CITY OF RANCHO SANTA MARGARITA
LOCAL HAZARD MITIGATION PLAN

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TABLE OF CONTENTS

LIST OF APPENDICES

LIST OF FIGURES

LIST OF TABLES

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SECTION 1.0: INTRODUCTION

Natural disasters can cause death and injuries, as well as significant damage to communities, businesses, public infrastructure, and the environment. Each year, natural disasters take the lives of hundreds of people and injure thousands more, and taxpayers pay billions of dollars annually to help recovery efforts. After disasters, repairs and reconstruction are often completed to simply restore the affected areas to their pre-disaster conditions. Such efforts expedite a return to normalcy; however, the replication of pre-disaster conditions results in a cycle of damage, reconstruction, and repeated damage. As the cost of damage from natural disasters continues to increase, communities realize the importance of identifying effective ways to reduce vulnerability to disasters. While it is not possible to prevent disasters from happening, their effects can be reduced or eliminated through well-organized public education and awareness efforts, preparedness, and mitigation. For those hazards that cannot be fully mitigated, the community must be prepared to provide efficient and effective response and recovery.

It is impossible to predict exactly when and where disasters will occur or the extent to which they will impact a community. However, with careful planning and collaboration among public agencies, stakeholders, and citizens, it is possible to minimize losses that may occur from disasters. Proactive mitigation planning helps reduce the cost of disaster response and, by protecting critical community facilities, reducing liability exposure, and minimizing overall community impacts and disruption. For hazards that can be mitigated, the City should be prepared to implement efficient and effective short- or long-term actions where needed.

The City of Rancho Santa Margarita developed this Local Hazard Mitigation Plan ("LHMP" or "plan") to reduce future loss of life and property resulting from disasters, and to provide increased resiliency, allowing the City to return to normal sooner, with fewer impacts to people, facilities, and infrastructure.

1.1 PLAN PURPOSE

The purpose of the LHMP is to provide the City with clear direction for hazard mitigation action planning. This LHMP identifies natural and human-induced hazards that threaten the community and provides resources, information, and strategies to reduce these threats, resulting in overall risk reduction.

This plan focuses on the mitigation component of the cycle shown in Figure 1.1, *Disaster Response Cycle*. Hazard mitigation plays an important role in reducing the impacts of disasters by identifying effective and feasible actions to reduce the risks posed by potential hazards. The City developed this plan to be consistent with current standards and regulations, ensuring that

Figure 1.1 Disaster Response Cycle

the understanding of hazards facing its community reflects best available information and current conditions.

The LHMP does not supersede current City plans or strategies (such as the General Plan), rather it enhances the ability to identify, inform and mitigate hazard risks unique to the City. Information in this plan will be used to help guide and coordinate mitigation activities and serve as a tool for decision-makers to direct mitigation activities and resources.

1.2 PLAN AUTHORITY

FEDERAL

The federal Robert T. Stafford Disaster Relief and Emergency Act (the Stafford Act), as amended by the Disaster Mitigation Act of 2000 (DMA 2000) and supported by various pieces of regulation, directs hazard mitigation planning activities such as this plan. A City is not required to prepare a LHMP, but the Stafford Act requires State, local, and tribal governments that wish to be eligible for federal hazard mitigation grant funds to submit a hazard mitigation plan that outlines the processes for identifying the natural and man-made hazards, risks, and vulnerabilities of the jurisdiction (United States Code [USC] Title 42, Section 5156[a]). FEMA has promulgated Code of Federal Regulations (CFR) Title 44, Part 201 to carry out the hazard mitigation planning requirements in the Stafford Act. These regulations direct the planning process, plan content, and FEMA approval for hazard mitigation plans.

This LHMP complies with the Stafford Act and DMA 2000, along with the appropriate sections of Title 44 of the CFR, including Parts 201, 206, and 322.

STATE

California Government Code Section 8685.9 (Assembly Bill [AB] 2140) limits the State of California's share of disaster relief funds paid out to local governments to 75 percent of the funds not paid for by federal disaster relief efforts, unless the jurisdiction has adopted a valid hazard mitigation plan consistent with DMA 2000 and has incorporated by reference the hazard mitigation plan into the jurisdiction's General Plan, which can be accomplished as part of the resolution for adoption of the LHMP.

With an approved and incorporated plan, the State may cover more than 75 percent of the remaining disaster relief costs. All California counties and cities are required to prepare a General Plan, which must include a Safety Element that identifies hazard conditions and public safety issues. California Government Code Section 65302.6 indicates that a community may adopt an LHMP into its Safety Element, if the LHMP meets applicable State requirements. This allows communities to use the LHMP to satisfy State requirements for Safety Elements.

California Government Code Section 65302 (g)(4), (Senate Bill [SB] 379), requires that the General Plan Safety Element address the hazards created or exacerbated by climate change. The Safety Element must identify how climate change is expected to affect hazard conditions in the community and include measures to adapt and be more

resilient to these anticipated changes. Since a LHMP can be incorporated into the Safety Element, including these items in the LHMP can satisfy the State requirement. SB 379 states that climate change must be addressed in the Safety Element when the LHMP is updated after January 1, 2017 (for communities that already have an LHMP), or by January 1, 2022 (for communities without an LHMP).

This LHMP is consistent with current standards and regulations, as outlined by the Governor's Office of Emergency Services (Cal OES) and FEMA. It uses the best available information, and its mitigation actions reflect best practices and community values. It meets the requirements of current State and federal guidelines and makes Rancho Santa Margarita eligible for all appropriate benefits under State and federal law and practices.

1.3 PLAN ADOPTION

Following FEMA approval, the City Council of Rancho Santa Margarita formally adopts the LHMP as its own Hazard Mitigation Plan. A copy of the resolution will be provided in Appendix A.

1.4 PLAN ORGANIZATION

The LHMP is organized into seven sections to reflect the logical progression of activities undertaken to develop the plan and includes all relevant documentation required to meet the necessary criteria for FEMA approval. Each section is briefly described below:

Section 1.0: Introduction describes the background and purpose of the plan, as well as the authority established for its development.

Section 2.0: Planning Process describes the LHMP planning process, as well as the meetings and outreach activities undertaken to engage partner agencies, stakeholders, and the public.

Section 3.0: Community Profile provides the history, geography, and demographics, of Rancho Santa Margarita, including land use and development trends.

Section 4.0: Hazards Assessment identifies and profiles the natural and human-induced hazards affecting the City, including their history, risk of future occurrence, and any effects changing weather patterns have on their frequency and intensity, where applicable. The selection of hazards and their prioritization is also discussed. This section also identifies the vulnerability and risk to the community and critical facilities associated with each hazard.

Section 5.0: Mitigation Strategy identifies the specific hazard mitigation actions to reduce potential risks to the City's critical facilities, residents, and business owners in order to improve resiliency, and assesses the City's capabilities to implement and achieve the mitigation actions.

Section 6.0: Plan Maintenance discusses implementation of the plan, including the process to monitor, evaluate, update, and maintain the LHMP, and identifies opportunities for continued public involvement.

Section 7.0: References identifies the various resources utilized throughout development of the LHMP.

1.5 MITIGATION GOALS

The following goals for reducing disaster risk have been identified for the Rancho Santa Margarita LHMP:

- To protect the general population from natural hazards/human-induced hazards
- To avoid damages to Rancho Santa Margarita's critical facilities, public infrastructure, and private property.
- To reduce the potential impact of natural disasters on the environment.
- To promote hazard mitigation measures as an integrated policy.

SECTION 2.0: PLANNING PROCESS

This section describes each stage of the planning process used to develop the LHMP. The LHMP planning process provides a framework to document the plan's development and follows the Federal Emergency Management Agency (FEMA)-recommended steps. The LHMP follows a prescribed series of planning steps which includes organizing resources, assessing risk, developing the mitigation plan, drafting the plan, reviewing and revising the plan, and adopting and submitting the plan for approval. Each step is described in this section.

Hazard mitigation planning in the United States is guided by statutory regulations described in the Disaster Mitigation Act of 2000 (DMA 2000) and implemented through Title 44 Code of Federal Regulations (CFR) Parts 201 and 206. FEMA's hazard mitigation plan guidelines outline a four-step planning process for the development and approval of hazard mitigation plans. Table 2-1, *DMA 2000 CFR Crosswalk*, lists the specific CFR excerpts that contain the requirements for approval, and identifies the applicable section of this LHMP.

Table 2-1
DMA 2000 CFR Crosswalk

DMA 2000 (44 CFR 201.6)	2019 LHMP Section
(1) Organize Resources	Section 2
201.6(c)(1)	Organize to prepare the plan
201.6(b)(1)	Involve the public
201.6(b)(2) and (3)	Coordinate with other agencies
(2) Assess Risks	Section 4
201.6(c)(2)(i)	Assess the hazard
201.6(c)(2)(ii) and (iii)	Assess the problem
(3) Develop the Mitigation Plan	Section 5
201.6(c)(3)(i)	Set goals (Section 1)
201.6(c)(3)(ii)	Review possible activities (actions)
201.6(c)(3)(iii)	Draft an action plan
(4) Plan Maintenance	Section 6
201.6(c)(5)	Adopt the plan
201.6(c)(4)	Implement, evaluate, and revise

For the development of the Rancho Santa Margarita LHMP, the planning process was tailored for the City. All basic federal guidance documents and regulations are met through the process. As documented in the corresponding sections, the LHMP planning process included organizing resources, assessing risks, developing the mitigation action strategy, drafting the plan, reviewing and revising the plan, and adopting and submitting the plan.

2.1 ORGANIZING RESOURCES

One of the first steps in the planning process involved organization of resources, including identifying the Project Management Team, and convening the Planning Team and performing document review.

2.1.1 PROJECT MANAGEMENT TEAM

The Project Management Team was responsible for day-to-day coordination of the LHMP work program, including forming and assembling the Planning Team; scheduling Planning Team meetings; preparing, reviewing, and disseminating Planning Team meeting materials; coordinating, scheduling and participating in community engagement activities and meetings; and, coordinating document review. The Project Management Team included staff from the City of Rancho Santa Margarita, who also participated on the Planning Team.

The Project Management Team worked with the LHMP Consultant Project Management Team throughout the development of the LHMP. The Consultant Team, consisting of hazard mitigation/planning professionals, provided guidance and support to the City through facilitation of the planning process, data collection, community engagement, and meeting materials and document development.

2.1.2 LHMP PLANNING TEAM

In addition to City staff, an invitation via email was sent to several agencies, and organizations advising them of Rancho Santa Margarita's efforts to prepare a LHMP and requesting their involvement in preparation of the plan, including an invitation to attend LHMP Planning Team meetings:

- Capistrano Unified School District
- City of Lake Forest
- City of Mission Viejo
- City of Yorba Linda
- Dove Canyon Emergency Preparedness[1]
- O'Neill Regional Park
- Orange County Emergency Management
- Orange County Fire Authority
- Orange County Health Care Agency
- Orange County Sheriff's Department
- Rancho Santa Margarita Landscape and Recreation Corporation (SAMLARC)
- Saddleback Valley Unified School District
- Santa Margarita Water District
- Southern California Edison
- Southern California Gas Company
- Trabuco Canyon Water District

The City received responses from some agencies and organizations expressing interest in participating directly on the Planning Team, and others indicating their inability to

[1] The Chair of Dove Canyon Emergency Preparedness joined the Planning Team after the first meeting.

participate but willingness to provide information. A copy of the correspondence is included in Appendix B.

The LHMP Planning Team consisted of staff members from the City, as well as representatives from other agencies. Members of the Planning Team represented the following City departments:

- City Administration
- Community Services
- Development Services
- Human Resources and Risk Management Administrator
- Public Safety
- Public Works & Engineering

The LHMP Planning Team worked together to ensure the success of the planning process and is responsible for its implementation and future maintenance. The team's key responsibilities included:

- Participation in Planning Team meetings
- Collection of valuable local information and other requested data
- Decision on plan process and content
- Development and prioritization of mitigation actions for the LHMP
- Review and comment on plan drafts
- Coordination and involvement in the public engagement process

Table 2-2, *LHMP Planning Team*, identifies the Planning Team members and their roles in the LHMP.

Table 2-2
LHMP Planning Team

Name	Title/Role	Organization	Planning Team Role
City Project Management Team			
Cheryl Kuta, AICP	Director of Development Services/LHMP Management Team	City of Rancho Santa Margarita	LHMP Management and Planning Team – Oversight and input on development and organization of Planning Team and meetings, participation in Planning Team meetings, development of and participation in community outreach, hazard identification, capabilities assessment, mitigation actions and prioritization, and plan review.
Wendy Starks, AICP	Principal Planner/LHMP Project Manager and Primary Point of Contact	City of Rancho Santa Margarita	Project Manager – Organization of Planning Team and meetings, participation in Planning Team meetings, development of and participation in community outreach, hazard identification, capabilities assessment, mitigation actions and prioritization, and plan coordination and review. Served as primary point of contact for City and Consultant Project Management Team, Planning Team, and Public.

Table 2-2
LHMP Planning Team (Continued)

Name	Title/Role	Organization	Planning Team Role
Diego Chavez	Human Resources and Risk Management Administrator/LHMP Management Team	City of Rancho Santa Margarita	LHMP Management and Planning Team – Input on development and organization of Planning Team and meetings, participation in Planning Team meetings, hazard identification, capabilities assessment, mitigation actions and prioritization, and plan review.
LHMP Planning Team			
Steve Aleshire	Supervising Park Ranger	OC Parks/O'Neill Regional Park	Hazard identification, capabilities assessment, mitigation actions and prioritization, plan review.
Michelle Anderson	Deputy Director OCSD-EMD	County Emergency Management	Capabilities assessment, mitigation actions and prioritization.
Derek Bingham	Associate Planner	City of Rancho Santa Margarita	Hazard identification, capabilities assessment, plan review.
Dennis Breckner	Administrative Sergeant	Orange County Sherriff's Department	Hazard identification, capabilities assessment, plan review.
Rob Copobianco	Division 3 Chief	Orange County Fire Authority	Hazard identification, capabilities assessment, plan review.
Karalee Darnell	Government Affairs Manager	Southern California Edison	Capabilities assessment, mitigation actions and prioritization, plan review.
Sharlyn de la Paz	Senior Management Analyst	City of Lake Forest	Capabilities assessment, plan review.
Jennifer Denmark	Facilities Planner	Saddleback Valley Unified School District	Capabilities assessment, mitigation actions and prioritization, plan review.
Brendan Dugan	Public Works Director/City Engineer	City of Rancho Santa Margarita	Hazard identification, capabilities assessment, mitigation actions and prioritization, plan review.
Mike Ferdig	Emergency Management Coordinator	City of Yorba Linda	Capabilities assessment, plan review.
Candice Fullenkamp	Community Executive Officer	SAMLARC	Hazard identification, capabilities assessment, mitigation actions and prioritization, plan review.
Juan Gonzalez	Public Affairs Manager	Southern California Gas Company	Hazard identification, capabilities assessment, mitigation actions and prioritization, plan review.
Tennille Langille	Executive Assistant	City of Rancho Santa Margarita	Hazard identification, capabilities assessment, mitigation actions and prioritization, plan review.
Lorrie Lausten	Principal Engineer	Trabuco Canyon Water District	Hazard identification, capabilities assessment, mitigation actions.
Chris Lopez	Safety Officer	Santa Margarita Water District	Capabilities assessment, mitigation actions and prioritization.
John McCulloch	Lieutenant/Chief of Police Services	Orange County Sherriff's Department	Hazard identification, capabilities assessment, mitigation actions and prioritization, plan review.
Jennifer Pezda	Environmental Planner Advisor	SoCalGas	Capabilities assessment, mitigation actions and prioritization, plan review.
Nick Pivaroff	Assistant Fire Marshall	Orange County Fire Authority	Capabilities assessment, mitigation actions and prioritization.
Wendi Redington	Community Services Supervisor	City of Rancho Santa Margarita	Capabilities assessment, mitigation actions and prioritization, plan review.
Darren Robertson	Administrative Captain OCFA Division 3	Orange County Fire Authority	Capabilities assessment, mitigation actions and prioritization, plan review.
Valer Secarea Jr.	Chair	Dove Canyon Emergency Preparedness	Capabilities assessment, mitigation actions and prioritization, plan review.
Niki Wetzel	Assistant Director of Community Development	City of Lake Forest	Hazard identification, capabilities assessment, mitigation actions and prioritization, plan review.

The LHMP Planning Team held four meetings, as summarized in Table 2-3, *Planning Team Meeting Summary*. Meeting materials, including PowerPoint presentations, sign-in sheets, agendas, notes, and other relevant handouts, are provided in Appendix B.

Table 2-3
Planning Team Meeting Summary

Date	Meeting	Discussion Items
January 9, 2019	Planning Committee Meeting #1	• Project Goals, Objectives, and Expectations • Purpose and Requirements of the LHMP • Hazard Identification and Prioritization • Critical Facilities
February 13, 2019	Planning Committee Meeting #2	• Summary of Hazards/Hazard Profiles • Risk Assessment Methodology • Critical Facilities • Capabilities Assessment and Identification • Hazard Mitigation Goals • Public Involvement Update
March 13, 2019	Planning Committee Meeting #3	• Risk Assessment/Vulnerability Overview • Mitigation Strategy Discussion • Capabilities Assessment • Public Involvement Update
May 1, 2019	Planning Committee Meeting #4	• Risk Assessment/Vulnerability Overview • Survey Summary • Mitigation Strategy • Capabilities Assessment

2.1.3 PUBLIC OUTREACH

A public outreach and engagement strategy was developed in order to maximize public involvement in the LHMP planning process. The LHMP public outreach strategy included a dedicated webpage, community survey, focus group meetings, and Rancho Santa Margarita E-newsletter distribution, as described below; refer to Appendix B.

WEBPAGE

A dedicated webpage was developed on the City's website for the LHMP. The webpage provided information on the LHMP and how the public can be involved in the planning process. A link to complete the community survey and a summary of the survey results were posted. The website was updated throughout the planning process and provided notifications and access to LHMP materials. The draft LHMP was also made available for review.

E-NEWSLETTER DISTRIBUTION

The February 2019 edition of the City of Rancho Santa Margarita e-newsletter notified recipients of the City's preparation of a LHMP and requested the community's involvement in its development by completing the community survey (described below). A link to the survey was provided. The e-newsletter is distributed to approximately 9,500 recipients.

COMMUNITY SURVEY

A community survey was developed to obtain input from the public about various hazard mitigation topics. In addition to basic demographic information, the survey asked residents to identify specific safety concerns, including identifying what hazards they felt were most likely to impact their neighborhood or property. Residents were also asked what actions they had taken to be more resistant to hazards. Information gained from the survey was used by the Planning Team to identify potential mitigation actions that would reduce damage and disruption from disaster or emergency events.

The survey was made available for completion on the LHMP webpage and the survey link was distributed via email by the City and Planning Team members. Hardcopies were also provided at the Focus Group meetings. The survey received 455 responses.

FOCUS GROUPS

Three focus group meetings were conducted to provide an opportunity for outreach to specific groups and organizations to ensure diversity in the public participation process. The purpose of these meetings was to provide an overview of hazard mitigation and the LHMP preparation process; introduce hazards to be profiled in the plan; receive input/feedback on the hazards; and ascertain the attendees experience with hazards and the potential mitigation actions. Attendees engaged in an open discussion guided by questions specific to the group. The Project Management team met with the Rancho Santa Margarita Chamber of Commerce on March 5, 2019; Applied Medical on March 5, 2019; and, AgeWell Senior Services on March 7, 2019.

PUBLIC REVIEW DRAFT LHMP

A public review draft LHMP was made available to the public for review and comment, for a 30-day period beginning July 8, 2019 and ending August 6, 2019. The draft LHMP was made available on the LHMP webpage and at the City's Development Services counter. Information was provided on how to submit comments or ask questions regarding the draft LHMP.

PLANNING COMMISSION AND CITY COUNCIL MEETINGS

An overview of the Draft LHMP was provided to the Rancho Santa Margarita Planning Commission and City Council, as part of their regularly scheduled meetings on August 7, 2019 and August 14, 2019, respectively. The presentation included an overview of the LHMP and the plan development process. City staff responded to questions from the Planning Commission and City Council, which included some minor revisions that have been incorporated into the plan. Opportunity for comments and questions from the public was also provided as part of the meeting; no public comments were received.

2.1.4 REVIEW AND INCORPORATE EXISTING INFORMATION

The LHMP Planning Team referenced a variety of plans, studies, data, and technical reports available from local, State, and federal sources to prepare the LHMP. Primary resources reviewed and incorporated as part of the LHMP planning process are listed in Table 2-4, *Primary Plan Resources*. A complete list of resources is included in Section 7.0, *References*.

