazard Zone
Essential Services Facilities	Backs Community Building	City Facility	Essential Government Operations	Urban Unzoned	No Threat	AT & SF Railroad	HWY 57				HWY 57 and AT & SF Railroad	Outside of Potential Liquefaction Hazard Zone
Essential Services Facilities	Aguirre Building	City Facility	Essential Government Operations	Urban Unzoned	No Threat	AT & SF Railroad					AT & SF Railroad	Outside of Potential Liquefaction Hazard Zone
Essential Services Facilities	Snack Shack at Champions Sports Complex	City Facility	Designated Emergency Shelters	Urban Unzoned	No Threat	AT & SF Railroad					AT & SF Railroad	Outside of Potential Liquefaction Hazard Zone
Essential Services Facilities	Bradford House	City Facility	Essential Government Operations	Urban Unzoned	No Threat		HWY 57				HWY 57	Outside of Potential Liquefaction Hazard Zone
Essential Services Facilities	Tynes Gym	City Facility	Designated Emergency Shelters	Urban Unzoned	No Threat		HWY 57		HWY 90		HWY 57 and HWY 90	Outside of Potential Liquefaction Hazard Zone
Essential Services Facilities	Koch Recreation Center	City Facility	Designated Emergency Shelters	Urban Unzoned	No Threat				HWY 90	HWY 142	HWY 90 and HWY 142	Outside of Potential Liquefaction Hazard Zone

Category	Name	Type	TYPE2	FHSZ	Fire Threat Class	Hazardous Material Route Railroad	Hazardous Material Route 57	Hazardous Material Route 91	Hazardous Material Route 90	Hazardous Material Route 142	Multiple Hazardous Materials Routes	Potential Liquefaction Area
Essential Services Facilities	SCE Placentia Substation	Electric Substation	Public Utility Plant Facilities	Urban Unzoned	No Threat	AT & SF Railroad	HWY 57				HWY 57 and AT & SF Railroad	Outside of Potential Liquefaction Hazard Zone
Essential Services Facilities	Placentia Fire Station #1	Fire Station	Public Safety	Urban Unzoned	No Threat	AT & SF Railroad	HWY 57				HWY 57 and AT & SF Railroad	Outside of Potential Liquefaction Hazard Zone
Essential Services Facilities	Placentia Fire Station # 2	Fire Station	Public Safety	Urban Unzoned	No Threat						No Hazardous Materials Routes	Outside of Potential Liquefaction Hazard Zone
Essential Services Facilities	Placentia Linda Hospital	Hospital	Public Safety	Urban Unzoned	No Threat						No Hazardous Materials Routes	Outside of Potential Liquefaction Hazard Zone
Essential Services Facilities	Placentia Station 25	Police Station	Public Safety	Urban Unzoned	No Threat	AT & SF Railroad					AT & SF Railroad	Potential Liquefaction Hazard Zone
Essential Services Facilities	Golden State Water Company	Water Facilities	Public Utility Plant Facilities	Urban Unzoned	No Threat	AT & SF Railroad	HWY 57				HWY 57 and AT & SF Railroad	Outside of Potential Liquefaction Hazard Zone
Essential Services Facilities	Golden State Water Company	Water Facilities	Public Utility Plant Facilities	Urban Unzoned	No Threat		HWY 57		HWY 90	HWY 142	HWY 57, HWY 90, and HWY 142	Outside of Potential Liquefaction Hazard Zone
Essential Services Facilities	Yorba Linda Water District	Water Treatment Facilities	Public Utility Plant Facilities	Urban Unzoned	No Threat	AT & SF Railroad					AT & SF Railroad	Potential Liquefaction Hazard Zone
Hazardous Material Facilities	First Element Fuel	Gas Station	Hazardous Material Facilities	Urban Unzoned	No Threat	AT & SF Railroad	HWY 57	HWY 91			HWY 57, HWY 91, and AT & SF Railroad	Outside of Potential Liquefaction Hazard Zone

Category	Name	Type	TYPE2	FHSZ	Fire Threat Class	Hazardous Material Route Railroad	Hazardous Material Route 57	Hazardous Material Route 91	Hazardous Material Route 90	Hazardous Material Route 142	Multiple Hazardous Materials Routes	Potential Liquefaction Area
Hazardous Material Facilities	G&M Oil Co.	Gas Station	Hazardous Material Facilities	Urban Unzoned	No Threat	AT & SF Railroad	HWY 57	HWY 91			HWY 57, HWY 91, and AT & SF Railroad	Outside of Potential Liquefaction Hazard Zone
Hazardous Material Facilities	Nickey Petroleum	Gas Station	Hazardous Material Facilities	Urban Unzoned	No Threat	AT & SF Railroad		HWY 91			HWY 91 and AT & SF Railroad	Potential Liquefaction Hazard Zone
Hazardous Material Facilities	ARCO AMPM #5213	Gas Station	Hazardous Material Facilities	Urban Unzoned	No Threat		HWY 57				HWY 57	Outside of Potential Liquefaction Hazard Zone
Hazardous Material Facilities	ARCO AMPM #82539	Gas Station	Hazardous Material Facilities	Urban Unzoned	No Threat				HWY 90		HWY 90	Outside of Potential Liquefaction Hazard Zone
Hazardous Material Facilities	Andres Technical Plating	Hazardous Material Business	Hazardous Material Facilities	Urban Unzoned	No Threat	AT & SF Railroad	HWY 57	HWY 91			HWY 57, HWY 91, and AT & SF Railroad	Outside of Potential Liquefaction Hazard Zone
Hazardous Material Facilities	AIRGAS US, LLC	Hazardous Material Business	Hazardous Material Facilities	Urban Unzoned	No Threat	AT & SF Railroad	HWY 57	HWY 91			HWY 57, HWY 91, and AT & SF Railroad	Outside of Potential Liquefaction Hazard Zone
Hazardous Material Facilities	A C Products Inc.	Hazardous Material Business	Hazardous Material Facilities	Urban Unzoned	No Threat	AT & SF Railroad	HWY 57	HWY 91			HWY 57, HWY 91, and AT & SF Railroad	Outside of Potential Liquefaction Hazard Zone
Hazardous Material Facilities	Singer Electric Motors	Hazardous Material Business	Hazardous Material Facilities	Urban Unzoned	No Threat	AT & SF Railroad	HWY 57	HWY 91			HWY 57, HWY 91, and AT & SF Railroad	Outside of Potential Liquefaction Hazard Zone
Hazardous Material Facilities	U-Haul Repair Shop Placentia RERS	Hazardous Material Business	Hazardous Material Facilities	Urban Unzoned	No Threat	AT & SF Railroad	HWY 57	HWY 91			HWY 57, HWY 91, and AT & SF Railroad	Outside of Potential Liquefaction Hazard Zone

Category	Name	Type	TYPE2	FHSZ	Fire Threat Class	Hazardous Material Route Railroad	Hazardous Material Route 57	Hazardous Material Route 91	Hazardous Material Route 90	Hazardous Material Route 142	Multiple Hazardous Materials Routes	Potential Liquefaction Area
Hazardous Material Facilities	Vita-Herb Nutriceuticals Inc.	Hazardous Material Business	Hazardous Material Facilities	Urban Unzoned	No Threat	AT & SF Railroad	HWY 57	HWY 91			HWY 57, HWY 91, and AT & SF Railroad	Outside of Potential Liquefaction Hazard Zone
Hazardous Material Facilities	Superior Processing	Hazardous Material Business	Hazardous Material Facilities	Urban Unzoned	No Threat	AT & SF Railroad		HWY 91			HWY 91 and AT & SF Railroad	Potential Liquefaction Hazard Zone
Hazardous Material Facilities	Stocker Industries	Hazardous Material Business	Hazardous Material Facilities	Urban Unzoned	No Threat	AT & SF Railroad	HWY 57	HWY 91			HWY 57, HWY 91, and AT & SF Railroad	Outside of Potential Liquefaction Hazard Zone
Hazardous Material Facilities	Onyx Concrete Coating	Hazardous Material Business	Hazardous Material Facilities	Urban Unzoned	No Threat	AT & SF Railroad		HWY 91			HWY 91 and AT & SF Railroad	Potential Liquefaction Hazard Zone
Hazardous Material Facilities	APCT Inc.	Hazardous Material Business	Hazardous Material Facilities	Urban Unzoned	No Threat	AT & SF Railroad		HWY 91			HWY 91 and AT & SF Railroad	Potential Liquefaction Hazard Zone
Hazardous Material Facilities	Alva Manufacturing Inc.	Hazardous Material Business	Hazardous Material Facilities	Urban Unzoned	No Threat	AT & SF Railroad	HWY 57	HWY 91			HWY 57, HWY 91, and AT & SF Railroad	Potential Liquefaction Hazard Zone
Hazardous Material Facilities	Service King Paint & Body, LLC	Hazardous Material Business	Hazardous Material Facilities	Urban Unzoned	No Threat	AT & SF Railroad	HWY 57	HWY 91			HWY 57, HWY 91, and AT & SF Railroad	Outside of Potential Liquefaction Hazard Zone
Hazardous Material Facilities	Hartwell Corporation	Hazardous Material Business	Hazardous Material Facilities	Urban Unzoned	No Threat	AT & SF Railroad					AT & SF Railroad	Potential Liquefaction Hazard Zone
Hazardous Material Facilities	Amparo Medical Inc.	Hazardous Material Business	Hazardous Material Facilities	Urban Unzoned	No Threat	AT & SF Railroad		HWY 91			HWY 91 and AT & SF Railroad	Potential Liquefaction Hazard Zone
Hazardous Material Facilities	Raptor Wireless Services	Hazardous Material Business	Hazardous Material Facilities	Urban Unzoned	No Threat	AT & SF Railroad	HWY 57	HWY 91			HWY 57, HWY 91, and AT & SF Railroad	Outside of Potential Liquefaction Hazard Zone