Table 2-4
Primary Plan Resources

Plans, Studies, Reports and Other Technical Data/Information	Planning Process/Area of Document Inclusion
Burned Area Emergency Response Assessment Final Specialist Report – Geologic Hazards, Holy Fire, August 27, 2018.	Hazard Profiles; Vulnerability Assessment; Mitigation Strategy
Cal Fire	Hazard Profiles; Vulnerability Assessment; Mitigation Strategy
Cal-Adapt	Hazard Profiles; Vulnerability Assessment; Mitigation Strategy
California Department of Water Resources	Hazard Profiles
California Geological Survey	Hazard Profiles; Vulnerability Assessment
City of Rancho Santa Margarita Continuity Plan	Hazard Profiles; Vulnerability Assessment
City of Rancho Santa Margarita General Plan	Community Profile; Hazard Profiles; Mitigation Strategy
Community Wildfire Prevention and Mitigation Report	Hazard Profiles; Vulnerability Assessment
FEMA Local Hazard Mitigation Plan Guidance	Multiple plan sections
FEMA Map Service Center	Hazard Profiles; Vulnerability Assessment
National Drought Mitigation Center	Hazard Profiles; Vulnerability Assessment
Natural Hazard Mitigation Plan for the City of Rancho Santa Margarita	Hazard Profiles; Vulnerability Assessment: Mitigation Actions; Mitigation Goals
OC Health Care Agency	Hazard Profiles; Vulnerability Assessment
OC Parks Firewood Management Policy	Hazard Profiles; Vulnerability Assessment
OC Public Works	Hazard Profiles
Orange County Regional Water and Wastewater MJHMP	Hazard Profiles; Vulnerability Assessment
SCE Circuit Reliability Review for Rancho Santa Margarita	Hazard Profiles; Vulnerability Assessment
South Orange County Integrated Regional Water Management Plan	Hazard Profiles
State of California Multi-Hazard Mitigation Plan	Hazard Profiles
US Census American Community Survey	Community Profile; Vulnerability Assessment
US Drought Monitor	Hazard Profiles; Vulnerability Assessment

2.2 ASSESS RISKS

In accordance with FEMA requirements, the LHMP Planning Team identified and prioritized the natural hazards affecting Rancho Santa Margarita and assessed the community's associated vulnerability from those hazards. Results from this phase of the LHMP planning process aided subsequent identification of appropriate mitigation actions to reduce risk from these hazards; refer to Section 5.0, *Mitigation Strategy*.

2.2.1 IDENTIFY/PROFILE HAZARDS

Based on a review of past hazards, as well as a review of existing plans, reports, and other technical studies, data, and information, the LHMP Planning Team determined if specific hazards were valid and identified other hazards that could affect the City. Content for each hazard profile is provided in Section 4.0, *Hazards Assessment*.

2.2.2 ASSESS VULNERABILITIES

Hazard profiling exposed the unique characteristics of individual hazards and begins the process of determining which areas within the City are vulnerable to specific hazard events. The vulnerability assessment included input from the LHMP Planning Team and a GIS overlaying method for hazard risk assessments. Using these methodologies, populations and infrastructure impacted by hazards were identified and potential loss estimates were determined, where available. The vulnerability assessments for each hazard is provided in Section 4.0.

2.3 DEVELOP MITIGATION PLAN

2.3.1 IDENTIFY GOALS

The City had previously engaged in development of a LHMP that did not result in approval or adoption. Although not approved, the draft plan provided relevant information in preparation of this LHMP, including the identification of mitigation goals. The Planning Team reviewed the previously developed goals and upon discussion, determined the goals to still be relevant. The Mitigation Goals are presented in Section 1.0, *Introduction*.

2.3.2 DEVELOP CAPABILITIES ASSESSMENT

A capabilities assessment is a comprehensive review of all the various mitigation capabilities and tools currently available to the City to implement the mitigation actions prescribed in the LHMP. The LHMP Planning Team identified the planning and regulatory; administrative and technical; financial; and education and outreach capabilities to implement mitigation actions, as detailed in Section 5.0.

2.3.3 IDENTIFY MITIGATON ACTIONS

As part of the LHMP planning process, the LHMP Planning Team worked to identify and develop mitigation actions, after which mitigation actions were prioritized as high, medium or low. The process began with the Planning Team identifying issues or concerns associated with the profiled hazards and potential ways in which the issue or concern could be addressed. During this process, the capabilities assessment was also referenced to better understand if the capability already existed and needed to be expanded, or if the capability was not currently available. Mitigation actions developed as part of the previous unapproved plan were also considered. A detailed discussion of the identification and prioritization of mitigation actions is provided in Section 5.0.

2.3.4 PLAN REVIEW AND REVISION

As previously noted, once the draft LHMP was completed, a public review period was provided from July 9 to August 7, 2019, to allow public review and comments. Comments received on the draft LHMP were reviewed and the LHMP was revised, as appropriate.

2.3.5 PLAN ADOPTION AND SUBMITTAL

This plan will be submitted to Cal OES and FEMA for review. Upon receiving "approvable pending adoption" notification from FEMA, this plan will be presented to the City Council for their consideration. If approved, a copy of the resolution will be provided in Appendix A.

2.3.6 PLAN MAINTENANCE

Plan maintenance procedures, found in Section 6.0, include the measures the City will take to ensure the LHMP's continuous long-term implementation. The procedures also include the manner in which the LHMP will be regularly monitored, reported upon, evaluated, and updated to remain a current and meaningful planning document.

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SECTION 3.0: COMMUNITY PROFILE

3.1 PHYSICAL SETTING

The City of Rancho Santa Margarita is within eastern Orange County about 10 miles northeast of the Pacific Ocean, in the foothills of the Santa Ana Mountains; refer to Figure 3-1, *Regional Location*. The City is comprised of 8,607 acres (13 square miles), of which 8,280 acres are located within the City's incorporated limits and 327 acres are located within the City's Sphere of Influence (SOI); refer to Figure 3-2, *City and Sphere of Influence*. The community is bisected by the Foothill Transportation Corridor State Route 241 (SR-241), which extends to the north connecting with North County cities such as Yorba Linda and Anaheim, and to the south terminating at Oso parkway. The cities of Mission Viejo and Lake Forest are located to the west, Cleveland National Forest is located to the east, and unincorporated Orange County is located to the north and south. Regional access to the City is provided via SR-241, SR-133, and Interstate 5.

3.2 HISTORY

The earliest historic accounts of the Rancho Santa Margarita come from the journals of Captain Gaspar de Portolá, Ensign Miguel Costanso, and Father Juan Crespi, who passed through the area on their expedition between San Diego and San Francisco Bay in 1769. With the construction of Mission San Juan Capistrano on November 1, 1776, a Spanish presence in the area was firmly established. Around 1810 an outpost of the Mission now known as the Trabuco Adobe was constructed on a high plateau in what is today O'Neill Park in Rancho Santa Margarita.

With Mexican independence in 1821, Mission lands formerly held by the Catholic Church were transferred to the Mexican government. The area was divided into three ranchos, Rancho Mission Viejo, Rancho Trabuco, and Rancho Santa Margarita. The Trabuco Adobe was occupied by a number of Basque sheep herders, before coming under the control of James L. Flood and Jerome O'Neill in 1882 following the American acquisition of California. O'Neill and Flood purchased all three ranchos the same year, with the massive estate operating as a ranch well into the 1920s. It was subdivided once again in 1940, with the heirs of the Flood estate claiming the southern portion, in today's San Diego County, and the O'Neill family retaining the northern portion, including the Rancho Santa Margarita. The Trabuco Adobe slowly decayed, with minor remnants still visible today.

A 278-acre portion of the land retained by the O'Neill family was donated to the County of Orange for public recreation in 1948, and an additional 120 acres of parkland was donated to the County in 1963. That same year, the O'Neill family also established the Mission Viejo Company and began plans for a master-planned community under the same name. However, it was not until the mid-1980s that ground was finally broken on the Urban Village that would become modern Rancho Santa Margarita. Envisioned as an Urban Village by master planner and urban designer Richard Reese, the community developed rapidly through the late 1980s and 1990s. The City of Rancho Santa Margarita eventually incorporated on January 1, 2000, after being joined with the neighboring communities of Robinson Ranch, Dove Canyon, Rancho Cielo, Trabuco Highlands, and Walden in 1999.

3.3 DEMOGRAPHICS

Basic demographic data for Rancho Santa Margarita (population, education, employment, and housing) obtained from the US Census 2013-2017 American Community Survey (ACS) is summarized below.[1]

3.3.1 POPULATION

Table 3-1, *Rancho Santa Margarita and Orange County Population and Housing Data (2017)*, provides an overview of the City's and County's demographics.

Table 3-1
Rancho Santa Margarita and Orange County Population and Housing Data (2017)

Category	Rancho Santa Margarita	Orange County
Total Population	49,078	3,155,816
Percent of Residents that are children (under 18 years)	26.3%	22.7%
Percent of Residents that are senior citizens (65 and over)	7.0%	13.5%
Median Age (years)	37.0	37.5
Median Household Income	$106,939	$81,851
Median House Value	$619,200	$620,500
Occupied Housing Units	17,339	1,024,976
Percent of Renter Occupied	29.1%	42.6%
Source: US Census American Community Survey 5-Year Estimates 2013- 2017.		

Rancho Santa Margarita's 2017 estimated population was 49,078 residents. When compared to Orange County, the City has a higher household income and home ownership rate, with a similar median house value. The City has a higher percentage of residents under 18 and a lower percentage of residents over 65 when compared to the County. The median age of City residents was 37.0, similar to the median age of Orange County residents at 37.5. Approximately 26.3 percent of the population was below the age of 18 and approximately 7.0 percent was above the age of 65.

A greater percentage of Rancho Santa Margarita residents identify as white when compared to Orange County; refer to Table 3-2, *Rancho Santa Margarita and Orange County Racial and Ethnic Composition*. Hispanic or Latino persons of any race constitute 19.6 percent of the City's residents compared to 34.2 percent of County residents. Persons identifying as "other race" account for 3.8 percent of the population, while those reporting two or more races make up 4.9 percent of the City's population.

[1] The 2013-2017 American Community Survey (ACS) 5-year estimates is the most current 5-year data profile available. It represents 60 months of collected data and provides the most reliable and largest data set.

NOT TO SCALE

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Regional Location

Figure 3-1

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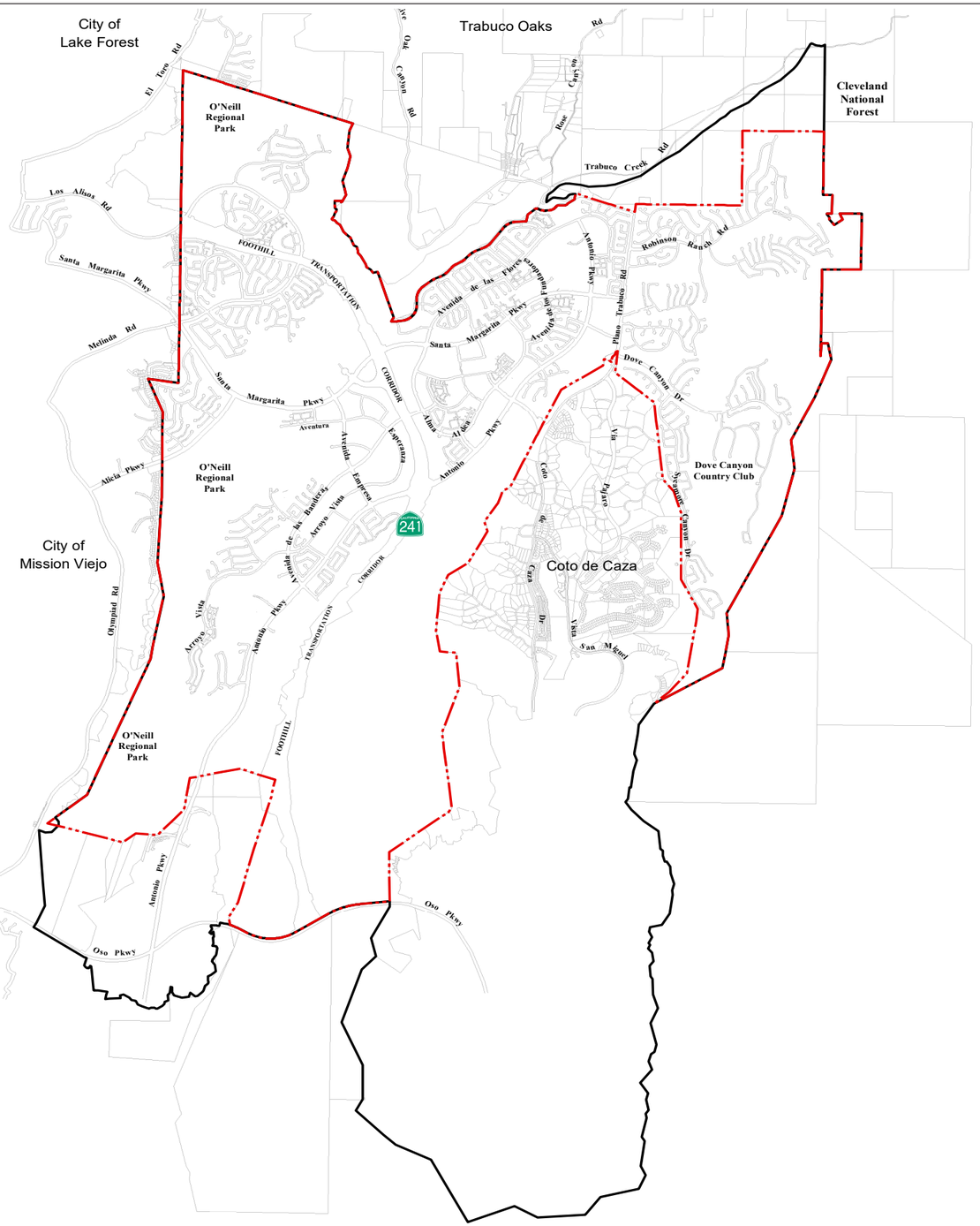

LEGEND

- City Boundary
- Sphere of influence

Source: Orange County Local Agency Formation Commission, 2013.

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09/19 | JN 169696

City and Sphere of Influence

Figure 3-2

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Table 3-2
Rancho Santa Margarita and Orange County Racial and Ethnic Composition (2017)

Race or Ethnicity	Rancho Santa Margarita		Orange County	
	Population	Percentage of Population	Population	Percentage of Population
White	38,184	77.8%	1,960,484	62.1%
Black or African American	1,249	2.5%	53,262	1.7%
American Indian and Alaskan Native	114	0.2%	14,468	0.5%
Asian	5,242	10.7%	621,178	19.7%
Native Hawaiian and Other Pacific Islander	46	0.01%	9,620	0.3%
Other Race	1,846	3.8%	373,605	11.8%
Two or More Races	2,397	4.9%	123,199	3.9%
Hispanic or Latino (of any race)[1]	9,604	19.6%	1,079,172	34.2%
Total	**49,078**	**100%**	**3,155,816**	**100%**

Source: US Census American Community Survey 5-Year Estimates 2013- 2017.
Hispanic or Latino persons are not counted as a separate racial or ethnic category; persons who identify as Hispanic or Latino are also included in other racial or ethnic categories.
Totals may vary slightly due to rounding.

3.3.2 EDUCATIONAL ATTAINMENT

When compared to Orange County, Rancho Santa Margarita residents have a higher level of education attainment; refer to Table 3-3, *Rancho Santa Margarita and Orange County Educational Attainment*. Of the City's population that is 25 years or older, 16.1 percent attained a graduate or professional degree, 33.6 percent attained a bachelor's degree, and 10.5 percent attained an associate degree. Approximately 4.2 percent of adults in Rancho Santa Margarita have not completed high school compared to over 15 percent of adults in the County.

Table 3-3
Rancho Santa Margarita and Orange County Educational Attainment (2017)

Education Attainment (Age 25 and Over)	Rancho Santa Margarita		Orange County	
	Population	Percentage of Population	Population	Percentage of Population
Less than 9th Grade	695	2.2%	181,950	8.5%
9th to 12th Grade, no diploma	638	2.0%	144,085	6.8%
High School Graduate	4,567	14.2%	369,128	17.3%
Some College, No Degree	6,943	21.5%	437,417	20.5%
Associate degree	3,371	10.5%	166,462	7.8%
Bachelor's Degree	10,848	33.6%	537,600	25.2%
Graduate or Professional Degree	5,188	16.1%	295,516	13.9%
Total	**32,250**	**100%**	**2,132,158**	**100%**

Source: US Census American Community Survey 5-Year Estimates 2013- 2017.
Totals may vary slightly due to rounding.

3.3.3 EMPLOYMENT

Of the 37,774 residents over 16 years of age, 28,413 were in the labor force. Out of the 28,413 people in the labor force, 27,410 (72.6 percent) were employed and 978 (2.6 percent) were unemployed. The educational services and health care/social services sector employed the largest number of City residents (19.0 percent), followed by professional scientific, management, and administrative and waste management services (15.1 percent) and manufacturing (12.0 percent). The median household income in the City was $106,939. While approximately 6.8 percent of employees work from home, a majority of Rancho Santa Margarita residents commute outside of the City for work. The average commute travel time is 30.1 minutes.

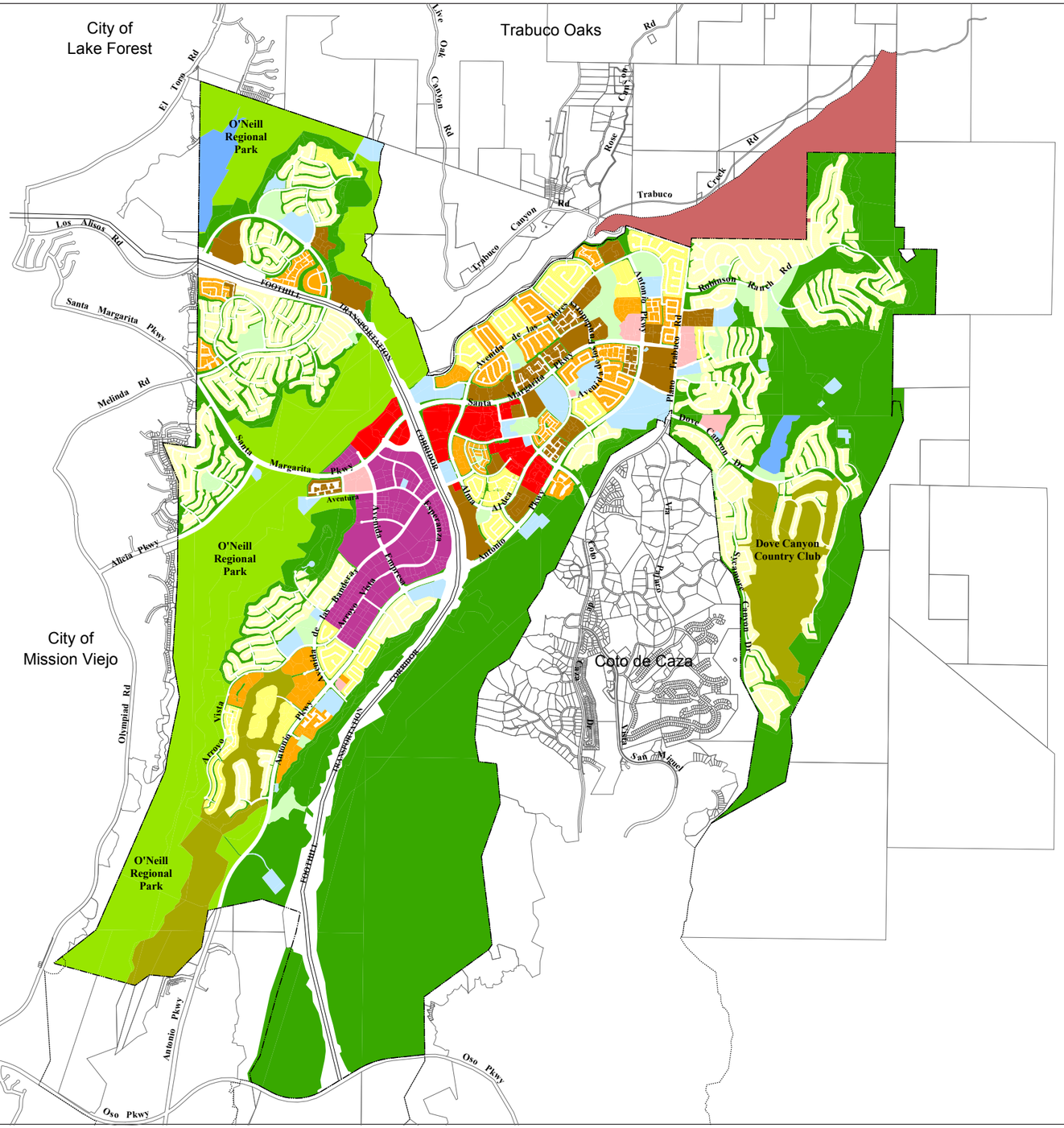
3.3.4 HOUSING

According to the City of Rancho Santa Margarita, there are 17,766 housing units within the City. The most prevalent type of housing within Rancho Santa Margarita is single family detached units, consisting of approximately 53.8 percent of the housing stock. Most of the housing was built between 1980 and 2001. The California Department of Finance estimates an average household size of 2.93 persons per household.[2]

3.4 LAND USES AND EXISTING DEVELOPMENT

Development of the City is guided by its General Plan. The Rancho Santa Margarita General Plan assigns land use designations to all land located within its incorporated boundaries; refer to Figure 3-3, *General Plan Land Use Map*. Rancho Santa Margarita has been primarily developed as a series of Planned Communities prior to incorporation; refer to Figure 3-4, *Rancho Santa Margarita Planned Communities*. Table 3-4, *Land Use Designations*, identifies the current General Plan land use designations and descriptions of the typical uses allowed in each designation.