Category	Name	Type	TYPE2	FHSZ	Fire Threat Class	Hazardous Material Route Railroad	Hazardous Material Route 57	Hazardous Material Route 91	Hazardous Material Route 90	Hazardous Material Route 142	Multiple Hazardous Materials Routes	Potential Liquefaction Area
Hazardous Material Facilities	Nalco Water Pretreatment Solutions LLC	Hazardous Material Business	Hazardous Material Facilities	Urban Unzoned	No Threat	AT & SF Railroad		HWY 91			HWY 91 and AT & SF Railroad	Potential Liquefaction Hazard Zone
Hazardous Material Facilities	Pacific Metal Cutting	Hazardous Material Business	Hazardous Material Facilities	Urban Unzoned	No Threat	AT & SF Railroad	HWY 57	HWY 91			HWY 57, HWY 91, and AT & SF Railroad	Outside of Potential Liquefaction Hazard Zone
Hazardous Material Facilities	Cleanroom Film and Bags	Hazardous Material Business	Hazardous Material Facilities	Urban Unzoned	No Threat	AT & SF Railroad					AT & SF Railroad	Potential Liquefaction Hazard Zone
Hazardous Material Facilities	Schorr Metal Inc.	Hazardous Material Business	Hazardous Material Facilities	Urban Unzoned	No Threat	AT & SF Railroad	HWY 57				HWY 57 and AT & SF Railroad	Potential Liquefaction Hazard Zone
Hazardous Material Facilities	Concrete Restoration System Inc.	Hazardous Material Business	Hazardous Material Facilities	Urban Unzoned	No Threat	AT & SF Railroad					AT & SF Railroad	Potential Liquefaction Hazard Zone
Hazardous Material Facilities	Fruth Custom Plastics Inc.	Hazardous Material Business	Hazardous Material Facilities	Urban Unzoned	No Threat	AT & SF Railroad					AT & SF Railroad	Potential Liquefaction Hazard Zone
Hazardous Material Facilities	Vitrax Corporation	Hazardous Material Business	Hazardous Material Facilities	Urban Unzoned	No Threat	AT & SF Railroad		HWY 91			HWY 91 and AT & SF Railroad	Potential Liquefaction Hazard Zone
Hazardous Material Facilities	Cardinal Health 414, LLC Nuclear Pharmacy Services	Hazardous Material Business	Hazardous Material Facilities	Urban Unzoned	No Threat	AT & SF Railroad		HWY 91			HWY 91 and AT & SF Railroad	Potential Liquefaction Hazard Zone
Hazardous Material Facilities	Apro LLC	Hazardous Material Business	Hazardous Material Facilities	Urban Unzoned	No Threat	AT & SF Railroad	HWY 57				HWY 57 and AT & SF Railroad	Potential Liquefaction Hazard Zone
Hazardous Material Facilities	Ride Wright Wheels Inc.	Hazardous Material Business	Hazardous Material Facilities	Urban Unzoned	No Threat	AT & SF Railroad					AT & SF Railroad	Potential Liquefaction Hazard Zone
Hazardous Material Facilities	Arlon Graphics LLC	Hazardous Material Business	Hazardous Material Facilities	Urban Unzoned	No Threat	AT & SF Railroad	HWY 57				HWY 57 and AT & SF Railroad	Outside of Potential Liquefaction Hazard Zone

Category	Name	Type	TYPE2	FHSZ	Fire Threat Class	Hazardous Material Route Railroad	Hazardous Material Route 57	Hazardous Material Route 91	Hazardous Material Route 90	Hazardous Material Route 142	Multiple Hazardous Materials Routes	Potential Liquefaction Area
Hazardous Material Facilities	Coast Southwest	Hazardous Material Business	Hazardous Material Facilities	Urban Unzoned	No Threat	AT & SF Railroad	HWY 57				HWY 57 and AT & SF Railroad	Outside of Potential Liquefaction Hazard Zone
Hazardous Material Facilities	West Coast Metal Stamping Inc.	Hazardous Material Business	Hazardous Material Facilities	Urban Unzoned	No Threat	AT & SF Railroad	HWY 57	HWY 91			HWY 57, HWY 91, and AT & SF Railroad	Outside of Potential Liquefaction Hazard Zone
Hazardous Material Facilities	Vanderveer Industrial Plastics LLC	Hazardous Material Business	Hazardous Material Facilities	Urban Unzoned	No Threat	AT & SF Railroad	HWY 57				HWY 57 and AT & SF Railroad	Outside of Potential Liquefaction Hazard Zone
Hazardous Material Facilities	Coast Southwest	Hazardous Material Business	Hazardous Material Facilities	Urban Unzoned	No Threat	AT & SF Railroad	HWY 57				HWY 57 and AT & SF Railroad	Outside of Potential Liquefaction Hazard Zone
Hazardous Material Facilities	Apro LLC	Hazardous Material Business	Hazardous Material Facilities	Urban Unzoned	No Threat	AT & SF Railroad					AT & SF Railroad	Potential Liquefaction Hazard Zone
Hazardous Material Facilities	Auger Industries	Hazardous Material Business	Hazardous Material Facilities	Urban Unzoned	No Threat	AT & SF Railroad	HWY 57				HWY 57 and AT & SF Railroad	Potential Liquefaction Hazard Zone
Hazardous Material Facilities	Apro LLC	Hazardous Material Business	Hazardous Material Facilities	Urban Unzoned	No Threat	AT & SF Railroad					AT & SF Railroad	Outside of Potential Liquefaction Hazard Zone
Hazardous Material Facilities	Sherwin-Williams Company	Hazardous Material Business	Hazardous Material Facilities	Urban Unzoned	No Threat				HWY 90		HWY 90	Outside of Potential Liquefaction Hazard Zone
Hazardous Material Facilities	Dunn-Edwards Corporation	Hazardous Material Business	Hazardous Material Facilities	Urban Unzoned	No Threat		HWY 57				HWY 57	Outside of Potential Liquefaction Hazard Zone

Category	Name	Type	TYPE2	FHSZ	Fire Threat Class	Hazardous Material Route Railroad	Hazardous Material Route 57	Hazardous Material Route 91	Hazardous Material Route 90	Hazardous Material Route 142	Multiple Hazardous Materials Routes	Potential Liquefaction Area
Hazardous Material Facilities	Placentia Linda Hospital	Hospital	Hazardous Material Facilities	Urban Unzoned	No Threat						No Hazardous Materials Routes	Outside of Potential Liquefaction Hazard Zone
Hazardous Material Facilities	Placentia Linda Hospital (The Center for Wound Care)	Hospital	Hazardous Material Facilities	Urban Unzoned	No Threat				HWY 90		HWY 90	Potential Liquefaction Hazard Zone
Hazardous Material Facilities	Plegel Oil Company Inc.	Oil Tank Farm	Hazardous Material Facilities	Urban Unzoned	No Threat	AT & SF Railroad					AT & SF Railroad	Outside of Potential Liquefaction Hazard Zone
Hazardous Material Facilities	Suburban Propane/LMTD. PRTNRSHP	Propane Tank Facility	Hazardous Material Facilities	Urban Unzoned	No Threat	AT & SF Railroad	HWY 57	HWY 91			HWY 57, HWY 91, and AT & SF Railroad	Outside of Potential Liquefaction Hazard Zone
Hazardous Material Facilities	Yorba Linda Water District	Water Utilities	Hazardous Material Facilities	Urban Unzoned	No Threat	AT & SF Railroad					AT & SF Railroad	Potential Liquefaction Hazard Zone
Hazardous Material Facilities	Golden State Water Company	Water Utilities	Hazardous Material Facilities	Urban Unzoned	No Threat	AT & SF Railroad	HWY 57				HWY 57 and AT & SF Railroad	Outside of Potential Liquefaction Hazard Zone
Hazardous Material Facilities	Golden State Water Company	Water Utilities	Hazardous Material Facilities	Urban Unzoned	No Threat		HWY 57		HWY 90	HWY 142	HWY 57, HWY 90, and HWY 142	Outside of Potential Liquefaction Hazard Zone

Source: City of Placentia GIS

Appendix G FEMA National Risk Index Report

The following is captured for Orange County from FEMA's National Risk Index. It is not specific to the City of Placentia, as it is for the larger Orange County. However, it is valuable to see the bigger picture of what can happen in and near the City. For that reason, it is included here.

National Risk Index

September 08, 2023

Orange County, California

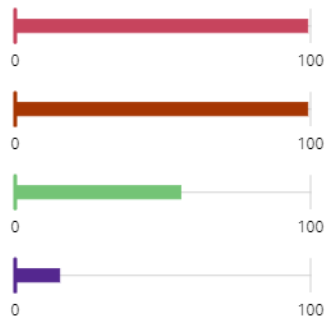
Summary

Risk Index is **Very High** — Score **99.8**

Expected Annual Loss is **Very High** — Score **99.8**

Social Vulnerability is **Relatively Moderate** — Score **56.2**

Community Resilience is **Very Low** — Score **15.4**

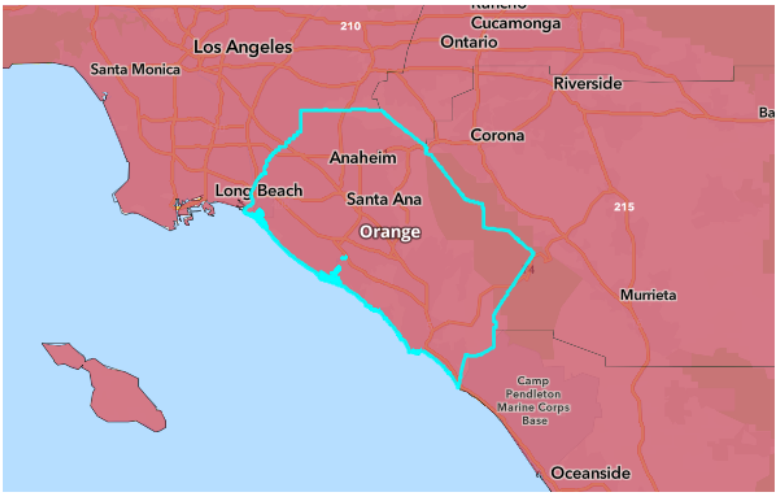


While reviewing this report, keep in mind that low risk is driven by lower loss due to natural hazards, lower social vulnerability, and higher community resilience.