[2] State of California, Department of Finance, E-5 Population and Housing Estimates for Cities, County and the State, 2011 – 2019, with 2010 Benchmark.



Sources: City of Rancho Santa Margarita, July 2015 and Orange County Local Agency Formation Commission, 2013.

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08/19 | JN 169696

General Plan Land Use Map

Figure 3-3

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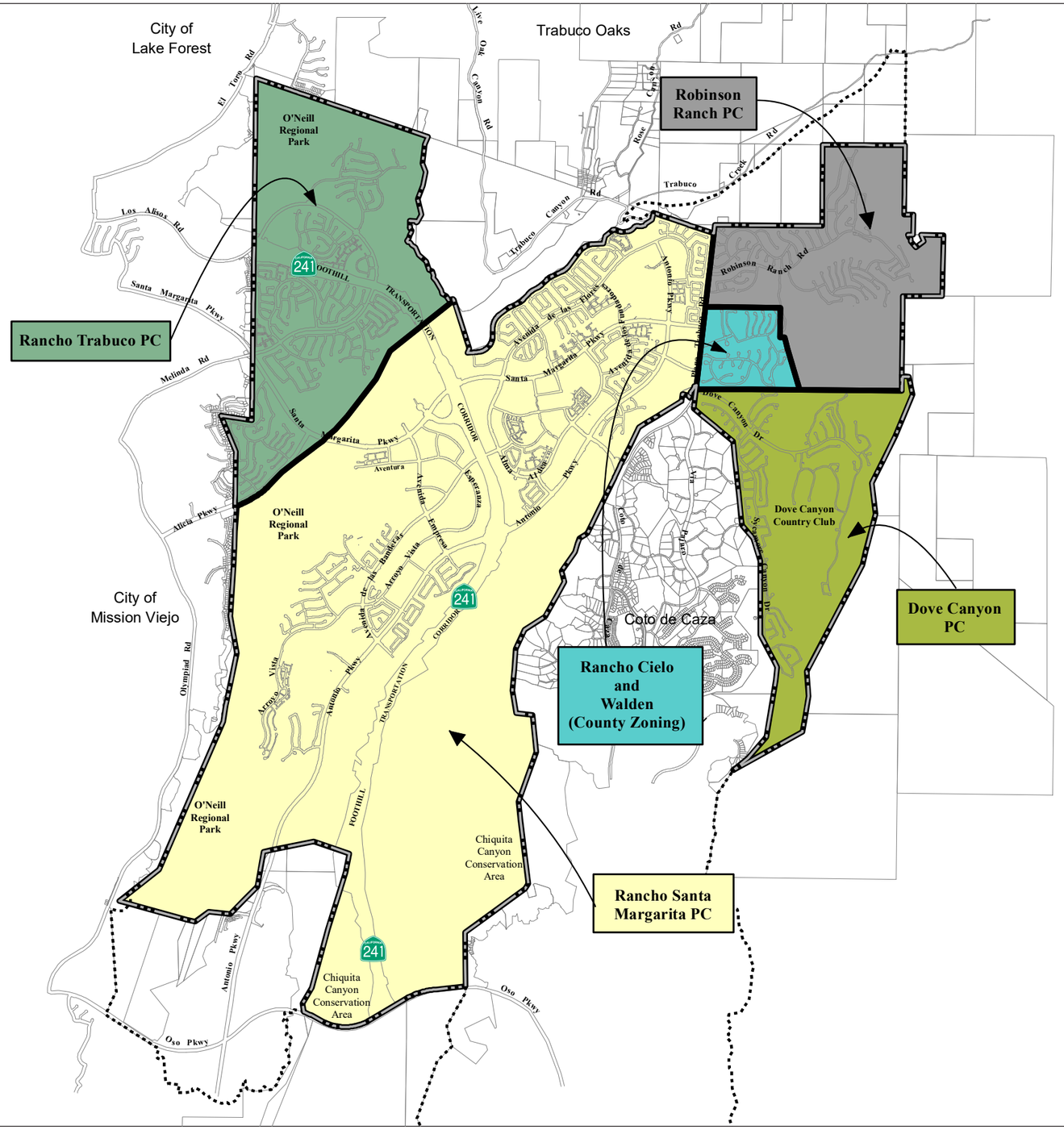

LEGEND

City Boundary

Sphere of Influence

Planned Communities Boundary

Sources: City of Rancho Santa Margarita and Orange County Local Agency Formation Commission, 2013.

Rancho Santa Margarita Planned Communities

Figure 3-4

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Table 3-4
Land Use Designations

Land Use	Maximum DUs/Net Acre or Maximum FAR/Net Acre	Summary Description of Land Use Designation
RESIDENTIAL LAND USE		
LDR – Low Density Residential	7.0 du/acre	Single-family detached units on moderate to large lots.
LMDR – Low-Medium Density Residential	11.0 du/acre	Small-lot single-family detached homes, as well as some single-family town homes and duplexes.
MDR – Medium Density Residential	18.0 du/acre	Detached single family homes on smaller lots, and attached, town homes, duplexes, multiple-family units such as apartments and condominiums.
HDR – High Density Residential	25.0 du/acre	Attached homes, apartments, condominiums, and senior housing.
COMMERCIAL AND BUSINESS LAND USES		
C – General Commercial	1.0:1 FAR	Retail stores, restaurants, lodging, personal services, business services, and financial services of a citywide or regional nature. Does not promote development of commercial strips.
NC – Neighborhood Commercial	0.6:1 FAR	Retail stores, service stations, restaurants, and services that serve the needs of surrounding neighborhoods.
BP – Business Park	1.0:1 FAR	Service commercial, retail commercial, office, light industrial, open space, and community facilities (excluding public and private schools).
PUBLIC/QUASI-PUBLIC FACILITIES LAND USE		
CF – Community Facility	0.6:1 FAR	Fire stations, police stations, public and private schools, recreation centers, water tanks, utilities, or other community facilities.
OPEN SPACE LAND USES		
P – Parks	0.5:1 FAR	Publicly- or privately-owned and dedicated park lands.
OS – Open Space	N/A	Streams and washes, open space easements, and other private and public open spaces.
OSG – Open Space Golf	0.4:1 FAR	Maintenance and development of golf courses and other private recreational uses.
ROS – Regional Open Space	0.4:1 FAR	Sections of O'Neill Regional Park within the City. Active and passive recreational uses consistent with Orange County regulations.
OTHER LAND USES		
FPC – Future Planned Community		Denotes large areas of land within the Sphere of Influence for detailed planning and development for residential, commercial, community facility, recreation and open space uses.

Rancho Santa Margarita has been primarily developed as a series of Planned Communities prior to incorporation. The Planned Communities comprising the incorporated City include:

- Rancho Santa Margarita Planned Community
- Rancho Trabuco Planned Community
- Robinson Ranch Planned Community
- Dove Canyon Planned Community

The area located southwest of the Robinson Ranch Planned Community is referred to as the Rancho Cielo and Walden Communities. These areas were developed consistent with the Orange County development code.

While the Planned Communities once set forth the zoning and site development standards for specific areas within the City, they were replaced by the Rancho Santa Margarita Zoning Code (RSMZC) in 2007. The Planned Communities now serve as a guide for the character of development in specific geographic areas of the City. At this time, the Planned Communities have been built out, leaving little opportunity for significant new development.

Existing (on-the ground) development within the City limits are identified in Table 3-5, *Existing Land Use Summary*.

Table 3-5
Existing Land Use Summary

Land Use	Acres	Existing Dwelling Units	Existing Square Feet
Low Density Residential	895.5	6,032	--
Low-Medium Density Residential	228.2	2,259	--
Medium Density Residential	263.3	4,080	--
High Density Residential	251.4	5,395	--
General Commercial	129.4	--	961,906
Neighborhood Commercial	43.5	--	363,454
Business Park	271.3	--	3,457,374
Community Facility	219.4	--	1,184,862
Parks	154	--	3,616
Open Space	3,162.6	--	10,000
Open Space Golf	457.1	--	67,026
Regional Open Space	1,164.3	--	--
Water	71.2	--	--
Right-of-Way (approximate)	1,061.3	--	--
Total	**8,372.5**	**17,766**	**6,048,238**

Source: City of Rancho Santa Margarita, *Rancho Santa Margarita General Plan Update Final Existing Conditions Report*, December 2017.
This data may vary from US Census ACS 5-year summary data due to the methodology and use of estimates.

As indicated in Table 3-5, there are 17,766 residential dwelling units and approximately 5.97 million square feet of commercial, business park, and community facilities uses within the City. Over 4,900 acres within the City are comprised of open space and park uses. Approximately 1,061 acres are right-of-way.

3.5 DEVELOPMENT TRENDS AND FUTURE DEVELOPMENT

The City is currently in the process of updating its General Plan; it is anticipated that the update will be adopted in early 2020. The General Plan Update is a strategic update focused on five elements: Conservation/ Open Space, Economic Development, Land Use, Noise, and Safety. The Circulation and Housing Elements were updated in 2014 and 2013, respectively; thus, no changes are proposed to those two elements. No changes

to the General Plan Land Use Map are proposed as part of the update. While the General Plan Update makes assumptions for growth based on a 20-year planning period, the LHMP is focused on a five-year horizon. Accordingly, some of the longer-term development trends associated with the General Plan may not occur within the period covered by this LHMP. In general, it is anticipated that new development will occur in a similar manner to historical development patterns in the City with only a limited number of parcels being developed at the maximum density or intensity. Additionally, there are future planned developments anticipated to occur within the City, described below.

Northeast Future Planned Community. The unincorporated area located north of Robinson Ranch is known as the Northeast Future Planned Community and designated Future Planned Community (FPC) on the Land Use Policy Map. This area consists of approximately 300 acres within the unincorporated jurisdiction of Orange County and is part of the Foothill- Trabuco Specific Plan adopted by the County in 1991. Future development of the Northeast Future Planned Community is expected to occur following annexation of the properties by the City and City approval of a Specific Plan ensuring that new development is compatible with the character of Rancho Santa Margarita. The City will work with the Local Agency Formation Commission (LAFCO) and owners of the area to prepare appropriate development plans and to annex this area into the City.

Chiquita Ridge. The City owns an approximately 92-acre property, known as Chiquita Ridge, along the east side of Antonio Parkway just south of Cañada Vista Park. Any future development of the property is subject to the terms of the Settlement Agreement which transferred the property to City ownership. According to the Settlement Agreement, 55 acres of the property may be developed, and 37 acres must be preserved for natural habitat. The property is currently designated as open space, therefore, future development would require the land use designation to be revised.

3.6 INFRASTRUCTURE SYSTEMS

Infrastructure systems within the City, such as roadways, water and wastewater facilities, electricity, and natural gas, provide vital community and individual functions. These facilities and distribution systems are primarily owned, operated, and maintained by other agencies. The ability for infrastructure systems to remain operational during hazard events and emergencies will contribute to the City's ability to withstand or recover sooner from hazard events.

3.6.1 TRANSPORTATION

Regional access to the City is provided via the SR-241, State Route 133 (SR-133), and Interstate 5 (I-5). SR-241 passes through the central portion of the City in a north-south direction while SR-133 and I-5 travel in a north-south direction west of the City, connecting with neighboring south Orange County cities. There are three major arterial roadways providing primary ingress and egress in the City: Santa Margarita Parkway, Antonio Parkway, and Alicia Parkway. Access to the eastern portion of the City, requires roadways to span Trabuco Canyon. Inspection and maintenance of the City's transportation facilities are critical to ensuring their protection against disasters, such as earthquakes.

3.6.2 WATER AND WASTEWATER

Rancho Santa Margarita is served by two water providers: the Santa Margarita Water District (SMWD) and the Trabuco Canyon Water District (TCWD). TCWD serves the eastern part of Rancho Santa Margarita (Robinson Ranch, Trabuco Highlands, Dove Canyon, Rancho Cielo, and Walden Communities). The remaining portions of the incorporated City are served by SMWD.

SMWD's system consists of 1,525 miles of water (potable and recycled) and sewer lines, 31 potable water tank reservoirs, two emergency storage potable water reservoirs, seven recycled water tank reservoirs, and two open-air recycled water reservoirs. TCWD's major facilities include the Robinson Ranch Reservoir, Dove Lake, and the Trabuco Creek Wells Facility which includes Rose Canyon Well and Lang Well. TCWD delivers potable water through its pressurized water system consisting of approximately 66 miles of pipelines. TCWD's system is interconnected with SMWD and Irvine Ranch Water District (IRWD) to provide reliability.

The SMWD and the TCWD are members of the Municipal Water District of Orange County (MWDOC). The MWDOC is a member of the Metropolitan Water District of Southern California (MWD). Nearly all the MWDOC water supply is purchased from MWD, which imports the water from the Colorado River Aqueduct (a small portion comes from Northern California through the State Water Project).

Since a majority of the City's water supplies are transported from outside of the area, damage to water conveyance systems in and outside of the area could interfere with the ability to provide water to the City.

The SMWD and TCWD are also responsible for the collection of wastewater within the City. SMWD owns and operates the Oso Creek Wastewater Reclamation System and the Chiquita Water Reclamation Plant. Additionally, wastewater from SMWD is also treated at the 3A Water Reclamation Plant, J.B. Lathan, and Los Alisos Water Recycling Plant. TCWD collects wastewater and reclaims it at the Robinson Ranch Wastewater Treatment Plant and has the capacity to divert wastewater to SMWD Chiquita Water Reclamation Plant. Water reclaimed by both SMWD and TCWD is used for irrigation purposes only. Damage to wastewater conveyance infrastructure and treatment facilities could occur as a result of a hazard event. Depending upon the nature and extent of the damage, a leak in a sewer pipe could pose a risk to the community's health and the environment and damage to a treatment facility could reduce capacity at the facility.

SMWD and TCWD are participating agencies in the Orange County Regional Water and Wastewater Multi-Jurisdictional Hazard Mitigation Plan (MJHMP). The MJHMP is currently in FEMA review. The MJHMP is comprised of the primary plan and 19 jurisdiction-specific annexes. SMWD and TCWD have identified mitigation actions to reduce the risk of damage to water and wastewater facilities and improve overall resiliency of their infrastructure systems and operations.

3.6.3 ELECTRICITY

Southern California Edison provides electricity to Rancho Santa Margarita. Electricity is distributed from power plants through power lines and substations. One substation, the Santa Margarita Substation, is located within the City northwest of Santa Margarita

Parkway and SR-241. Power lines within the City are primarily located underground, with the exception of aboveground utilities at the Santa Margarita Parkway bridge and two at Plano Trabuco. Damage to the substation or the larger distribution system outside of the City could result in power loss to the City. More localized power losses can also occur in the event underground transmission lines are damaged.

3.6.4 NATURAL GAS

Southern California Gas provides gas service to Rancho Santa Margarita. There are no major gas transmission lines traversing the City; however, there are major transmission lines located within other areas of Orange County. Damage to these facilities could interfere with natural gas service in the City. Similarly, more localized disruptions could occur in the event local transmission lines are damaged.

3.7 CRITICAL FACILITIES AND FACILITIES OF CONCERN

The LHMP Planning Team identified 76 critical facilities and facilities of concern for incorporation in the hazard vulnerability/risk analysis; refer to Table 3-6 and Figure 3-5, *Rancho Santa Margarita Critical Facilities and Facilities of Concern*. Critical facilities and facilities of concern are owned, operated, and maintained by various agencies, not just the City. Critical facilities serve an important function in the operations of the municipal government and in serving the community. These facilities include City Hall, fire station, community center, major transportation systems, water and wastewater facilities, communication facilities, and utility facilities. Damage to these facilities caused by a hazard event has the potential to impair response and recovery and may lead to disruption of services. Facilities of concern are less vital to safety and well-being, but may assist in evacuations, serve as assembly points or temporary shelters, or provide a supportive role in preparing for and recovering from hazard events.

Where available, the LMHP Planning Team identified a facility's potential loss value, comprised of replacement and contents for each facility. If a facility is completely destroyed in a hazard event, the replacement and contents values indicate the cost to replace the entire facility and all of its contents. Typically, the cost to repair a damaged facility would be less than the replacement value. While the replacement and contents values are used throughout this plan to estimate potential losses, it is noted that the actual cost to recover from a hazard event will depend on the type and magnitude of the event.

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Table 3-6
Rancho Santa Margarita Critical Facilities and Facilities of Concern

ID	Name	Facility Type	Critical Facility	Facility of Concern	Owner/Responsible Agency
1	RSM City Hall	Government	X		City of Rancho Santa Margarita
2	RSM Post Office			X	Federal Government
3	RSM Library			X	County of Orange
4	RSM Postal Annex			X	Federal Government
5	OCFA Station 45 Fire Station		X		Orange County Fire Authority
6	Cox Master Telecommunications Facility	Communications	X		
7	Pac Bell Central Switch			X	
8	Santa Margarita Substation	Electrical	X		Southern California Edison
9	Community Center	Community	X		City of Rancho Santa Margarita
10	RSM Beach Club and Lake			X	SAMLARC
11	Arroyo Vista K-8	Public School		X	Capistrano Unified School District/State
12	Tijeras Creek Elementary			X	
13	Cielo Vista Elementary			X	Saddleback Valley Unified School District/State
14	Melinda Heights Elementary			X	
15	Robinson Elementary			X	
16	Trabuco Mesa Elementary			X	
17	RSM Intermediate			X	
18	Mission Hills Christian School	Private School		X	
19	Rancho Viejo Montessori School			X	
20	Santa Margarita Catholic High School			X	
21	St. Junipero Serra Catholic School			X	
22	St. John's Episcopal School			X	
23	Banderas Bridge	Transportation	X		Caltrans
24	Santa Margarita Bridge (#1)		X		City of Rancho Santa Margarita

Table 3-6
Rancho Santa Margarita Critical Facilities and Facilities of Concern (Continued)

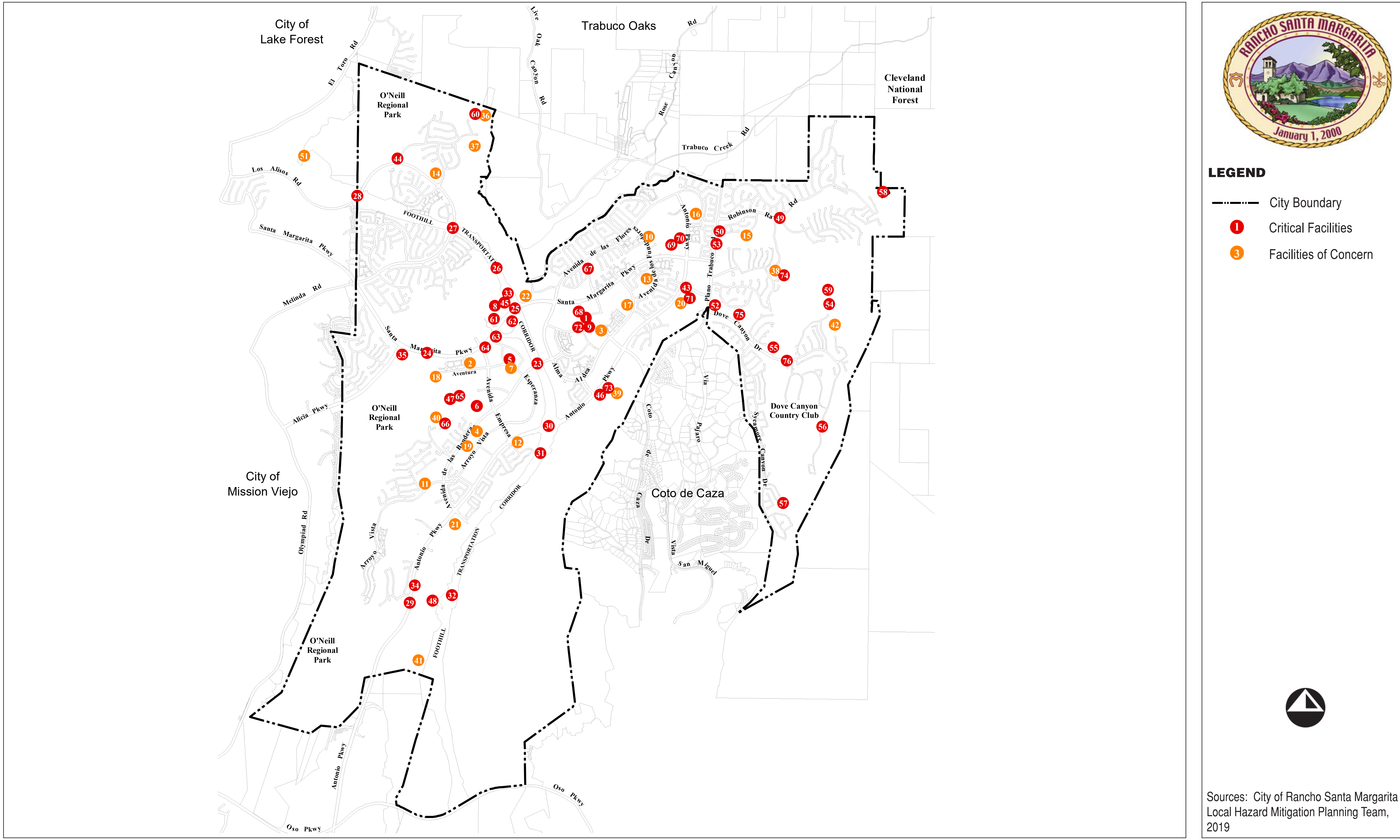
ID	Name	Facility Type	Critical Facility	Facility of Concern	Owner/Responsible Agency
25	Santa Margarita Bridge (#2)	Transportation	X		Caltrans
26	241 Toll Road Bridge		X		
27	Melinda Road Bridge		X		
28	Los Alisos Bridge		X		
29	Antonio Parkway Bridge (#1)		X		
30	Antonio Parkway Bridge (#2)		X		
31	241 Toll Road/Tijeras Creek		X		
32	Cañada Chiquita Bridge		X		
33	Pedestrian Bridge		X		
34	Plano Lift Station	Sanitary Sewer	X		Santa Margarita Water District
35	Trabuco Lift Station & Pump Station		X		
36	Rancho Trabuco Reservoir	Reservoir		X	
37	Trabuco Ridge Reservoirs (two)			X	
38	Starr Reservoir			X	
39	Foothill Reservoir			X	
40	Island Pasture Reservoir			X	
41	Upper Chiquita Reservoir			X	
42	Dove Canyon Reservoir			X	Trabuco Canyon Water District
43	Mesa Pump Station	Water Facility	X		Santa Margarita Water District
44	Altisima Pump Station		X		
45	Island Pump Station		X		
46	Foothill Pump Station		X		
47	Island Pasture Pump Station		X		
48	Antonio Pump Station		X		