For more information about the National Risk Index, its data, and how to interpret the information it provides, please review the **About the National Risk Index** and **How to Take Action** sections at the end of this report. Or, visit the National Risk Index website at **hazards.fema.gov/nri/learn-more** to access supporting documentation and links.

Risk Index

The Risk Index rating is **Very High** for **Orange County, CA** when compared to the rest of the U.S.



Score **99.78**

National Percentile

99.78

Percentile Within California

91.40

0 100

100% of U.S. counties have a lower Risk Index

91% of counties in California have a lower Risk Index

Risk Index Legend

Very High | Relatively High | Relatively Moderate | Relatively Low | Very Low

No Rating | Not Applicable | Insufficient Data

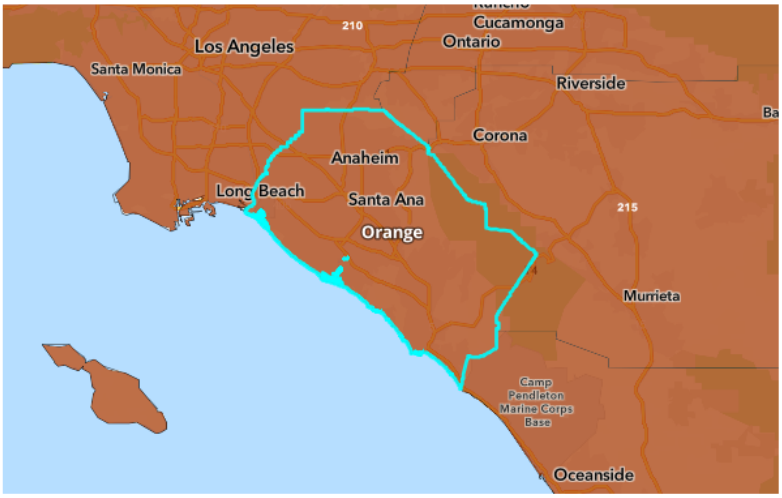
Hazard Type Risk Index

Hazard type Risk Index scores are calculated using data for only a single hazard type, and reflect a community's Expected Annual Loss value, community risk factors, and the adjustment factor used to calculate the risk value.

Hazard Type	EAL Value	Social Vulnerability	Community Resilience	CRF	Risk Value	Score
Earthquake	$926,116,576	Relatively Moderate	Very Low	1.26	$1,183,370,693	99.9
Wildfire	$49,545,003	Relatively Moderate	Very Low	1.26	$45,718,477	99.8
Riverine Flooding	$7,228,030	Relatively Moderate	Very Low	1.26	$9,652,289	96
Tornado	$4,799,429	Relatively Moderate	Very Low	1.26	$5,847,332	87.4
Heat Wave	$795,214	Relatively Moderate	Very Low	1.26	$1,021,683	89.1
Landslide	$257,345	Relatively Moderate	Very Low	1.26	$252,628	94.5
Strong Wind	$201,184	Relatively Moderate	Very Low	1.26	$251,692	36.7
Lightning	$147,219	Relatively Moderate	Very Low	1.26	$184,964	67.2
Drought	$70,453	Relatively Moderate	Very Low	1.26	$72,661	61.3
Coastal Flooding	$72,431	Relatively Moderate	Very Low	1.26	$61,413	44.7
Hail	$31,814	Relatively Moderate	Very Low	1.26	$40,146	29
Tsunami	$11,837	Relatively Moderate	Very Low	1.26	$10,338	56.8
Winter Weather	$52	Relatively Moderate	Very Low	1.26	$45	2
Cold Wave	$0	Relatively Moderate	Very Low	1.26	$0	0
Avalanche	--	Relatively Moderate	Very Low	1.26	--	--
Hurricane	--	Relatively Moderate	Very Low	1.26	--	--
Ice Storm	--	Relatively Moderate	Very Low	1.26	--	--
Volcanic Activity	--	Relatively Moderate	Very Low	1.26	--	--

Expected Annual Loss

In **Orange County, CA**, expected loss each year due to natural hazards is **Very High** when compared to the rest of the U.S.



Score	99.81

National Percentile
99.81
Percentile Within California
91.40
0 100

100% of U.S. counties have a lower Expected Annual Loss

91% of counties in California have a lower Expected Annual Loss

Expected Annual Loss Legend

Very High | Relatively High | Relatively Moderate | Relatively Low | Very Low
No Expected Annual Losses | Not Applicable | Insufficient Data

Composite Expected Annual Loss	**$989,276,586.32**
Composite Expected Annual Loss Rate National Percentile	**76.8**

Building EAL	**$732,036,877.76**	Population EAL	**22.16** fatalities
Building EAL Rate	**$1 per $737.93 of building value**	Population EAL Rate	**1 per 143.65K people**
Agriculture EAL	**$151,844.48**	Population Equivalence EAL	**$257,087,864.08**
Agriculture EAL Rate	**$1 per $623.23 of agriculture value**		

Expected Annual Loss for Hazard Types

Expected Annual Loss scores for hazard types are calculated using data for only a single hazard type, and reflect a community's relative expected annual loss for only that hazard type.

14 of 18 hazard types contribute to the expected annual loss for **Orange County, CA**.

Hazard Type	Expected Annual Loss Rating	EAL Value	Score
Earthquake	Very High	$926,116,576	99.9
Wildfire	Relatively High	$49,545,003	99.8
Riverine Flooding	Relatively High	$7,228,030	95.6
Tornado	Relatively Moderate	$4,799,429	86.8
Heat Wave	Relatively Moderate	$795,214	88.2
Landslide	Relatively High	$257,345	95.1
Strong Wind	Relatively Low	$201,184	37.3
Lightning	Relatively Moderate	$147,219	65.9
Coastal Flooding	Relatively Low	$72,431	47.9
Drought	Relatively Low	$70,453	63.7
Hail	Very Low	$31,814	29.7
Tsunami	Relatively Low	$11,837	73.4
Winter Weather	Very Low	$53	4.7
Cold Wave	No Expected Annual Losses	$0	0.0
Avalanche	Not Applicable	--	--
Hurricane	Not Applicable	--	--
Ice Storm	Not Applicable	--	--
Volcanic Activity	Not Applicable	--	--

Expected Annual Loss Values

Hazard Type	Total	Building Value	Population Equivalence	Population	Agriculture Value
Avalanche	--	--	--	--	--
Coastal Flooding	$72,431	$36,792	$35,638	0.00	n/a
Cold Wave	$0	$0	$0	0.00	$0
Drought	$70,453	n/a	n/a	n/a	$70,453
Earthquake	$926,116,576	$672,909,934	$253,206,642	21.83	n/a
Hail	$31,814	$3,861	$27,878	0.00	$76
Heat Wave	$795,214	$642	$780,992	0.07	$13,579
Hurricane	--	--	--	--	--
Ice Storm	--	--	--	--	--
Landslide	$257,345	$229,955	$27,389	0.00	n/a
Lightning	$147,219	$5,081	$142,138	0.01	n/a
Riverine Flooding	$7,228,030	$6,242,163	$920,485	0.08	$65,382
Strong Wind	$201,184	$58,367	$142,719	0.01	$97
Tornado	$4,799,429	$3,133,211	$1,665,679	0.14	$539
Tsunami	$11,837	$545	$11,291	0.00	n/a
Volcanic Activity	--	--	--	--	--
Wildfire	$49,545,003	$49,416,324	$126,960	0.01	$1,718
Winter Weather	$52	$1	$52	0.00	$0

Exposure Values

Hazard Type	Total	Building Value	Population Equivalence	Population	Agriculture Value
Avalanche	--	--	--	--	--
Coastal Flooding	$1,285,676,835,079	$23,450,696,401	$1,262,226,138,678	108,812.60	n/a
Cold Wave	$0	$0	$0	0.00	$0
Drought	$93,187,548	n/a	n/a	n/a	$93,187,548
Earthquake	$37,509,260,879,000	$540,188,479,000	$36,969,072,400,000	3,186,989.00	n/a
Hail	$37,470,594,336,814	$540,194,502,903	$36,930,305,200,000	3,183,647.00	$94,633,911
Heat Wave	$37,470,221,575,022	$540,176,984,179	$36,929,949,956,932	3,183,616.38	$94,633,911
Hurricane	--	--	--	--	--
Ice Storm	--	--	--	--	--
Landslide	$4,809,296,581,619	$86,797,070,290	$4,722,499,511,329	407,112.03	n/a
Lightning	$37,470,499,702,903	$540,194,502,903	$36,930,305,200,000	3,183,647.00	n/a
Riverine Flooding	$1,231,642,642,864	$13,695,785,696	$1,217,942,297,822	104,995.03	$4,559,347
Strong Wind	$37,470,594,336,814	$540,194,502,903	$36,930,305,200,000	3,183,647.00	$94,633,911
Tornado	$37,470,594,336,814	$540,194,502,903	$36,930,305,200,000	3,183,647.00	$94,633,911
Tsunami	$404,888,238,519	$9,092,555,519	$395,795,683,000	34,120.32	n/a
Volcanic Activity	--	--	--	--	--
Wildfire	$513,844,030,158	$9,413,903,356	$504,380,175,862	43,481.05	$49,950,940
Winter Weather	$38,049,693,586	$647,467,889	$37,401,994,455	3,224.31	$231,241

Annualized Frequency Values

Hazard Type	Annualized Frequency	Events on Record	Period of Record
Avalanche	--	--	--
Coastal Flooding	2.1 events per year	n/a	Various (see documentation)
Cold Wave	0 events per year	0	2005-2021 (16 years)
Drought	53.9 events per year	1,603	2000-2021 (22 years)
Earthquake	0.899% chance per year	n/a	2021 dataset
Hail	0.1 events per year	4	1986-2021 (34 years)
Heat Wave	1.9 events per year	26	2005-2021 (16 years)
Hurricane	--	--	--
Ice Storm	--	--	--
Landslide	0.1 events per year	24	2010-2021 (12 years)
Lightning	0.9 events per year	18	1991-2012 (22 years)
Riverine Flooding	2.5 events per year	61	1996-2019 (24 years)
Strong Wind	0.2 events per year	6	1986-2021 (34 years)
Tornado	0.1 events per year	22	1950-2021 (72 years)
Tsunami	0 events per year	13	1800-2021 (222 years)
Volcanic Activity	--	--	--
Wildfire	1.46% chance per year	n/a	2021 dataset
Winter Weather	0 events per year	0	2005-2021 (16 years)