Table 3-6
Rancho Santa Margarita Critical Facilities and Facilities of Concern (Continued)

ID	Name	Facility Type	Critical Facility	Facility of Concern	Owner/Responsible Agency
49	Robinson Ranch Pump Station	Water Facility	X		Trabuco Canyon Water District
50	Plano Trabuco Lift Station & Pump Station	Wastewater and Water Facility	X		
51	Upper Oso Reservoir (with Compressor Building)	Reservoir		X	Santa Margarita Water District
52	Via Allegre Lift Station	Wastewater Facility	X		Trabuco Canyon Water District
53	Heritage Lift Station		X		
54	Trabuco Dam	Dam	X		
55	Dove Dam		X		
56	Bell Canyon Lift Station	Wastewater Facility	X		
57	Barneburg Lift Station		X		
58	Trabuco Reservoirs (two)	Water Reservoir	X		
59	Robinson Ranch Wastewater Treatment Plant	Wastewater Facility	X		
60	Macro Wireless Facility	Communication	X		AT&T
61	Macro Wireless Facility		X		Verizon
62	Macro Wireless Facility		X		Sprint
63	Macro Wireless Facility		X		Sprint, T-Mobile, Verizon, AT&T
64	Macro Wireless Facility		X		Sprint
65	Macro Wireless Facility		X		Verizon
66	Macro Wireless Facility		X		T-Mobile
67	Macro Wireless Facility		X		Verizon
68	Macro Wireless Facility		X		T-Mobile
69	Macro Wireless Facility		X		Verizon
70	Macro Wireless Facility		X		AT&T, T-Mobile
71	Macro Wireless Facility		X		Sprint
72	Macro Wireless Facility		X		AT&T
73	Macro Wireless Facility		X		Metro PCS, Sprint, AT&T

Table 3-6
Rancho Santa Margarita Critical Facilities and Facilities of Concern (Continued)

ID	Name	Facility Type	Critical Facility	Facility of Concern	Owner/Responsible Agency
74	Macro Wireless Facility	Communication	X		Sprint, Verizon
75	Macro Wireless Facility		X		AT&T
76	Golf Club Lift Station	Wastewater Facility	X		Trabuco Canyon Water District



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09/19 | JN 169696

Rancho Santa Margarita Critical Facilities and Facilities of Concern

Figure 3-5

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SECTION 4.0: HAZARD ASSESSMENT

4.1 HAZARD IDENTIFICATION AND PRIORITIZATION

HAZARD IDENTIFICATION

The first step in developing the risk assessment is identifying the hazards. Federal Emergency Management Agency (FEMA) guidance identifies several hazards that may affect communities. The list of hazards is comprehensive, but not meant to be exhaustive or limit a community from identifying other hazards within their plans. Additionally, a community may not be susceptible to all hazards identified for consideration. In reviewing the previously prepared, but unapproved Hazard Mitigation Plan for the City and the FEMA list of hazards, the Planning Team discussed the potential for a specific hazard to affect the community. The discussion considered previous occurrences within the City and surrounding area and the Planning Team's professional experience and knowledge. Table 4-1, *Rancho Santa Margarita Hazard Identification*, summarizes the Planning Team's discussion and determination of hazards for inclusion in the LHMP.

Table 4-1
Rancho Santa Margarita Hazard Identification

Hazards	Identified in Previous (unapproved) Rancho Santa Margarita Hazard Mitigation Plan	Include in LHMP?	Discussion of Hazard's Inclusion or Exclusion
Avalanche	No	No	Not applicable to Rancho Santa Margarita
Changing Weather Patterns	No	Yes	Changing weather patterns is not a stand-alone hazard, but it may change the characteristics of the hazards that affect the community, such as frequency and intensity. Therefore, changing weather patterns is discussed within each of the applicable hazard profiles.
Coastal Erosion	No	No	Not applicable due to the distance from the coast.
Coastal Storm	No	No	Not applicable due to the distance from the coast.
Dam Failure	Yes	Yes	Since several reservoirs are located within or adjacent to the City, the hazard profile will address dam/reservoir failure.
Disease/Pest Management	Yes	Yes	O'Neill Regional Park, partially located within the City, has experienced some issues with infestation of trees due to the borer beetle. Other vector control concerns include mosquitos. Thus, the Planning Team determined the hazard was of enough significance to be included within the LHMP.

Table 4-1
Rancho Santa Margarita Hazard Identification (Continued)

Hazards	Identified in Previous (unapproved) Rancho Santa Margarita Hazard Mitigation Plan	Include in LHMP?	Discussion of Hazard's Inclusion or Exclusion
Drought	Yes	Yes	The City depends on groundwater and imported surface water, both of which are susceptible to drought.
Earthquake Fault Rupture	Yes	Yes	The City is located within a seismically active area and would be subject to earthquake hazards in the future.
Expansive Soils	No	No	Expansive soils are not a significant concern within the City.
Extreme Heat	No	Yes	Although extreme heat conditions are relatively rare in Rancho Santa Margarita, due to the increase in frequency and the affect when combined with other hazards, such as drought and wildfires, the Planning Team determined the hazard should be included within the LHMP.
Flood	Yes	Yes	FEMA-identified floodplains associated with major creeks are located within the City. Some localized flooding has also occurred, typically related to heavy rain events.
Geological Hazards	No	No	Geologic hazards within the City are associated with seismic activity and therefore are addressed under Seismic Hazards.
Hailstorm	No	No	The City does not typically experience hailstorms.
Hazardous Materials	No	Yes	Hazardous materials are typically associated with the transport or use of hazardous materials and are included as part of Human-Induced Hazards.
Human-Caused Hazards	No	Yes	The Planning Team identified human-induced hazards specific to the City, which include arson, hazardous materials, terrorism and unexploded ordnance.
Hurricane	No	No	Hurricanes do not occur within the City.
Land Subsidence	No	No	Rancho Santa Margarita is not subject to land subsidence.
Landslide/Mudflow	Yes	Yes	Portions of the City have experienced landslides and mudflows.
Lightning	No	No	Significant lightning events do not typically occur within the City.
Liquefaction	No	Yes	There are areas within the City identified as having the potential for liquefaction. Liquefaction is addressed under Seismic Hazards.

Table 4-1
Rancho Santa Margarita Hazard Identification (Continued)

Hazards	Identified in Previous (unapproved) Rancho Santa Margarita Hazard Mitigation Plan	Include in LHMP?	Discussion of Hazard's Inclusion or Exclusion
Sea Level Rise	No	No	Not applicable due to the distance from the coast.
Seismic Hazards	Yes	Yes	The City is in an area susceptible to earthquake ground shaking and associated seismic hazards.
Severe Winter Storm	Yes	Yes	The climate within southern California does not result in ice storms, blizzards, or significant snowfall. Rancho Santa Margarita does experience heavy rain events. For purposes of the LHMP, heavy rain events are profiled under Severe Weather.
Tornado	No	No	Tornadoes do not typically occur within the City.
Tsunami	No	No	The City is not located within or in proximity to a tsunami inundation area.
Volcano	No	No	The City is not located in an active volcano area.
Wildfire	Yes	Yes	Large portions of the City and surrounding area are located in high fire hazard zones.
Wind	No	No	Regular wind does not occur within the City.
Windstorm	No	Yes	Santa Ana winds events are common in Rancho Santa Margarita. For purposes of the LHMP, Santa Ana wind events are profiled under Severe Weather.

HAZARD PRIORITIZATION

Following FEMA's guidance for preparation of Local Hazard Mitigation Plans, the Planning Team used a Microsoft Excel-based tool to prioritize the identified hazards assigning each hazard a ranking of 1 to 4, where one is the lowest score and four is the highest, for the following criteria:

- Probability (likelihood of occurrence)
- Location (size of potentially affected area)
- Maximum Probable Extent (intensity of damage)
- Secondary Impacts (severity of secondary impacts to community)

The rankings were assigned based on group discussion, knowledge of past occurrences, and familiarity with the City's vulnerabilities. The four criteria were assigned a weighted value (recommended by FEMA and confirmed by the Planning Team) based on the importance of the criterion; refer to Table 4-2, *Hazard Ranking Methodology*. The hazard rankings were multiplied by weighted factors to obtain a score for each criterion. A higher weight was given to the criterion considered more important or significant. For

example, the probability of the hazard's occurrence received a higher weight than the potential secondary impacts. The scores for location, maximum probable extent (anticipated damage), and secondary impacts for each hazard were added together to determine the total impact score for each hazard. The total impact score was then multiplied by the overall probability score to determine the final score for each hazard. The final scores were used to determine the prioritization of each hazard based on the following FEMA recommended scale:

- Low Threat: 0 to 12
- Medium Threat: 12.1 to 42
- High Threat: 42.1 and above

Table 4-3, *Hazard Rankings*, identifies the criterion scores, final scores, and the hazard planning consideration (threat level) for each hazard based on discussions with the Planning Team and the prioritization process described above.

Table 4-2
Hazard Ranking Methodology

Probability (2.0): Based on the estimated likelihood of occurrence from historical data.	
Probability (2.0): **Estimated likelihood of occurrence from historical data.**	**Score**
Unlikely (less than 1% probability in next 100 years or has a recurrence interval of greater than every 100 years)	1
Somewhat Likely (between 1% and 10% probability in next year or has a recurrence interval of 11 to 100 years)	2
Likely (between 10% and 100% probability in next year or has a recurrence interval of 10 years or less)	3
Highly Likely (near 100% probability in next year or happens every year)	4
Location (0.8): **Size of geographical area of community affected by the hazard.**	
Affected Area	**Score**
Isolated	1
Small	2
Medium	3
Large	4
Maximum Probable Extent (0.7): **Anticipated damage to a typical facility/structure in the community.**	
Impact	**Score**
Negligible – less than 10% damage	1
Limited – between 10% and 25% damage	2
Critical – between 25% and 50% damage	3
Catastrophic – more than 50% damage	4
Secondary Impacts (0.5): **Estimated secondary impacts to the community at large.**	
Impact	**Score**
Negligible – no loss of function, downtime, and/or evacuations	1
Limited – minimal loss of function, downtime, and/or evacuations	2
Moderate – some loss of function, downtime, and/or evacuations	3
High – major loss of function, downtime, and/or evacuations	4

Table 4-3
Hazard Rankings

Hazard Type	Probability	Location	Maximum Probable Extent	Secondary Impact	Total Score	Hazard Planning Consideration (Threat Level)
Seismic Hazards	4	4	4	4	64.00	High
Wildfire	4	4	4	4	64.00	High
Windstorm – Santa Ana	4	4	2	4	52.80	High
Changing Weather Patterns	4	4	2	3	48.80	High
Disease/Pest Management	4	3	3	3	48.00	High
Drought	3	4	3	4	43.80	High
Severe Weather including Storm – Heavy Rain	3	4	1	2	29.40	Medium
Flood	4	1	1	4	28.00	Medium
Landslide/Mudflow	3	2	2	1	21.00	Medium
Human-Induced Hazards (Hazardous Materials, Arson, and Unexploded Ordnance)	2	1	4	3	20.40	Medium
Liquefaction	2	2	2	4	20.00	Medium
Terrorism	1	1	3	1	6.80	Low
Dam/Reservoir Failure	1	2	1	2	6.60	Low
Refer to Table 4-2 for the hazard ranking methodology. The total score is based on an equation that provides a weighted value to each category by its importance.						

It should be noted that some hazards, such as disease/pest management, were identified as having higher threat levels due to their probability of occurrence and their interrelatedness with other hazards, specifically wildfires. The Planning Team acknowledged that many of the hazards with the potential to impact the community, could exacerbate wildfire conditions or be exacerbated as a result of wildfires. Thus, wildfire conditions are discussed throughout the hazard profiles.

As part of the hazard identification and prioritization process, the Planning Team determined that some hazards could be combined or included within a larger hazard category. In addition, some hazards were renamed to reflect the specific hazard affecting Rancho Santa Margarita. Therefore, for purposes of the hazard profiles, earthquake fault rupture, ground shaking, and liquefaction are all addressed under the heading of Seismic Hazards. Severe Weather includes heavy winds (Santa Ana winds), rain events (including El Nino years), and extreme heat. Human-induced hazards include arson, hazardous materials releases, terrorism, and unexploded ordnances.

Changing weather patterns is not a stand-alone hazard but has the potential to exacerbate other natural hazards in the City. As such, the Planning Team determined it would be best to discuss changing weather pattern considerations within each applicable hazard profile. Similarly, power outage (both planned and unplanned) could occur as a result of several hazards, resulting in secondary impacts within the community. Power outage is discussed in detail in the Severe Weather Profile and is also cross referenced in other relevant hazard profiles. The following hazards are discussed within the LHMP:

- Dam/Reservoir Failure
- Drought
- Flood
- Human-Induced Hazards
- Landslide/Mudflow
- Pest Management and Disease
- Seismic Hazards
- Severe Weather
- Wildfire

4.2 HAZARD PROFILES

This section contains profiles for the hazards identified as having the potential to occur in Rancho Santa Margarita. Each hazard includes a description of the hazard, location of where the hazard may occur, severity of the hazard, history of the hazard, and the probability of the hazard's future occurrence.

4.2.1 DAM/RESERVOIR FAILURE

DESCRIPTION

A dam is a barrier preventing the flow of water or loose solid materials (such as soil or snow) or a barrier built across a watercourse for impounding water. Dams are artificial barriers, which are 25 feet or more in height or have an impounding capacity of 50-acre feet or more. Dam failure is the uncontrolled release of impounded water from behind a dam. Flooding, earthquakes, blockages, landslides, lack of maintenance, improper operation, poor construction, vandalism, and terrorism can all cause a dam to fail. Dam failure causes downstream flooding that can affect life and property.

Reservoirs are defined as an artificial lake, pond, impoundment or tank, used to store water. Reservoirs can be created on the surface by constructing dams to store water. Additionally, tank reservoirs can be constructed to store water either above ground, on the surface, or below ground. Reservoir failure is the uncontrolled release of impounded water from a reservoir. Flooding, earthquakes, blockages, landslides, lack of maintenance, improper operation, poor construction, vandalism, and terrorism activities can all cause a reservoir to fail. Seismic activity may also cause inundation by the action of a differential movement of a reservoir and the water within, causing shearing or buckling of the reservoir infrastructure.

Dam or reservoir failures are most likely to happen for the following reasons:[1]

- Overtopping, caused by water spilling over the top of a dam; usually a precursor of dam failure because of inadequate spillway design, debris blockage of spillways, or settlement of the dam crest.
- Foundation defects, including settlement and slope instability.
- Cracking caused by natural settling of a dam or seismic movements.
- Inadequate maintenance and upkeep.
- Piping, when seepage through a dam is not properly filtered, soil particles continue to progress and form sinkholes in the dam.

LOCATION AND EXTENT

Critical dams and reservoirs within the City of Rancho Santa Margarita, as identified by TCWD and SMWD, are listed in Table 4-4, *Dams and Reservoirs*. Development of maps

[1] Association of State Dam Safety Officials, *Dam Failure and Incidents*, https://damsafety.org/dam-failures, accessed February 6, 2019.

that show inundation areas in the event of dam failure is the responsibility of the dam's owner and is discussed below. No major dams are located upstream of the City; however, two smaller dam facilities (Dove Dam and Trabuco Dam) are located within the City.

Table 4-4
Dams and Reservoirs in Rancho Santa Margarita

Name	Type	Jurisdiction[1]
Arroyo Trabuco Reservoir	Reservoir	TCWD
Dove Canyon Reservoir	Reservoir	TCWD
Dove Dam	Dam	TCWD
Foothill Reservoir	Reservoir	SMWD
Island Pasture Reservoir	Reservoir	SMWD
Rancho Trabuco Reservoir	Reservoir	SMWD
Robinson Ranch Reclaimed Water Reservoir	Reservoir	TCWD
South County Regulating Reservoir	Reservoir	SMWD
Starr Reservoir	Reservoir	SMWD
Trabuco Dam	Dam	TCWD
Trabuco Reservoirs (2)	Reservoir	TCWD
Trabuco Ridge Reservoirs (2)	Reservoir	SMWD
Upper Chiquita Reservoir	Reservoir	SMWD
Upper Oso Reservoir (with Compressor Building)	Reservoir	SMWD
Note: 1. TCWD = Trabuco Canyon Water District and SMWD = Santa Margarita Water District		
Source: City of Rancho Santa Margarita General Plan, Trabuco Canyon Water District and Santa Margarita Water District		

Additionally, there are several water facilities and treatment plants located within the City as described in Table 4-5, *Water/Wastewater Facilities in Rancho Santa Margarita*. Localized flooding or inundation could result if structural damage occurred to these facilities.

Table 4-5
Water/Wastewater Facilities in Rancho Santa Margarita

Name	Type	Jurisdiction[1]
Altisima Pump Station	Water Facility	SMWD
Antonio Pump Station	Water Facility	SMWD
Barneburg Lift Station	Water Facility	TCWD
Bell Canyon Lift Station	Water Facility	TCWD
Chiquita Ridge Wastewater Treatment Plant	Treatment Plant	SMWD
Foothill Pump Station	Water Facility	SMWD
Heritage Lift Station	Water Facility	TCWD
Mesa Pump Station	Water Facility	SMWD
Plano Lift Station	Sanitary Sewer	SMWD
Plano Trabuco Lift Station & Pump Station	Water Facility	TCWD
Robinson Ranch Pump Station	Water Facility	TCWD
Robinson Ranch Wastewater Treatment Plant	Treatment Plant	TCWD
Trabuco Creek Wells Facility	Water Facility	TCWD
Trabuco Lift Station & Pump Station	Sanitary Sewer	SMWD
Trabuco Pump Station	Water Facility	SMWD
Via Allegre Lift Station	Water Facility	TCWD
Note: 1. TCWD = Trabuco Canyon Water District and SMWD = Santa Margarita Water District		
Source: City of Rancho Santa Margarita General Plan, Trabuco Canyon Water District and Santa Margarita Water District		

West of Rancho Santa Margarita, Lake Mission Viejo is located adjacent to the City and could pose a concern in case of failure due to the proximity of the Lake to Alicia Parkway (a major ingress and egress to Rancho Santa Margarita). Smaller flood control improvements associated with Lake Mission Viejo such as canals, culverts, levees, and retention basins could suffer structural damage during an earthquake that could affect the City. According to the General Plan, these facilities could pose an inundation hazard if they contain water at the time of the seismic event, or if they are not repaired soon after an earthquake and prior to the next winter storm season.