Historic Loss Ratios

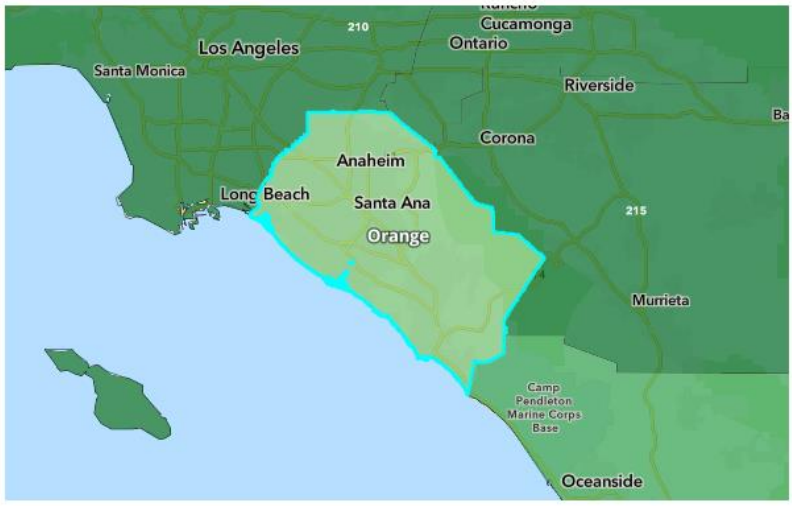
Hazard Type	Overall Rating
Avalanche	--
Coastal Flooding	Very Low
Cold Wave	No Rating
Drought	Very Low
Earthquake	Relatively High
Hail	Very Low
Heat Wave	Very Low
Hurricane	--
Ice Storm	--
Landslide	Very Low
Lightning	Relatively Low
Riverine Flooding	Very Low
Strong Wind	Very Low
Tornado	Very Low
Tsunami	Relatively Low
Volcanic Activity	--
Wildfire	Relatively Low
Winter Weather	Relatively Low

Expected Annual Loss Rate

Hazard Type	Building EAL Rate (per building value)	Population EAL Rate (per population)	Agriculture EAL Rate (per agriculture value)
Avalanche	--	--	--
Coastal Flooding	$1 per $14.68M	1 per 1.04B	--
Cold Wave	--	--	--
Drought	--	--	$1 per $1.34K
Earthquake	$1 per $802.77	1 per 145.85K	--
Hail	$1 per $139.93M	1 per 1.32B	$1 per $1.24M
Heat Wave	$1 per $841.13M	1 per 47.29M	$1 per $6.97K
Hurricane	--	--	--
Ice Storm	--	--	--
Landslide	$1 per $2.35M	1 per 1.35B	--
Lightning	$1 per $106.31M	1 per 259.82M	--
Riverine Flooding	$1 per $86.54K	1 per 40.12M	$1 per $1.45K
Strong Wind	$1 per $9.26M	1 per 258.76M	$1 per $976.06K
Tornado	$1 per $172.41K	1 per 22.17M	$1 per $175.67K
Tsunami	$1 per $990.40M	1 per 3.27B	--
Volcanic Activity	--	--	--
Wildfire	$1 per $10.93K	1 per 290.88M	$1 per $55.07K
Winter Weather	$1 per $839.18B	1 per 712.44B	$1 per $21.64P

Social Vulnerability

Social groups in **Orange County, CA** have a **Relatively Moderate** susceptibility to the adverse impacts of natural hazards when compared to the rest of the U.S.



Score **56.21**

National Percentile
56.21
Percentile Within California
31.00
0 100

56% of U.S. counties have a lower Social Vulnerability

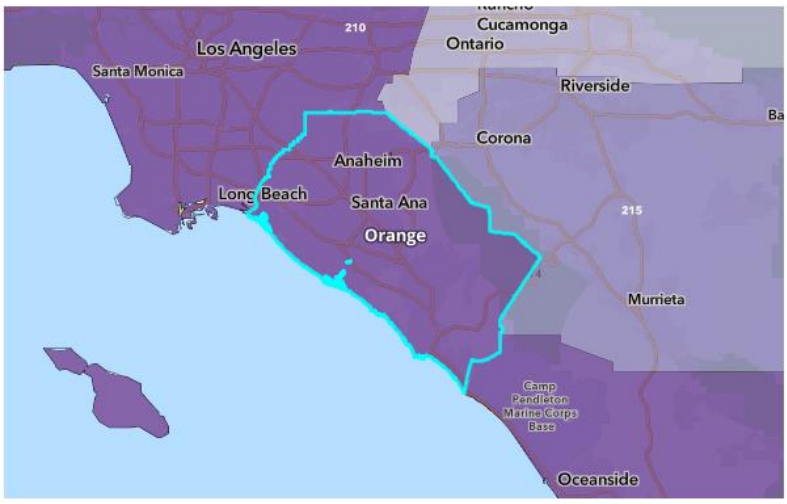
31% of counties in California have a lower Social Vulnerability

Social Vulnerability Legend

Very High | Relatively High | Relatively Moderate | Relatively Low | Very Low | Data Unavailable

Community Resilience

Communities in **Orange County, CA** have a **Very Low** ability to prepare for anticipated natural hazards, adapt to changing conditions, and withstand and recover rapidly from disruptions when compared to the rest of the U.S.