Dam inundation maps show flooding that could result from a hypothetical failure of a dam or its critical appurtenant structure. Inundation maps are required to include the inundation boundary, flood wave arrival time, maximum depth, and maximum velocity. The map must also include aerial imagery (i.e.: google earth picture) at a scale that is appropriate for emergency response purposes, critical facilities in the inundation area, and must be stamped by a California licensed civil engineer.

Trabuco Canyon Water District (TCWD) and Santa Margarita Water District (SMWD) are in the process of developing inundation maps for dams and reservoirs within their jurisdiction. Inundation mapping is anticipated to be completed in Fall/Winter 2019. Therefore, at the time this Plan was adopted by FEMA the extent of a dam or reservoir failure was not currently known but due to the number of dams and reservoirs within the City and surrounding area, it is likely that a dam or reservoir failure would extend into and flood portions of the community. The extent of inundation would depend upon the significance of the failure and its location. The amount of area experiencing flooding, flood depth levels, and warning times that would allow for evacuation, would also be highly dependent upon the type of facility, significance of the failure, and its location.

PREVIOUS OCCURRENCES

Rancho Santa Margarita (along with the rest of Orange County cities) has never experienced a major dam failure. The closest dam failures to the City occurred in the City of Los Angeles (St. Francis Dam Disaster of 1928 and Baldwin Hills Dam Disaster of 1963). The City of Westminster in north Orange County experienced a reservoir (tank) failure in 1998. No other incidents have occurred.[2]

PROBABILITY OF FUTURE OCCURRENCES

As there has only been one water storage structure failure in over one hundred years of Orange County history, the probability for future events is anticipated to remain low. However, dam/reservoir failure resulting in flooding within the community could occur due to severe seismic activity. Since the Baldwin Hills Dam failure in 1963, the State of California implemented stringent standards, regulations, and regular inspections. Additional regulations were put into place after the Oroville Dam crisis in 2017, triggering additional inundation mapping and emergency preparedness planning. Both TCWD and SMWD are in the process of complying with these additional regulations.

[2] Municipal Water District of Orange County, *Orange County Regional Water and Wastewater Hazard Mitigation Plan Public Review Draft*, August 2018.

CHANGING WEATHER PATTERNS

Dam/reservoir failure is not directly correlated to changing weather patterns within Rancho Santa Margarita. Dam and reservoir failure could be caused by seismic activity, which is also not caused by changing weather patterns. However, ground failure (due to oversaturated soils) compromising infrastructure integrity or heavy rains overtopping dams could occur. Largely, dam and reservoir operations occur outside of weather patterns and are not impacted by them.

4.2.2 DROUGHT

DESCRIPTION

Drought in its simplest definition is an extremely dry climatic period where the available water falls below a statistical average for a region. Drought is also defined by factors other than rainfall, including vegetation conditions, agricultural productivity, soil moisture, water levels in reservoirs, and stream flow. Droughts or water shortages are a gradual phenomenon, occurring over multiyear periods and increasing with the length of dry conditions. When precipitation is less than normal for a period, the flow of streams and rivers declines, water levels in lakes and reservoirs fall, and the depth to water in wells increases. If dry weather persists and water supply problems develop, the dry period can become a drought. Drought cycles are common in southern California and are influenced by cyclical El Niño and La Niña events.

The term "drought" can have different meanings depending on how a water deficiency affects day to day activities. Drought is a complex natural hazard, which is reflected in the following four definitions commonly used to describe it:

- Agricultural – Agricultural drought is defined principally in terms of naturally occurring soil moisture deficiencies relative to water demands of plant life, usually arid crops.

- Hydrological – Hydrological drought is related to the effects of precipitation shortfalls on stream flows and reservoir, lake, and groundwater levels.

- Meteorological – Meteorological drought is defined solely on the degree of dryness, expressed as a departure of actual precipitation from an expected average or normal amount based on monthly, seasonal, or annual time scales.

- Socioeconomic – Drought associates the supply and demand of economic goods or services with elements of meteorological, hydrologic, and agricultural drought. Socioeconomic drought occurs when the demand for water exceeds the supply because of weather-related supply shortfall. It may also be called a water management drought.

Although climate is a primary contributor to hydrological drought, other factors such as changes in land use (i.e., deforestation), land degradation, and the construction of dams all affect the hydrological characteristics of a region. Since regions are interconnected by natural systems, the impact of meteorological drought may extend well beyond the

borders of the precipitation-deficient area. Changes in land use upstream may alter hydrologic characteristics such as infiltration and runoff rates, resulting in more variable stream flow and a higher incidence of hydrologic drought downstream. Land use change is one-way human actions alter the frequency of water shortage even when no change in precipitation has been observed.[3]

Droughts cause public health and safety impacts, as well as economic and environmental impacts. Public health and safety impacts are primarily associated with catastrophic wildfire risks and drinking water shortage risks for small water systems in rural areas and private residential wells. Examples of other impacts include costs to homeowners due to loss of residential landscaping, degradation of urban environments due to loss of landscaping, agricultural land fallowing and associated job loss, degradation of fishery habitat, and tree mortality with damage to forest ecosystems. Drought conditions can also result in damage to older infrastructure that is located within dry soils with potential to leak or break. Dead or dying vegetation poses a risk to falling and damaging structures and infrastructure systems.

In Orange County, drought conditions typically result in implementation of large-scale conservation efforts, reducing water supplies to customers and altering the pricing system by implementing higher rates for water usage that exceeds certain levels (i.e., wasteful). Higher rates that may be imposed during a drought could have disproportionate impacts on lower-income households. Reduction in groundwater supplies during drought conditions can also result in the need for water agencies that have high reliance on local groundwater supplies to purchase larger amounts of imported water. Drought conditions have also resulted in drier brush and an increase in the size and severity of wildfires; refer to the Wildfire Hazard Profile for further discussion.

LOCATION AND EXTENT

Droughts are generally widespread events that could easily affect the entire City of Rancho Santa Margarita, and the larger Orange County region. The geographic extent of drought conditions could extend to every resident and business owner receiving water from TCWD and SMWD, the water suppliers for the City. Both TCWD and SMWD rely on imported water from other regions (e.g., Colorado River and northern California) via aqueducts. As a result, droughts can be caused or made worse by conditions in the regions in which the water originates.

Drought severity depends on numerous factors, including duration, intensity, geographic extent, as well as regional water supply demands by humans and vegetation. The severity of drought can be aggravated by other climatic factors, such as prolonged high winds and low relative humidity. The magnitude of drought is usually measured in time and the severity of the hydrologic deficit.

The U.S. Drought Monitor is a map released weekly that indicates the portions of the United States that are experiencing drought and the severity of the drought based on five classifications: abnormally dry (D0), showing areas that may be going into or are

[3] National Drought Mitigation Center, *Drought Basics*, https://drought.unl.edu/Education/DroughtBasics.aspx, accessed January 31, 2019.

coming out of drought, and four levels of drought: moderate (D1), severe (D2), extreme (D3), and exceptional (D4); refer to Table 4-6, *Drought Severity Classification*.

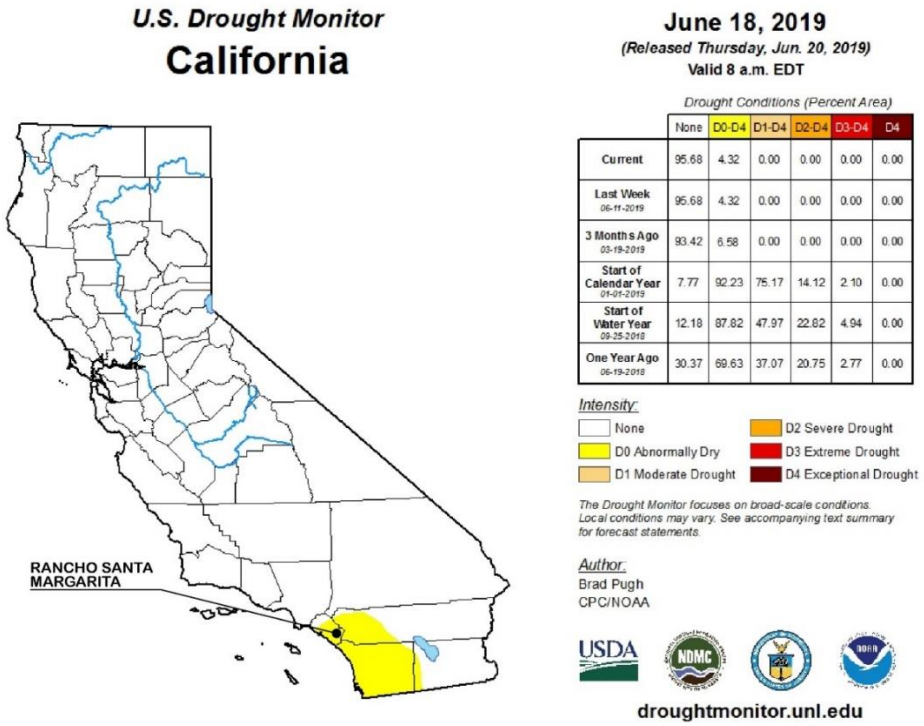
Table 4-6
Drought Severity Classification

Category	Description	Possible Impacts
D0	Abnormally Dry	Going into drought: short-term dryness slowing planting, growth of crops or pastures. Coming out of drought: some lingering water deficits; pastures or crops not fully recovered.
D1	Moderate Drought	Some damage to crops, pastures; streams, reservoirs, or wells low, some water shortages developing or imminent; voluntary water-use restrictions requested.
D2	Severe Drought	Crop or pasture losses likely; water shortages common; water restrictions imposed.
D3	Extreme Drought	Major crop/pasture losses; widespread water shortages or restrictions.
D4	Exceptional Drought	Exceptional and widespread crop/pasture losses; shortages of water in reservoirs, streams, and wells creating water emergencies.
Source: U.S. Drought Monitor, *Drought Classification,* https://droughtmonitor.unl.edu/AboutUSDM/AbouttheData/DroughtClassification.aspx, accessed February 1, 2019.		

The Drought Monitor is not a forecast but looks backward; providing a weekly assessment of drought conditions based on how much precipitation did or did not fall. Because drought is a slow-moving hazard, it may take more than one good rainfall to end a drought, especially if an area has been in drought for a long time.

Figure 4-1, *Drought Monitor Map*, depicts the drought monitor map, which identifies areas of drought and labels them by intensity as shown in Table 4-6. As of May 14, 2019, south Orange County is classified as "Abnormally Dry" by the U.S. Drought Monitor.

Figure 4-1
Drought Monitor Map



Source: United States Drought Monitor, *California,* https://droughtmonitor.unl.edu/CurrentMap/StateDroughtMonitor.aspx?CA, accessed June 25, 2019.

PREVIOUS OCCURENCES

Although defining drought can be challenging across a large geography, California has experienced numerous severe droughts over the past century. FEMA declared one drought emergency for California in January 1977, and other drought emergency declarations have been declared by the State. According to the 2018 State Hazard Mitigation Plan, from 1972 to 2016, there were fifteen drought State Emergency Proclamations in California.[4]

The most severe drought on record began in 2012 and continued through 2017. On January 17, 2014, the governor of California declared a State drought emergency, and on April 1, 2014 the governor announced the first-ever mandatory 25 percent statewide water use reduction and a series of actions to help save water, increase enforcement to prevent wasteful water use, streamline the State's drought response, and invest in new technologies that would make California more drought resilient. At the time of the announcement, the volume of Sierra Nevada snowpack was approximately 14 percent of normal. Despite multiple storms in Feburary 2014, drought conditions persisted. By the end of May 2014, all of California was in a condition of "extreme" or "exceptional" drought. At the same time, the volume of the Sierra Nevada snowpack had decreased to less than 10 percent of normal and water stored in Lake Oroville, the major reservoir for the State Water Project, was at 58 percent of normal.[5] On April 7, 2017, the governor issued an executive order ending the drought emergency in Southern California, including Orange County.

During drought conditions, the City partners with SMWD and TCWD to educate residents and business owners regarding State-mandated water conservation measures. Table 4-7, *Historical Droughts*, shows the historical droughts that have occurred in California from 1827 through the present.

PROBABILITY OF FUTURE OCCURENCES

Based on previous occurrences and trends in California, the likelihood that Rancho Santa Margarita will experience drought conditions in the future is considered high. The U.S. Seasonal Drought Outlook depicts large-scale trends based on U.S. Drought Monitor areas (intensities of D1 to D4), as shown in Figure 4-2, *U.S. Seasonal Drought Outlook*. The southern California region, including Rancho Santa Margarita, is currently not showing drought tendencies due to the heavy rain season in 2018–2019. While it is not a current concern based on available data, drought is considered to have a high probability for reoccurrence within the City.

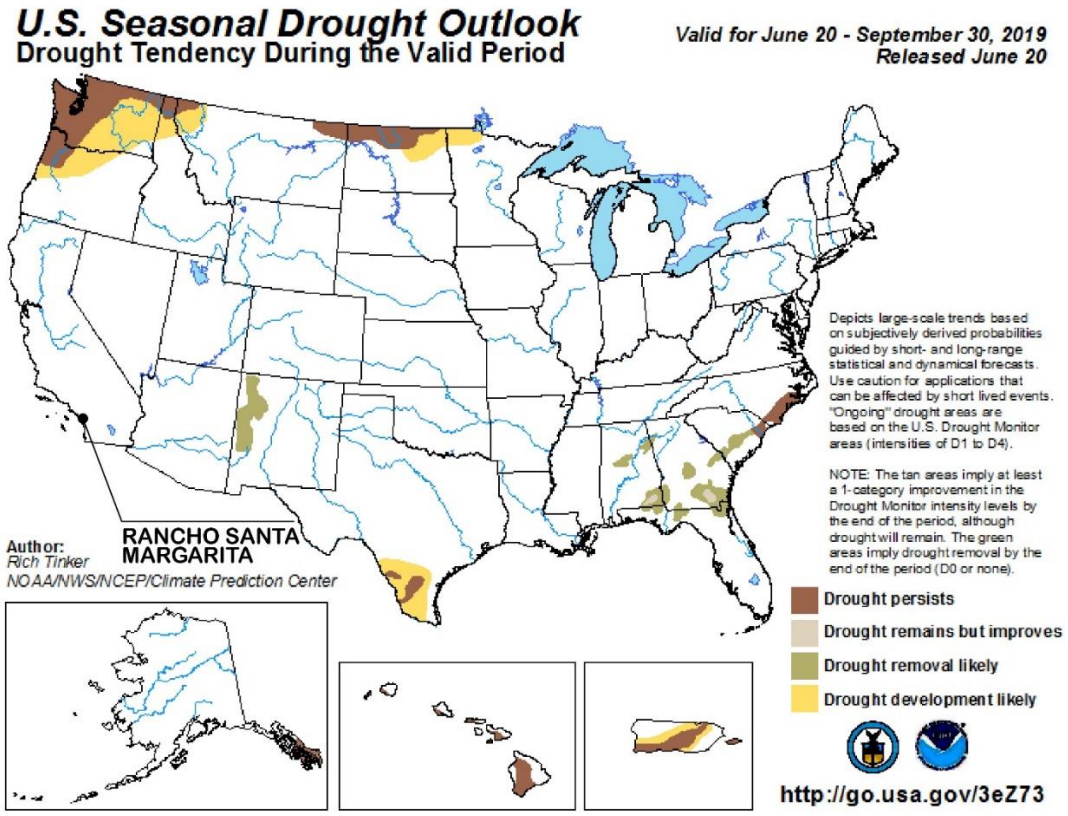
[4] California Governor's Office of Emergency Services, *2018 California State Hazard Mitigation Plan*, https://www.caloes.ca.gov/HazardMitigationSite/Documents/003-2018%20SHMP_FINAL_ACK-TOC.pdf, published September 2018, accessed February 1, 2019.
[5] California Department of Water Resources, *California's Most Significant Droughts: Comparing Historical and Recent Conditions*, February 2015.

Table 4-7
Historical Droughts

Date	Area Affected	Notes
1827–1916	Statewide	Multiyear: 1827–29, 1843–44, 1856–57, 1863–64 (particularly extreme), 1887–88, 1897–1900, 1912–13.
1917–21	Statewide except central Sierra Nevada and north coast	Simultaneous in affected areas, 1919–20. Most extreme in north.
1922–26	Statewide except central Sierra Nevada	Simultaneous in effect for entire State only during 1924, which was particularly severe.
1928–37	Statewide	Simultaneously in effect for entire State, 1929–34. Longest, most severe in State's history.
1943–51	Statewide	Simultaneously in effect for entire State, 1947–49. Most extreme in south.
1959–62	Statewide	Most extreme in Sierra Nevada and central coast.
1976–77	Statewide, except for southwestern deserts	Driest 2 years in State's history. Most severe in northern two-thirds of State.
1987–92	Statewide	Moderate, continuing through 1989. Most extreme in northern Sierra Nevada.
2000-2002	Statewide	Most severe in southern California.
2007-2009	Statewide	Twelfth driest 3-year period on record at the time. Most severe in western San Joaquin Valley.
2012–17	Statewide	Most severe California drought on record.

Sources: Paulson, R. W., E. B. Chase, R. S. Roberts, and D. W. Moody, Compilers, National Water Summary 1988-89--Hydrologic Events and Floods and Droughts: U.S. Geological Survey Water-Supply Paper.
California Department of Water Resources, California's Most Significant Droughts: Comparing Historical and Recent Conditions, February 2015.

Figure 4-2
U.S. Seasonal Drought Outlook



Source: National Weather Service Climate Prediction Center, *U.S. Seasonal Drought Outlook*, https://www.cpc.ncep.noaa.gov/products/expert_assessment/sdo_summary.php, accessed June 25, 2019.

CHANGING WEATHER PATTERNS

In Governor Brown's 2014 drought emergency declaration, he noted that droughts could occur more regularly into the future. According to the 2018 State Hazard Mitigation Plan, climate scientists studying California find that drought conditions are likely to become more frequent and persistent over the twenty-first century due to changing weather patterns such as more frequent and extended periods of high temperature conditions. The experiences faced by water supply agencies during the most recent drought (2012-2017) underscore the need to examine water storage, distribution, management, conservation, and use policies more closely. Decreasing snowmelt, reduced precipitation, and higher temperatures are all expected effects of changing weather patterns. When coupled with increasing populations and increasing demand for water in southern portions of California, these conditions may result in future water shortages for Rancho Santa Margarita residents.

4.2.3 FLOOD

DESCRIPTION

Flooding occurs when a waterway, either a natural one or an artificial drainage channel, receives more water than it is capable of conveying, causing the water level in the waterway to rise. Depending on how long these conditions last and the amount of water the waterway receives in proportion to its capacity, the rising water level may eventually overtop the waterway's banks or any other boundaries to the drainage area, resulting in flooding in the surrounding area.

Floods often occur during heavy precipitation events, when the amount of rainwater exceeds the capacity of storm drains or flood control channels. Floods can also happen when infrastructure such as levees, dams, or culverts fail, or when a section of drainage infrastructure fails, and water cannot be drained from an area fast enough. These failures can be linked to precipitation events (i.e.,., when water erodes away a levee, allowing water to escape and flood nearby areas), or can be a consequence of other emergency situations (i.e., a dam collapsing due to an earthquake).

FEMA defines flood or flooding as a general and temporary condition of partial or complete inundation of normally dry land areas from:

- The overflow of inland or tidal waters;
- The unusual and rapid accumulation or runoff of surface waters from any source; or,
- Mudslides (i.e., mudflows) which are proximately caused by flooding and are akin to a river of liquid and flowing mud on the surfaces of normally dry land areas, as when earth is carried by a current of water and deposited along the path of the current.

Floods can be caused by a number of factors, including:

- Weather and climate patterns (e.g., El Niño, La Niña, Pineapple Express, Atmospheric River, etc.)
    - El Niño and La Niña are complex weather patterns resulting from variations in ocean temperatures in the equatorial Pacific. Warmer or colder than average ocean temperatures in one part of the world can influence weather around the globe. El Niño and La Niña episodes typically last 9 to 12 months, but some prolonged events may last for years.[6]
    - Pineapple Express is a name given to an atmospheric river on the West Coast. It is a channel in the atmosphere that moves vast amounts of moisture and can result in massive showers.
- Hydrologic features such as reservoirs, ponds, lakes, rivers, etc. can have a large impact on the amount of flooding.
- The absorption capacity of the ground depends on the composition of soil and bedrock of the area. Less absorbent soil conditions in addition to lack of proper storm infrastructure can result in flooding.
- Type and density of vegetation is related to absorption of moisture affecting the flow of water.
- Patterns of land use/urbanization relates to the pervious and impervious nature of the ground.
- Expected level, age, and condition of flood management infrastructure will impact flooding conditions.
- Large-scale wildfires dramatically alter the terrain and ground conditions. Vegetation absorbs rainfall, reducing runoff. However, wildfires leave the ground charred, barren, and unable to absorb water, creating conditions ripe for flash

[6] National Ocean Service, *What are El Niño and La Niña?*, https://oceanservice.noaa.gov/facts/ninonina.html, accessed February 4, 2019.

flooding and mudflow. Flood risk remains significantly higher until vegetation is restored – up to 5 years after a wildfire.[7]

The force of a flood can be enough to carry away large objects and damage structures, causing considerable damage to buildings and infrastructure. In severe instances, floodwaters themselves can destroy structures or move them off their foundation. Floods can saturate and weaken soil, potentially making structures built on them more susceptible to damage or collapse. Flooding can affect water quality, as large volumes of water can transport contaminants into water bodies and overload storm and wastewater systems. Additionally, large increases in water volume can cause water body erosion and loss of aquatic habitat. It can also cause great economic loss to people and government due to the destruction of roads, bridges, farms, businesses, houses, and automobiles.

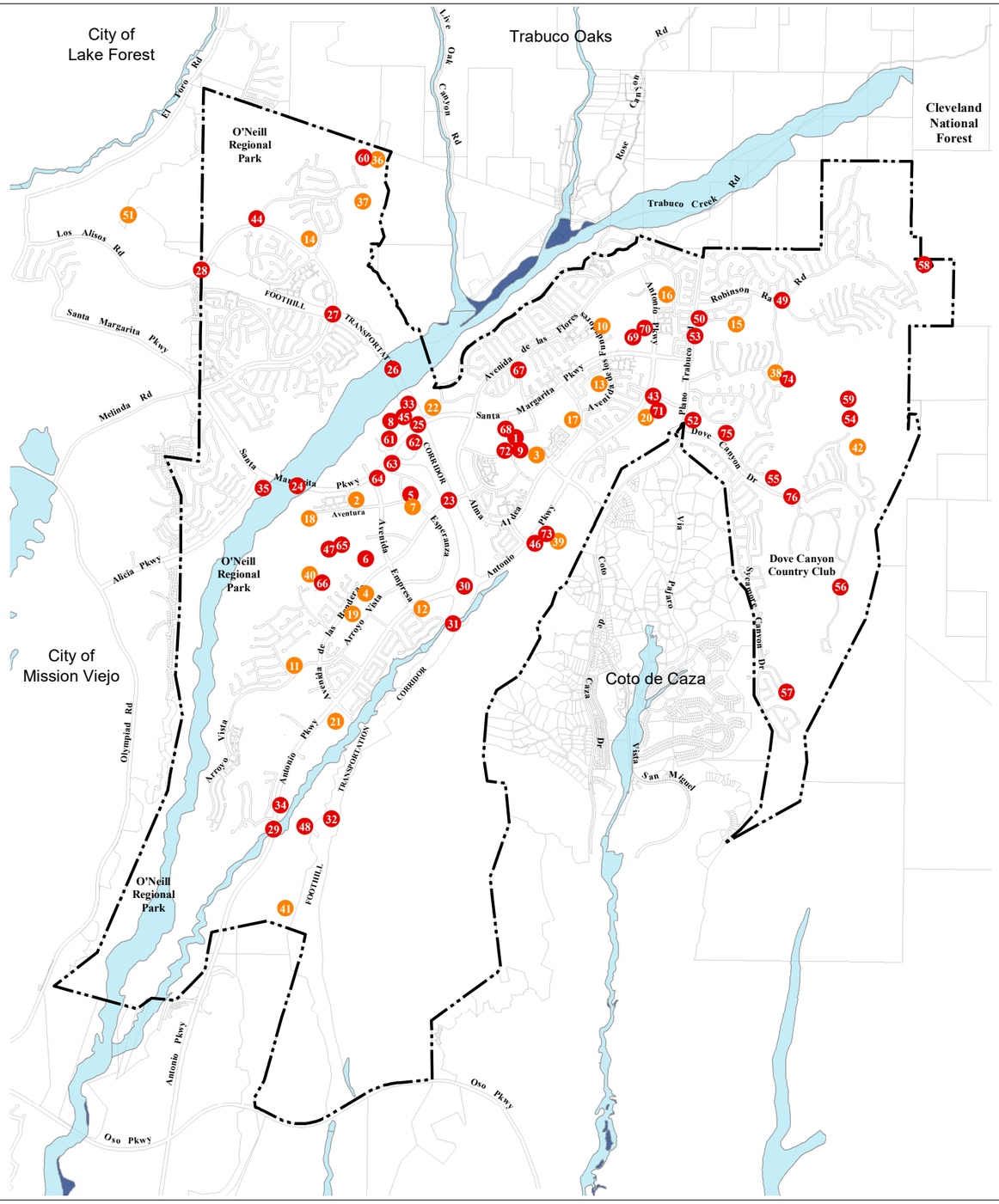
LOCATION AND EXTENT

Orange County's terrain makes it naturally susceptible to flooding. Many of the rivers, creeks, and streams flow through natural floodplains on their way to the ocean. The City is located within the San Juan Creek watershed and is responsible for storm drain systems within City boundaries. The Orange County Flood Control District (OCFCD) is the agency responsible for regional flood control. Trabuco Creek and Tijeras Canyon Creek drain the northern and western areas of the City, while Dove Canyon drains the southeastern portion.

Flood zones within Rancho Santa Margarita are determined by Flood Insurance Rate Maps (FIRMs), produced by FEMA in partnership with various communities. A FIRM is the official flood map that shows a community's flood hazard areas. These may include high-hazard (Special Flood Hazard Areas [SFHA]), moderate- to low-hazard areas, and undetermined areas. A SFHA map shows the 100-year floodplain, divided into zones A and AE.[8] A FIRM also includes 500-year floodplains and higher, classified as moderate and minimal risk areas. A 100- and 500-year flood is an event that has a 1 in 100 (1 percent) and 1 in 500 (0.2 percent) chance, respectively, of occurring in any given year. This data is incorporated into FIRMs to support the National Flood Insurance Program (NFIP) and provide the basis for community floodplain management regulations and flood insurance requirements.

Figure 4-3, *Flood Hazard Zone*, shows the locations of flood zones in Rancho Santa Margarita, and Table 4-8 provides the details and acreage of these zones that occur within the City. Potential flooding could occur along the Arroyo Trabuco Creek (also known as Trabuco Creek) and Tijeras Canyon Creek areas.

[7] Federal Emergency Management Agency, *Wildfires: You Need Flood Insurance*, https://www.fema.gov/wildfires-you-need-flood-insurance, accessed February 4, 2019.
[8] Federal Emergency Management Agency, *Overview: Flood Hazard Mapping Updates*, https://www.fema.gov/media-library-data/1468504201672-3c52280b1b1d936e8d23e26f12816017/Flood_Hazard_Mapping_Updates_Overview_Fact_Sheet.pdf, accessed February 4, 2019.



RANCHO SANTA MARGARITA
January 1, 2000

LEGEND

- City Boundary
- 1 Critical Facilities
- 3 Facilities of Concern
- 100-Year Flood
- 500-Year Flood

Sources: City of Rancho Santa Margarita and Orange County Local Agency Formation Commission, 2013. City of Rancho Santa Margarita Local Hazard Mitigation Plan Planning Team, 2019.

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Table 4-8
Acreage by Flood Zones

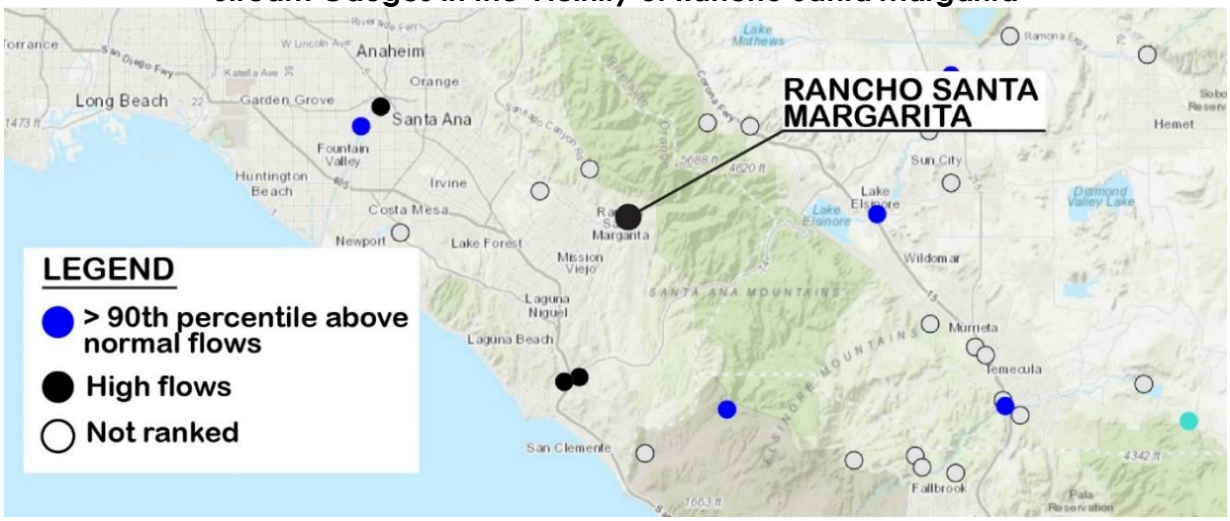
Zone	Risk	Flood	Area (Acres)
A	High	1% (100-year flood)	86.14
AE	High	1% (100-year flood)	342.92
Source: Michael Baker International GIS, 2019.			

Along Trabuco Creek, a dense growth of trees and brush are located in the main channel, which could result in higher flood levels. Floods that could impact the City would typically be of short duration, with high peak volumes and high velocity. This is due to the arid to semi-arid nature of the area. When a major storm moves in, water collects rapidly and runs off quickly due to the rapid descent of the mountains into Trabuco Creek, Tijeras Canyon Creek, and Dove Canyon. Consequently, resultant flows are of the flash-flood type, generally having sharp peaks and short durations. Although some severe floods have impacted the area in the past, flooding damage in this area has generally been lower than in other areas of Orange County because of its relatively undeveloped state in the upper watershed areas. No homes or structures are located within the 100-year or 500-year flood zones within the City.

Localized flooding can occur outside of mapped flood hazard zones during heavy rain events associated with extensive runoff. Localized flooding typically occurs when significant amounts of rain fall over a short time period and/or, as a result of overloaded or blocked stormwater drainage systems that cause sheet flow into streets and low-lying areas. The City consistently maintains storm drain channels and proactively clears storm drains ahead of weather events. However, during heavy rain events there is the potential for fallen tree limbs or debris to interfere with the storm drain system, resulting in flooding of local streets.

The extent or magnitude of flooding is measured by percentage and annual chance floods. The flooding areas are classified as 1 in 100 (1 percent) or high risk, and 1 in 500 (0.2 percent) or moderate risk of flooding. Areas having a chance of less than 0.2 percent are classified as low risk areas. Floods are measured by stream gauges that are installed in bodies of water located near populated areas. They are installed and operated by the United States Geological Survey (USGS) and monitor water levels constantly. This data is then sent to the National Weather Service, and a warning is sent if there is potential for flooding. Many gauges are Automated Local Evaluation in Real-Time (ALERT) gauges, which are designed to send an automated warning when water levels reach predetermined levels or change rapidly. Figure 4-4, *Stream Gauges in the Vicinity of Rancho Santa Margarita,* shows the location of gauges in the vicinity of Rancho Santa Margarita.

Figure 4-4
Stream Gauges in the Vicinity of Rancho Santa Margarita



Source: U.S. Geological Survey, *WaterWatch Streamflow Map*, https://waterwatch.usgs.gov/index.php?id=real&sid=w__gmap, accessed February 4, 2019.

The National Weather Service report, *A History of Significant Weather Events in Southern California*, includes a chronological list of events organized by weather type. However, only a handful of these events have affected Rancho Santa Margarita. Additionally, NOAA's Storm Event Database summarizes flood events of regional significance affecting the City of Rancho Santa Margarita. These are documented below: [9, 10]

- In December 1997, an El Niño storm brought the heaviest rain to Orange County in 70 years; the neighboring city, Mission Viejo, totaled as much as 10 inches in heavy downpours. Widespread flooding and mudslides occurred throughout the County.

- In December 2010, a large storm brought heavy rain and periods of serious flooding throughout Orange County, prompting a Federal disaster declaration. Orange County officials estimated $36 million in total damages due to 10 inches or more of rain received.

- In February 2014, the only significant storm of the 2013 – 2014 rainy reason caused minor street flooding in neighboring city, Mission Viejo.

- In July - August 2015, moisture from Hurricane Dolores and Hurricane Linda resulted in uncharacteristic showers and thunderstorms with up to 4 inches of rain in southern California.

[9] National Oceanic and Atmospheric Administration, National Weather Service, *A History of Significant Weather Events in Southern California*, https://www.weather.gov/media/sgx/documents/weatherhistory.pdf, accessed Feburary 5, 2019.
[10] NOAA National Centers for Environmental Information, *Storm Events Database*, https://www.ncdc.noaa.gov/stormevents/, accessed February 5, 2019.

While many flood events have occurred within southern Orange County, no major floods have historically caused major damage within the City of Rancho Santa Margarita; refer to the discussion of Landslides/Mudflows, below.

PROBABILITY OF FUTURE OCCURENCES

Based on the frequency of severe weather events and the capacity of facilities, there is medium probability of future occurrences of flooding. As discussed, FEMA defines flood zones based on the probability of occurrence, expressed in a percentage of the chance of a flood of a specific extent occurring in any given year. For areas located within the 100-year flood zone, there is a 1 percent chance in a given year that this area will be inundated by flood waters. For moderate flood hazard areas located within the 500-year flood zone, this probability decreases to 0.2 percent. For minimal flood hazard areas, they are located outside of the 0.2 percent annual chance flood. Figure 4-3 denotes the 100- and 500-year flood zones within the City. Flooding incidents are most likely to occur within these delineated areas.

Additionally, the OCFCD performs analyses (i.e., deficiency studies) to identify the adequacy of specific reaches of flood control facilities. The results are classified based on a facility's existing capacity to hold 100-year flow:

- Adequate – Existing capacity of 100 percent or greater;
- Marginally Adequate – Existing capacity is between 90 and 100 percent;
- Deficient – Existing capacity of the system is less than 90 percent.

Within the Trabuco Creek Channel (Facility L02), the flood control facility between Foothill Transportation Corridor to Trabuco Canyon Road for 5,800 linear feet is categorized as deficient.[11] Thus, this facility may have a future impact on flooding within this area.

CHANGING WEATHER PATTERNS

Changing weather patterns have a direct effect on flooding. According to research conducted by UCLA, California will experience extremely wet and extremely dry seasons by the end of the century. It is predicted that "over the next 40 years, the State will be 300 to 400 percent more likely to have a prolonged storm sequence as severe as the one that caused the legendary California flood more than 150 years ago."[12] With population density and increased urbanization of Orange County, such a flood could be devastating. While the annual rainfall averages may remain constant, the wet season may be narrower, leading to large downpours in a short period of time that overwhelm infrastructure and lead to increased flooding.

[11] O.C. Public Works, *Flood Plan for the South Orange County Integrated Regional Watershed Management Plan*, June 2013.
[12] University of California Los Angeles Newsroom, *Study forecasts a severe climate future for California*, http://newsroom.ucla.edu/releases/california-extreme-climate-future-ucla-study, accessed February 4, 2019.

4.2.4 HUMAN-INDUCED HAZARDS

The following human-induced hazards are analyzed below: arson, hazardous materials, terrorism, and unexploded ordnance.

DESCRIPTION

Arson

Common law arson is defined as the willful and malicious burning or charring of property. While most arson crimes involve damage to buildings, arson can also be committed by a person who sets fire to forest or wildlands. Property damage or destruction is not required, and the knowing burning of personal property is generally enough to constitute arson.[13]

Hazardous Materials

A hazardous material means a material that, because of its quantity, concentration, or physical or chemical characteristics, poses a significant present or potential hazard to human health and safety or to the environment if released. The term "release" means spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing into the environment, unless permitted or authorized by a regulatory agency.[14] Hazardous materials can be in the form of explosives, flammable and combustible substances, poisons, and radioactive materials. Hazardous materials accidents can occur during production, storage, transportation, use, or disposal.[15]

The impacts of hazardous material release vary, depending on the type and amount of material released. Hazardous materials exposure can include the following effects: skin/eye irritation; difficulty breathing; headaches; nausea; behavior abnormalities; cancer; genetic mutations; physiological malfunctions (i.e., reproductive impairment, kidney failure); physical deformations; or, birth defects.[16]

Many chemicals used in household cleaning, construction, dry cleaning, landscaping, and automotive maintenance and repair are considered hazardous. Accidents can occur in the production, use, transport, or disposal of hazardous waste.

Terrorism/Mass Attack

Domestic terrorism is defined by the Federal Bureau of Investigation (FBI) as perpetuated by individuals and/or groups inspired by or associated with a primarily U.S. based movement that espouses extremist ideologies of a political, religious, social, racial, or

[13] Cornell Law School, *Legal Information Institute*, https://www.law.cornell.edu/wex/arson, accessed February 4, 2019.
[14] Health and Safety Code Division 20, Chapter 6.95 Hazardous Materials Release Response Plans and Inventory, Article 1.
[15] Ready: Official website of the Department of Homeland Security, *Hazardous Materials Incidents*, https://www.ready.gov/hazardous-materials-incidents, accessed February 5, 2019.
[16] U.S. Environmental Protection Agency, *Health and Ecological Hazards Caused by Hazardous Substances*, https://www.epa.gov/emergency-response/health-and-ecological-hazards-caused-hazardous-substances, accessed February 5, 2019.

environmental nature. International terrorism is perpetuated by individuals and/or groups inspired by or associated with designated foreign terrorist organizations or nations (i.e., State sponsored).[17] The U.S. Federal Code states that terrorism must appear to be intended to 1) intimidate or coerce a civilian population; 2) influence the policy of a government by intimidation or coercion; or, 3) affect the conduct of a government by mass destruction, assassination or kidnapping.[18]

In addition to use of weapons, terrorism can be carried out through other channels. Bioterrorism refers to biological agents (microbes or toxins) used as weapons to further personal or political agendas. Acts of bioterrorism range from a single exposure directed at an individual by another individual to government-sponsored biological warfare resulting in mass casualties. A bioterrorist attack could be caused by virtually any pathogenic microorganism. The agents of greatest concern are anthrax (a bacterium) and smallpox (a virus). Both can be lethal. Anthrax is not communicable, while smallpox is readily transmitted from person to person.[19] Cyberterrorism is defined by the FBI as a "premeditated, politically motivated attack against information, computer systems, computer programs, and data which results in violence against non-combatant targets by subnational groups or clandestine agents."[20]

Other acts of violence that do not qualify as terrorism would be defined as mass attacks. Assailants use weapons to attack and intimidate crowds in public places, with the intention of harming multiple victims. Mass attacks could include the following:[21]

- Active shooter: Individuals using firearms to cause mass casualties;
- Intentional Vehicular Assault (IVA): Individuals using a vehicle to cause mass casualties;
- Improvised Explosive Device (IED): Individuals using homemade bombs; and
- Other methods may include knives, fires, drones, or other weapons.

Unexploded Ordnance

Unexploded ordnance (UXO) are explosive weapons that did not explode when they were employed, and still pose a risk of detonation, sometimes many years after use. Approximately 1,800 acres of Rancho Santa Margarita were used between 1944 to 1956 for aircraft bombing practice and gunnery practice range called Trabuco Bombing Range, in connection with El Toro Marine Corps Air Station. Pilots dropped small practice bombs that included an explosive charge designed to create smoke upon impact.

[17] Federal Bureau of Investigation, *Terrorism*, https://www.fbi.gov/investigate/terrorism, accessed February 4, 2019.
[18] U.S. Federal Code Title 18, Chapter 113B, Section 2331.
[19] Centers for Disease Control and Prevention, *Bioterrorism*, https://www.cdc.gov/healthcommunication/toolstemplates/entertainmented/tips/Bioterrorism.html, accessed Feburary 5, 2019.
[20] Federal Bureau of Investigation, *Cyber Crime*, https://www.fbi.gov/investigate/cyber, accessed February 5, 2019.
[21] Ready.gov, *Mass Attacks in Crowded & Public Spaces*, https://www.ready.gov/public-spaces, accessed February 5, 2019.

Additionally, practice rockets that did not contain an explosive charge were fired. While the ordnance used in the City are only practice devices, there is still the potential for small explosive charges that could burn or cause fatal injuries if picked up or disturbed.[22]

LOCATION AND EXTENT

Arson

Arson could occur anywhere throughout the City, including urbanized or open space areas. Depending on the type of arson, available fuel, and weather conditions, the fire could spread amongst different areas of the City and potentially extend beyond the City into neighboring areas.

Arson fires are not measured on a specific scale and are usually classified by size or impact. The size and severity of any fire depends on the availability of fuel, weather conditions, and topography. Arson committed within Moderate, High, and Very High Fire Hazard Severity Zones have the potential to spread more quickly and through a large portion of the City; refer also to the discussion of Wildfires, in 4-29 below.

Hazardous Materials

Hazardous materials are generated, used, and stored by facilities throughout Rancho Santa Margarita and surrounding communities for a variety of purposes in service industries, small business, schools, and households. Uses known to handle, store, and/or maintain hazardous materials within the City involve fixed facilities comprised of gas stations, pump stations, commercial and retail businesses.