Score **15.44**

National Percentile

15.44

Percentile Within California

8.60

0 100

85% of U.S. counties have a higher Community Resilience

91% of counties in California have a higher Community Resilience

Community Resilience Legend

Very High | Relatively High | Relatively Moderate | Relatively Low | Very Low | Data Unavailable

About the National Risk Index

The National Risk Index is a dataset and online tool to help illustrate the United States communities most at risk for 18 natural hazards: Avalanche, Coastal Flooding, Cold Wave, Drought, Earthquake, Hail, Heat Wave, Hurricane, Ice Storm, Landslide, Lightning, Riverine Flooding, Strong Wind, Tornado, Tsunami, Volcanic Activity, Wildfire, and Winter Weather.

The National Risk Index leverages available source data for Expected Annual Loss due to these 18 hazard types, Social Vulnerability, and Community Resilience to develop a baseline relative risk measurement for each United States county and Census tract. These measurements are calculated using average past conditions, but they cannot be used to predict future outcomes for a community. The National Risk Index is intended to fill gaps in available data and analyses to better inform federal, state, local, tribal, and territorial decision makers as they develop risk reduction strategies.

Explore the National Risk Index Map at **hazards.fema.gov/nri/map**.

Visit the National Risk Index website at **hazards.fema.gov/nri/learn-more** to access supporting documentation and links.

Calculating the Risk Index

Risk Index scores are calculated using an equation that combines scores for Expected Annual Loss due to natural hazards, Social Vulnerability and Community Resilience:

$$\text{Risk Index} = \text{Expected Annual Loss} \times \text{Social Vulnerability} \div \text{Community Resilience}$$

Risk Index scores are presented as a composite score for all 18 hazard types, as well as individual scores for each hazard type.

For more information, visit hazards.fema.gov/nri/determining-risk.

Calculating Expected Annual Loss

Expected Annual Loss scores are calculated using an equation that combines values for exposure, annualized frequency, and historic loss ratios for 18 hazard types:

Expected Annual Loss = Exposure × Annualized Frequency × Historic Loss Ratio

Expected Annual Loss scores are presented as a composite score for all 18 hazard types, as well as individual scores for each hazard type.

For more information, visit **hazards.fema.gov/nri/expected-annual-loss**.

Calculating Social Vulnerability

Social Vulnerability is measured using the Social Vulnerability Index (SVI) published by the Centers for Disease Control and Prevention (CDC).

For more information, visit **hazards.fema.gov/nri/social-vulnerability**.

Calculating Community Resilience

Community Resilience is measured using the Baseline Resilience Indicators for Communities (HVRI BRIC) published by the University of South Carolina's Hazards and Vulnerability Research Institute (HVRI).

For more information, visit **hazards.fema.gov/nri/community-resilience**.

How to Take Action

There are many ways to reduce natural hazard risk through mitigation. Communities with high National Risk Index scores can take action to reduce risk by decreasing Expected Annual Loss due to natural hazards, decreasing Social Vulnerability, and increasing Community Resilience.

For information about how to take action and reduce your risk, visit **hazards.fema.gov/nri/take-action**.

Disclaimer

The National Risk Index (the Risk Index or the Index) and its associated data are meant for planning purposes only. This tool was created for broad nationwide comparisons and is not a substitute for localized risk assessment analysis. Nationwide datasets used as inputs for the National Risk Index are, in many cases, not as accurate as available local data. Users with access to local data for each National Risk Index risk factor should consider substituting the Risk Index data with local data to recalculate a more accurate risk index. If you decide to download the National Risk Index data and substitute it with local data, you assume responsibility for the accuracy of the data and any resulting data index. Please visit the **Contact Us** page if you would like to discuss this process further.

The methodology used by the National Risk Index has been reviewed by subject matter experts in the fields of natural hazard risk research, risk analysis, mitigation planning, and emergency management. The processing methods used to create the National Risk Index have produced results similar to those from other natural hazard risk analyses conducted on a smaller scale. The breadth and combination of geographic information systems (GIS) and data processing techniques leveraged by the National Risk Index enable it to incorporate multiple hazard types and risk factors, manage its nationwide scope, and capture what might have been missed using other methods.

The National Risk Index does not consider the intricate economic and physical interdependencies that exist across geographic regions. Keep in mind that hazard impacts in surrounding counties or Census tracts can cause indirect losses in your community regardless of your community's risk profile.

Nationwide data available for some risk factors are rudimentary at this time. The National Risk Index will be continuously updated as new data become available and improved methodologies are identified.

The National Risk Index Contact Us page is available at **hazards.fema.gov/nri/contact-us**.