Most of the hazardous materials in Rancho Santa Margarita are associated with relatively low risk, small-scale operations, such as vehicle fueling and service stations, power generators, pools, and garment cleaners. Common hazardous materials include diesel fuel, chlorine, flammable waste, fuel waste, radiator coolant, ethylene glycol, pesticides, paint thinner, non-halogenated solvents, slop oil, toxics, and petroleum distillate solvents. The City does not contain the types of industrial uses that typically result in larger amounts of hazardous materials, nor is heavy industry located in adjoining areas of other cities. The majority of properties within the City containing hazardous materials are located along Santa Margarita Parkway, Antonio Parkway, Aventura, and Arroyo Vista. These facilities include gasoline service stations, utility facilities, dry cleaner facilities, and the former Trabuco Bombing Range (discussed below under Unexploded Ordnance) site.

According to the State Water Resources Control Board GeoTracker, leaking underground storage tanks were discovered at the 1) Shell Oil Gas Station (21712 Plano Trabuco); 2) Mobil Gas Station (31421 Santa Margarita Parkway), and; 3) OCFA Fire Station #45 (30131 Aventura). Proper clean-up activities commenced, and all three incidents are listed as completed, case closed. Several other underground storage tanks (UST) are operated and maintained within the City boundaries, without incident. Additionally, one cleanup site program closed in 2012 occurred at the Plano Lift Station due to a sewage spill on

[22] City of Rancho Santa Margarita, *Potentially Explosive Ordnance in the City of Rancho Santa Margarita and O'Neill Regional Park*, July 23, 2015.

Antonio Parkway. The former Trabuco Bombing Range is also designated as a Military Cleanup Site (refer to unexploded ordnance sections for details regarding cleanup activities).[23]

The Environmental Protection Agency (EPA) biennially collects information regarding the generation, management, and disposal of hazardous materials under the Resource Conservation and Recovery Act (RCRA). The Biennial Report Summary for 2015 indicated three hazardous waste generators in Rancho Santa Margarita: Control Components Inc. (22591 Avenida Empresa); Ralphs (31481 Santa Margarita Parkway); and Target (30602 Santa Margarita Parkway).[24] Hazardous waste generated at these locations (including alkaline solutions, inorganic solid waste, organic solid waste, oil waste, pharmaceutical waste, heavy metals and others) are disposed pursuant to RCRA regulations.

Hazardous materials are also transported throughout California and Orange County, with the largest amount of transportation occurring along highways under the regulatory authority of the California Highway Patrol (CHP). Over 250 miles of interstate highway, including the third busiest highway transportation corridor in the country (Interstate 5), and 719 miles of other major transportation routes run through Orange County. CHP has designated these highways as hazardous materials transportation corridors. In addition to several major arterials, State Route 241 (SR 241) bisects the City. Rancho Santa Margarita is also located in proximity to Interstate 5 and State Route 73. There is some level of risk in the event of traffic collisions or other conditions that result in a release.

The extent of a hazardous materials release is dependent on several conditions, including the nature of the material, climate conditions, the amount of chemical released, and the regulatory environment. The extent of the release can also depend on intent (non-malicious or malicious). Malicious hazardous materials releases are included under the Terrorism Hazard Profile. Non-malicious releases would be accidental releases because of human error, technological failure, or natural hazards.

The nature of the released material is usually the most important determinant of the extent or severity of a spill. Hazardous materials can be flammable, radioactive, infectious, corrosive, toxic/poisonous, or otherwise reactive. For example, a radioactive material spill would have much further-reaching extent when compared to a paint spill. Climate conditions also affect the severity of hazardous materials spills. For example, heavy rains or winds can spread hazardous materials over a larger geographical area and cause challenging cleanup conditions. Challenging cleanup conditions could allow for further contaminations due to the spill. Additionally, natural hazards such as wildfires or earthquakes could cause hazardous materials releases as a secondary effect with challenging cleanup conditions.

[23] California State Water Resources Control Board, *GeoTracker: Rancho Santa Margarita*, https://geotracker.waterboards.ca.gov/map/, accessed February 5, 2019.
[24] U.S. Environmental Protection Agency, *Biennial Report Summary*, https://rcrapublic.epa.gov/rcrainfoweb/action/modules/br/summary/view, accessed February 5, 2019.

Terrorism/Mass Attack

Locations most vulnerable to terrorism or other violent mass attacks are places where people gather, places of political importance, infrastructure, and destinations. Examples include but are not limited to:

- Schools
- Hospitals
- City hall
- Community centers
- Libraries
- Transit operations and stops
- Shopping malls/large retail centers
- Freeways/Toll Roads and other transportation infrastructure
- Power plants and utility infrastructure
- Event/entertainment centers

Although more limited, as with any city, Rancho Santa Margarita has locations such as those identified above that could be vulnerable to terrorism or mass attacks.

An international evaluation scale called the Global Terrorism Index (GTI) measures national terrorism and considers four indicators weighted over 5 years to measure the severity of the attack:

- Total number of terrorist incidents in a given year
- Total number of fatalities caused by terrorists in a given year
- Total number of injuries caused by terrorists in a given year
- A measure of the total property damage from terrorist incidents in a given year

In the United States, the Department of Homeland Security (DHS) utilizes the National Terrorism Advisory System (NTAS) to effectively communicate information about terrorist threats by providing timely, detailed information to the American public. NTAS consists of two types of advisories: Bulletins and Alerts. Because DHS may issue NTAS Bulletins in circumstances not warranting a more specific warning, NTAS Bulletins provide the DHS with greater flexibility to provide timely information to stakeholders and members of the public. When there is specific, credible information about a terrorist threat against the United States, DHS will share an NTAS Alert with the American public when circumstances warrant doing so.

Unexploded Ordnance (UXO)

Of the original 1,800-acre Trabuco Bombing range, approximately 1,300 acres have already been developed as residential, city park/open space, and the Tijeras Creek Golf Club. The remaining 500 acres of undeveloped land is permanently set aside as open space and county parks, and is currently within O'Neill Regional Park, under the jurisdiction of the County of Orange Resources and Development Management Department. During residential and commercial development preparation, the soil was turned over and material two to three feet below the surface was passed through a screen. Additionally, the area was swept using a metal detector capable of detecting

down two feet.[25] Removed UXO has historically been located within the boundaries of O'Neill Regional Park, particularly around the adobe hut near the San Francisco Solano marker.

The U.S. Army Corps of Engineers (Corps), published the Final Remedial Investigation Work Plan for the Former Trabuco Bombing Range, Rancho Santa Margarita, California, dated October 2006. The Remedial Investigation (RI) Work Plan addressed characterization of the former Trabuco Bombing Range to provide information necessary to estimate location, concentration, and nature of munitions and explosives of concern (MEC) present at the site. In addition, soil sampling activities were conducted to determine if munitions constituents (MC) were released when compared to Human Heath Preliminary Remediation Goals and project ambient conditions to confirm or deny a release of MC has occurred. MCs are defined as any materials originating from unexploded ordnance, discarded military munitions, or other military munitions, including explosive and nonexplosive materials, and emission, degradation, or breakdown elements of such ordnance or munitions (10 United States Code 2710 (e)(4)). If an MC release is confirmed, future investigations would be conducted to assess possible impacts to human health, ecological receptors, and the environment associated with munitions constituents (MCs). It is possible unexploded ordnance could be located within undeveloped parkland in the O'Neill Regional Park, where it is unknown whether the areas were cleared.

Unexploded ordnance is not measured on a specific scale and is usually classified by type or geographic distribution. Since the ordnances used in the area were practice devices and not live, detonation would likely be limited to the immediate area. However, the severity of the detonation could be significant depending upon its proximity to a person.

PREVIOUS OCCURRENCES

Arson

The cause of the Holy Fire that began on August 6, 2018 was determined to be arson. Impacts of the Holy Fire are discussed in the Wildfire Hazard Profile (Section 4.2.9).




[25] City of Rancho Santa Margarita, *Potentially Explosive Ordnance in the City of Rancho Santa Margarita and O'Neill Regional Park*, July 23, 2015.

Currently, a Holy Jim Canyon resident faces four felony charges for this crime.[26] This is the most significant arson event effecting the City in recent history. Previous occurrences of arson involve fires of a much smaller nature.

Hazardous Materials

The Comprehensive Environmental Response, Compensations, and Liability Act (CERCLA), Emergency Planning and Community Right-to-Know Act (EPCRA), and California law require responsible parties to report hazardous materials releases if certain criteria are met. Recent spills in the City are identified in Table 4-9, *Cal OES Historical HazMat Spill Notifications in Rancho Santa Margarita since 2010*.

Table 4-9
Cal OES Historical HazMat Spill Notifications in Rancho Santa Margarita since 2010

Spill Date	Agency	Site	Spill Substance Type	Amount
10/26/2017	Private Citizen	Los Pioneros	Hydraulic Fluid	20 ft x 30 ft
02/13/2017	Trabuco Canyon Water District	Dove Lake, Dove Canyon Drive	Sewage	2000 gal.
08/31/2016	OC Public Works	149 Mira Mesa	Petroleum	3 – 5 gal.
05/02/2014	Santa Margarita Water District	30442 Esperanza	Sewage	132 gal.
07/15/2013	Circle K	31527 Santa Margarita Pkwy	Petroleum	5 gal.
03/20/2013	Fedex Ground	16 Tanglewood Lane	Petroleum	.5 gal.
03/07/2013	Trabuco Canyon Water District	31772 Via Allegre	Sewage	600 gal.
10/03/2010	Veederoot	31521 Santa Margarita Pkwy	Petroleum	12 oz.
02/05/2010	Point Conception	23121 Arroyo Vista	Roofing Sealant	Unknown

Source: California Governor's Office of Emergency Services, *Spill Release Reporting*, http://www.caloes.ca.gov/cal-oes-divisions/fire-rescue/hazardous-materials/spill-release-reporting, accessed February 6, 2019.

Terrorism/Mass Attack

Though there have been a variety of threats in Orange County, there is no substantial history of terrorism or mass attacks in Rancho Santa Margarita or the surrounding area.[27] The most recent terrorism incident in Orange County occurred in the City of Aliso Viejo at a day spa located at the intersection of Moulton Parkway and Oso Parkway. A package bomb detonated, killing the woman who opened the box, injuring two spa clients, and causing major structural damage to the building. Evacuations were prompted in the nearby medical buildings and daycare facilities. The FBI Joint Terrorism Task Force and Orange County Sherriff Department arrested a Long Beach resident, and the prosecution is currently ongoing.[28]

[26] Los Angeles Times, *Judge dismisses two charges against Holy fire arson suspect*, https://www.latimes.com/local/lanow/la-me-ln-holy-fire-clark-20181227-story.html, accessed February 6, 2019.
[27] Crime Mapping, *City of Rancho Santa Margarita*, https://www.crimemapping.com/map/ca/RanchoSantaMargarita, accessed February 5, 2019.
[28] United Stated Department of Justice, *Long Beach Man Arrested on Federal Charges for Bombing Aliso Viejo Spa that Killed Ex-Girlfriend*, https://www.justice.gov/usao-cdca/pr/long-beach-man-arrested-federal-charges-bombing-aliso-viejo-spa-killed-ex-girlfriend, accessed June 25, 2019.

Unexploded Ordnance (UXO)

Unexploded ordnances have previously been located within the vicinity of O'Neill Regional Park; however, no known detonations have taken place.

PROBABILITY OF FUTURE OCCURRENCES

Arson

Although arson is not a historically common activity within the City of Rancho Santa Margarita, it is difficult to assess the future probability of such an occurrence. Rancho Santa Margarita has a long history of being identified as a safe community with very low criminal activity. Thus, the probability of future occurrences is considered low.

Hazardous Materials

Rancho Santa Margarita has experienced hazardous releases historically, and includes several facilities that manufacture, transport, or use hazardous materials. To effectively manage hazardous materials and waste, the City implements applicable policies and regulations from the County, State and federal government. The City implements applicable portions of the Orange County Hazardous Materials Area Plan and the Orange County Hazardous Waste Management Plan. Both the federal government and the State require all business that handle more than a specified amount of hazardous materials or extremely hazardous materials, termed a reporting quantity, to submit a business plan to the local Certified Unified Program Agency (CUPA). The CUPA with responsibility for the City is the Orange County Environmental Health Department. These business plans are submitted to the CUPA annually.

The City participates in a Household Hazardous Waste (HHW) collection program, set up by the County of Orange in accordance with the California Integrated Solid Waste Management Act of 1989. HHW drop-off facilities are located throughout the county. The City also participates in a recycling program operated under a private sector contract. Based on the data provided above, there is a medium probability of hazardous materials releases occurring in the City.

Terrorism/Mass Attack

The probability of a terrorist attack in Rancho Santa Margarita is low; however, terrorism incidents can occur without warning. Though use of weapons for terrorism may be rare, the prevalent use of computers and the internet for cyberterrorism and the relative ease of bioterrorism increase the likelihood of a terrorism incident.

Unexploded Ordnance (UXO)

Due to the City and O'Neill Regional Park being located adjacent to and in some areas overlapping portions of the former Trabuco Bombing Range and previous ordnance removal activities, the likelihood of an unexploded ordnance being within the area is high. However, the actual probability of an unexploded ordnance being detonated is

considered low due to education and a public safety campaign notifying the public of what to do and what not to do in the event of discovery.

CHANGING WEATHER PATTERNS

Arson

Arson is a human caused hazard and is not correlated with changing weather patterns. However, changing weather patterns may make arson fires more devastating by increasing temperatures and decreasing humidity during the fire season. Plant based fuel may increase, providing more material for arson fires to turn into wildfires.

Hazardous Materials

Hazardous materials releases are typically caused by accidental conditions, which are not correlated with changing weather patterns. However, hazardous materials releases can result from a natural hazard event such as a wildfire or severe weather event. Changing weather patterns may cause an increase in the number of these events in Rancho Santa Margarita. Hazardous materials releases during wildfire and severe weather events can spread contamination to large geographic areas and amplify long-term impacts to human and ecological health.

Terrorism

The interaction of natural hazards and changing weather patterns can increase the frequency and severity of events. Significant and prolonged conditions can cause conflicts regarding natural resources and livelihood insecurity, as well as food insecurity or water scarcity. Terrorist groups can recruit and operate more easily in fragile and conflict-affected environments.[29]

Unexploded Ordnance (UXO)

Unexploded ordnance is related to historical conditions associated with the use of the devices for training, which are not correlated with changing weather patterns.

[29] Climate Diplomacy, *Insurgency, Terrorism and Organised Crime in Warming Climate*, https://www.climate-diplomacy.org/publications/insurgency-terrorism-and-organised-crime-warming-climate, accessed February 5, 2019.

4.2.5 LANDSLIDE/MUDFLOW

DESCRIPTION

When a hillside or other slope becomes unstable, the soil and rocks that make up the slope slide toward the bottom. Landslides are often sudden, although some occur very slowly over a long period of time. Loose and fractured materials are more likely to slide than compact materials or solid rock, and steep slopes are at greater risk than gentle rises. Areas that have been recently burned by wildfires are more susceptible to sliding because the fire destroys the plant cover that helps stabilize slopes.

Landslides are usually induced by either earthquakes or moisture. The shaking of an earthquake can decrease slope stability, or in a more severe instance, can fracture the earth material enough that it slides. Moisture-induced landslides can occur when the ground soaks up enough water that it becomes loose and unstable. This is often the result of intense or long-lasting rainfall but can also result from a pipeline burst or overwatering landscapes. In some cases, hillside erosion from rainfall can cause instability and result in landslides. If the slide is wet enough to become mud, the event is known as a mudslide or a mudflow.

Regardless of the cause or specific form, a landslide can damage or destroy structures built on the sliding material or in its path. Underground infrastructure, such as pipelines or telecommunication lines, may be severed during a landslide. This could lead to infrastructure-induced flooding if water pipes are broken. In addition to property damage, landslides can crush or bury people, creating a risk of serious injury or death.

LOCATION AND EXTENT

Figure 4-5 *Landslide Hazard Zones*, identifies landslide hazard zones within the City and surrounding area based on terrain, geologic, geotechnical and seismological data. These areas are susceptible to earthquake-induced landslide hazards and do not depict areas that could be at risk for moisture-induced landslides According to the County of Orange and Orange County Fire Authority Hazard Mitigation Plan, locations at risk from landslides or debris flows (mudflows) include areas with one or more of the following conditions:[30]

- On or close to steep hills

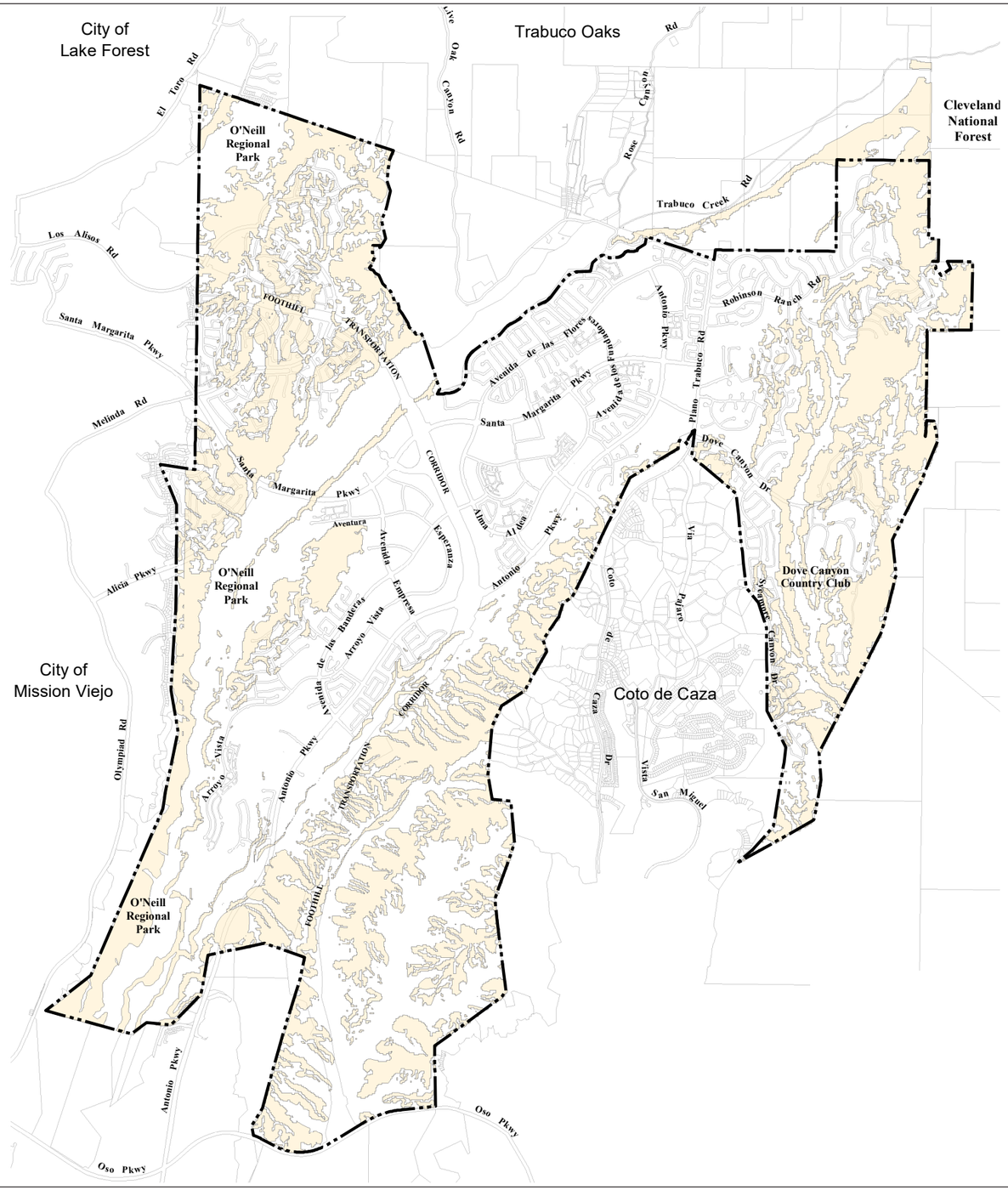
[30] County of Orange and Orange County Fire Authority, *Local Hazard Mitigation Plan*, adopted November 2015.

- Steep road-cuts or excavations
- Existing landslides or places of known historic landslides (such sites often have tilted powerlines, trees tilted in various directions, cracks in the ground, and irregular-surfaced ground)
- Steep areas where surface runoff is channeled, such as below culverts, V-shaped valley, canyon bottoms, and steep stream channels
- Fan-shaped areas of sediment and boulder accumulation at the outlets of canyons
- Canyon areas below hillside mountains that have recently (within 1 to 6 years) been subjected to wildfire

Areas of steep slopes and the creeks that convey surface runoff from the community serve as locations at risk for landslides and mudflows within Rancho Santa Margarita. The City's location within and adjacent to high wildfire hazard areas also makes it more susceptible to experiencing landslides and mudflows associated with heavy rain events following a wildfire event.

Landslides and mudflows have different predictability and velocity levels depending upon the nature and location of the event. Slow landslides may damage structures and infrastructure and are difficult to stabilize due to their large size. However, slow landslides allow people to evacuate before there is the danger of loss of life. Landslides and mudflows with high velocity can destroy structures or other lifeline utilities and can cause significant loss of life or injury. The severity of a landslide is often measured by the amount of material that slides (e.g., in cubic feet).[31] Mudflows tend to be more fluid and because they flow down a stream or creek, they can extend beyond the community in which they originated. Mudflows can occur suddenly without time for adequate warning and reach 100 miles per hour. Monitoring of weather conditions and understanding historic fire conditions within the area can help to identify conditions in which mudflows are likely.

[31] U.S. Geologic Survey, *The Landslide Handbook – A Guide to Understanding Landslides*, https://pubs.usgs.gov/circ/1325/pdf/Sections/Section1.pdf, accessed February 1, 2019.



LEGEND

- City Boundary
- 1 Critical Facilities
- 3 Facilities of Concern
- Landslide

Refer to Table 3-6 for details regarding Critical Facilities and Facilities of Concern

Sources: Orange County Land Base, 2001; City of Rancho Santa Margarita Local Hazard Mitigation Planning Team, 2019

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09/19 | JN 169696

Landslide Hazard Zones

Figure 4-5

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PREVIOUS OCCURRENCES

No significant landslides have occurred within Rancho Santa Margarita in City history. There was one isolated slope failure incident in Bell Canyon (2010) which covered a street with five to six feet of mud. This event was caused by heavy rains and dead plant materials which blocked drainage facilities and was remediated. Mudflows have historically occurred within the Trabuco Canyon area during and after heavy storms. A recent example occurred in November 2018, when a late fall storm on the Holy Fire burn scar turned Trabuco Creek into a river of mud, ash, and debris.[32] Prior to heavy storms, the City of Rancho Santa Margarita works proactively to close areas with mudflow potential and clear drainage channels, focusing on target areas to reduce damage associated with mudflows. The City also provides signs that warn people that Trabuco Canyon and the Holy Jim Canyon area are closed.

PROBABILITY OF FUTURE OCCURRENCES

Landslides and mudflows are considered to have a medium probability of occurring in the City. Several steep slopes are noted as landslide hazard zones in Rancho Santa Margarita, where the probability of landslides is higher. Additionally, landslides can be caused by earthquake activity, which was determined to have a high probability of occurring in the City. Areas that have experienced fires and loss of vegetation could experience landslide or mudflow events associated with heavy rain conditions.

CHANGING WEATHER PATTERNS

There is no known link between weather patterns and seismic activity, and therefore changing weather patterns are not expected to directly affect earthquake-induced landslides. In southern California, changing weather patterns are anticipated to decrease overall precipitation levels and cause more frequent drought conditions, but

[32] ABC7 Eyewitness News, *Trabuco Creek turns into raging river of mud amid rain storm,* https://abc7.com/weather/video-trabuco-creek-turns-into-raging-river-of-mud-amid-storm/4791668/, published November 29, 2018, accessed March 20, 2019.

there is also a possibility of increased frequency of intense storms. Drought conditions cause soil to dry out over time, reducing the ability for soils to absorb precipitation when storms occur. Decreased absorption can result in increased amounts of runoff with the potential for landslide and/or mudflow conditions. More significant or frequent storm events can also result in more precipitation to be absorbed by the soil of slopes in Rancho Santa Margarita and could destabilize hillsides and cause an increase in the frequency of landslide events or mudflows. Increased temperatures and dry conditions associated with changing weather patterns can also result in wildfires. When wildfires burn through an area, they often cause devegetation and destabilization of soil that can also result in landslides or mudflows during intense storm events.

4.2.6 PEST MANAGEMENT AND DISEASE

DESCRIPTION

Pest Management

Pests can include disease, insects, or weeds that cause costly and irreparable harm to natural resources. Methods to manage these problems includes integrated pest management, that couples the use of pesticides and biological pest control and monitoring to reduce the overuse of pesticide applications.[33]

A pest of major concern in Orange County is the Invasive Shot Hole Borer (ISHB), an invasive beetle that attacks dozens of common native and landscape trees. ISHB is a general term for two related shot hole borer beetles, the Polyphagous Shot Hole Borer (PSHB) and Kuroshio Shot Hole Borer (KSHB). Trees particularly susceptible to ISHB infestations include California sycamore, oak, willow, cottonwood, and maple. The ISHB tunnels into host trees and spreads Furasrium Dieback (FD), a fungus that disrupts the transport of water and nutrients, ultimately leading to tree decline or death. Infested tree material must be removed and properly disposed to prevent ISHB from infecting nearby trees. It is believed that ISHB was introduced into southern California via products or shipping material from southeast Asia. However, the specific origin is unclear.[34]

Disease

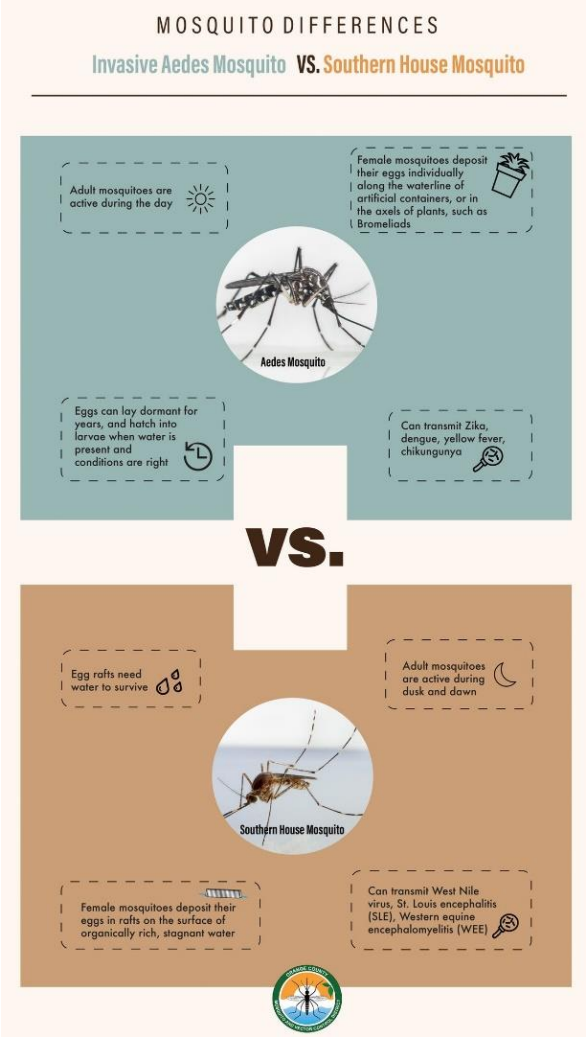
Disease can spread during a public health crisis, an occurrence or imminent threat of an illness or health condition that affects humans in one or more geographic areas. A public health crisis can be caused by natural or human caused factors and can be either infectious or noninfectious. Disease poses a substantial risk of human fatalities or permanent/long-term disabilities, along with a significant impact on the economy. Factors such as age, illness, diet, alcohol use, pregnancy, medical or nonmedical drug

[33] U.S. Department of Agriculture – National Institute of Food and Agriculture, *Pest Management*, https://nifa.usda.gov/topic/pest-management, accessed February 6, 2019.
[34] University of California, Agriculture and Natural Resources, *Invasive Shot Hole Borers*, https://ucanr.edu/sites/pshb/, accessed February 6, 2019.

use, immunity level, and general health condition all affect a person's sensitivity to disease in a public health crisis.[35]

Diseases can spread in Orange County through vectors – defined as "any insect or other arthropod, rodent, or other animal of public health significance capable of harboring or transmitting the causative agents of human disease, or capable of causing human discomfort and injury." Specific vectors of concern include rats, mosquitos, flies and Red Imported Fire Ants. Diseases of concern include West Nile virus, flea-borne typhus, and spotted fever. OC Vector Control routinely tests for the presence of Lyme disease in local tick populations and has not experienced any confirmed locally acquired human cases of Lyme. Additionally, Zika, yellow fever and dengue can be transmitted through mosquitos, but there have been no recent cases of these diseases being transmitted locally in California.

Figure 4-6
Invasive Aedes Mosquito vs. Southern House Mosquito



A new mosquito species has been identified by the Orange County Mosquito and Vector Control District, the invasive Aedes mosquitos. Unlike other native types of mosquitos, Aedes can lay their eggs in small containers of water even as small as a bottle cap filled with water. They are also extremely aggressive and active during the day, which is atypical of southern California mosquito behavior. Refer to Figure 4-6 for a comparison between the invasive Aedes mosquito and standard southern California mosquitos. Aedes mosquitos can transmit Zika, dengue, chikungunya and yellow fever; however, as discussed above, there are no recent cases of these viruses being transmitted locally. Aedes mosquitos have not been documented in Rancho Santa Margarita but have been identified in nearby City of Mission Viejo. Orange County Mosquito and Vector Control District coordinates with the City for educational and prevention purposes.[36]

[35] Humanitarian Health Action, *Definitions: emergencies*, https://www.who.int/hac/about/definitions/en/, accessed February 6, 2019.
[36] Orange County Mosquito and Vector Control District, *Invasive Aedes Mosquitos,* https://www.ocvector.org/invasive-aedes-mosquitoes, accessed March 25, 2019.

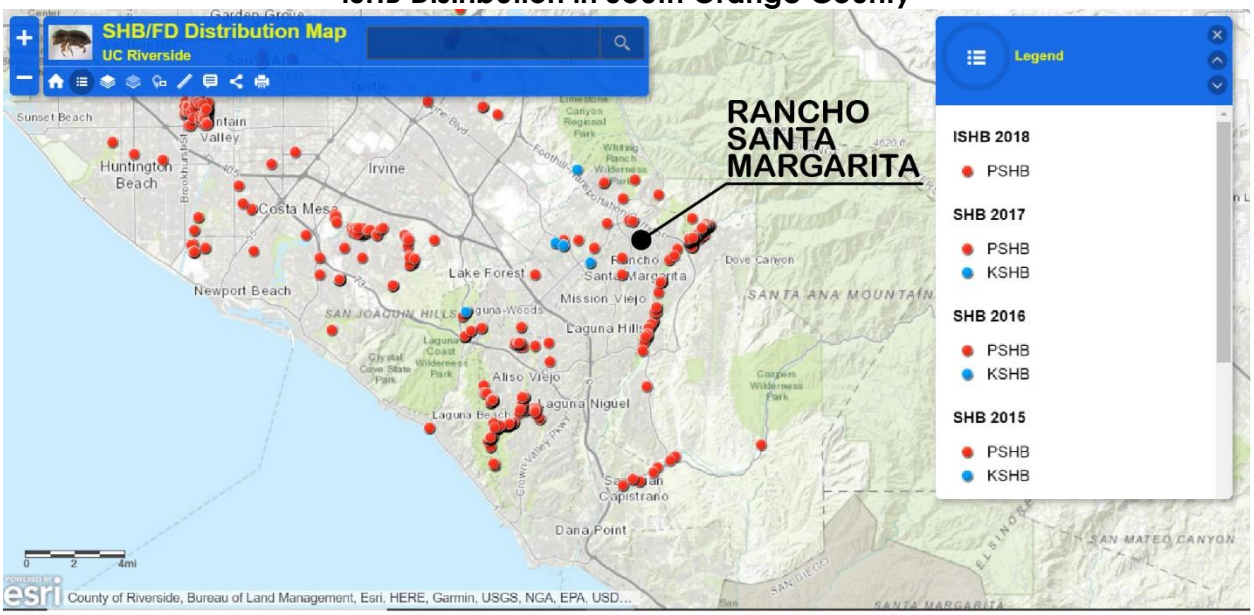
LOCATION AND EXTENT

Pest Management

ISHB is identified throughout Orange County, and infestations are concentrated in Rancho Santa Margarita within O'Neill Regional Park. There have been a few instances of ISHB infecting ornamental landscape outside of the regional park boundaries. Refer to Figure 4-7, *ISHB Distribution in South Orange County*, for mapped ISHB locations within the City and surrounding communities.

The speed of infection and the widespread infestation of ISHB is unprecedented, and experts are still working toward understanding the full extent of this pest. The US Forest Service estimated that ISHB could kill as many as 27 million trees in the southern California region, or roughly 38 percent. The economic loss of ecosystem services provided by those trees, including energy conservation, air quality improvement and carbon storage, would generate a cost of over 600 million annually. Thus, the severity of the ISHB infestation is considered high due to the biological and economic impacts already incurred and anticipated in the future.[37]

Figure 4-7
ISHB Distribution in South Orange County



SHB = Shot Hole Borer **PSHB = Polyphagous Shot Hole Borer**
FD = Fusarium Dieback **KSHB = Kuroshio Shot Hole Borer**

Source: UC Riverside, *SHB/FD Distribution Map*, http://ucanr.maps.arcgis.com/apps/Viewer/index.html?appid=3446e311c5bd434eabae98937f085c80, accessed February 6, 2019.

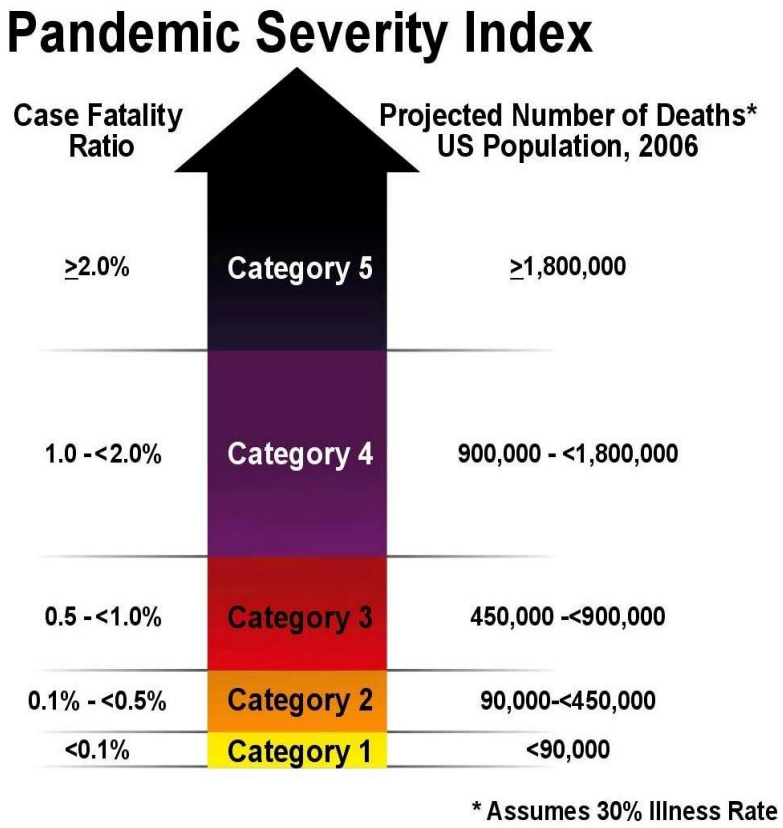
[37] University of California, Agriculture and Natural Resources, *Invasive Shot Hole Borers*, https://ucanr.edu/sites/pshb/, accessed February 6, 2019.

Disease

A public health crisis involving either infectious or non-infectious diseases can originate anywhere in the City or region and can spread through the population of Rancho Santa Margarita. A crisis can spread rapidly at places of congregation, such as schools, commercial centers, or places of worship.

The Centers for Disease Control and Prevention (CDC) Pandemic Severity Index ranks outbreaks of disease using categories of increasing severity; refer to Figure 4-8. The goal of the index is to provide guidance as to what measures various organizations can enact that will slow down the progression of a pandemic, easing the burden of stress upon community resources while solutions, like drugs and vaccines, can be brought to lessen the impacts of the situation. [38]

Figure 4-8
Pandemic Severity Index



Source: CDC, Mitigation Slides, https://www.cdc.gov/media/pdf/MitigationSlides.pdf, accessed February 6, 2019.

[38] Centers for Disease Control and Prevention, *Pandemic Severity Assessment Framework*, https://www.cdc.gov/flu/pandemic-resources/national-strategy/severity-assessment-framework.html, accessed February 6, 2019.

PREVIOUS OCCURRENCES

Pest Management

There is no precedent for the ISHB infestation within the City. Borer beetles were identified in the City between 2016-2017, and within the southern California region around 2003. There are no known previous occurrences prior to this discovery, and there is no comparable pest in existence within Orange County.

Disease

There is no history of major public health crises or major vector borne disease outbreaks in the City of Rancho Santa Margarita.

PROBABILITY OF FUTURE OCCURENCES

Pest Management

ISHB is likely to continue spreading within the City and southern California region, due to the existing distribution. Management techniques currently involve removal of infested material; there is no known way to eradicate either the beetle or the fungus once a tree is infected. The University of California is leading research efforts to better understand the beetle and identify eradication techniques. Until then, the probability of future occurrences within Rancho Santa Margarita is high.

Disease

As public health crises can result from local, regional, or global factors, and are difficult to predict, there is a medium probability of future occurrences in Rancho Santa Margarita. The regulations related to reporting and monitoring of agents that can lead to public health crises are robust, and early identification of these agents reduces the risk of a crisis. Additionally, the Orange County Vector Control District regularly conducts field surveys to determine presence of vector-borne disease. The probability of future occurrences within Rancho Santa Margarita is high.

CHANGING WEATHER PATTERNS

Pest Management

ISHB is not connected to changing weather patterns. However, ISHB is causing the death of native trees within the City of Rancho Santa Margarita which could cause an increase in fuel material for future wildfires associated with increased temperatures and drier conditions. Additionally, the loss of native habitat can also exacerbate flooding or erosion issues within the City especially during heavy rain events.

Disease

Changing weather patterns can have significant impacts on public health and has the potential to be a cause of a public health crisis. Warming trends could facilitate higher

rates of climate-related illnesses and death. Food-borne, water-borne and vector-borne infections and diseases have the capacity to spread more quickly.

Changing weather patterns can also exacerbate droughts and biodiversity loss, resulting in food shortages and affecting public health. Environmental disasters related to changing weather patterns such as heavy rainfall and flooding can be breeding grounds for disease-causing insects, especially mosquitos leading to malaria, as well as pollution of water causing a public health crisis.[39]

4.2.7 SEISMIC HAZARDS

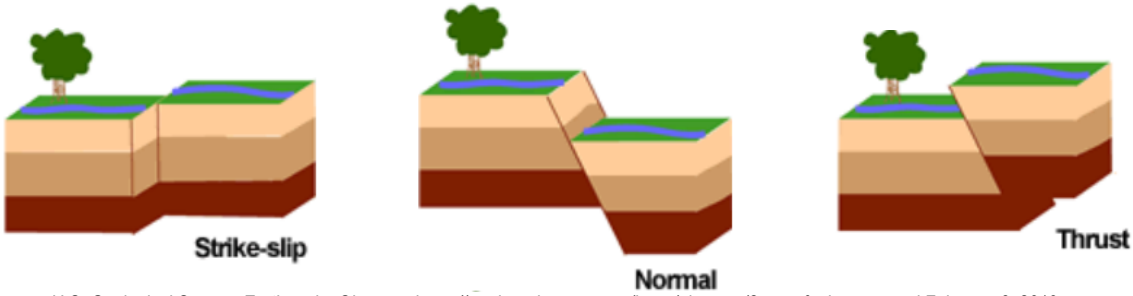
DESCRIPTION

Earthquakes

The US Geological Survey (USGS) defines an earthquake as a sudden slip on a fault and the resulting ground shaking and radiated seismic energy caused by the slip (or any other sudden stress changes in the earth).[40] Faults are fractures along the earth's crust between two blocks of earth and can be defined as a strike slip, normal, or thrust faults, as depicted in Figure 4-9, below.

Fault movement can occur rapidly, in the form of an earthquake, or may occur slowly, in the form of creep. During an earthquake, the rock on one side of a fault suddenly slips with respect to the other. Earthquakes occur without warning and result in effects such as ground motion, surface faulting, and ground failure (including liquefaction and landslides), described below.

Figure 4-9
Types of Faults



Source: U.S. Geological Survey, *Earthquake Glossary*, https://earthquake.usgs.gov/learn/glossary/?term=fault, accessed February 6, 2019.

Ground Motion

Ground motion is seismic shaking (vibration) of the ground during an earthquake. When a fault ruptures, seismic waves radiate and cause the ground to vibrate. The severity of

[39] University of Nevada, Reno, *The Public Health Response to Climate Change*, https://onlinedegrees.unr.edu/blog/the-public-health-response-to-climate-change/, accessed February 6, 2019.
[40] U.S. Geologic Survey, *Earthquake Glossary*, https://earthquake.usgs.gov/learn/glossary/?term=earthquake, accessed January 30, 2019.

the vibration increases with the amount of energy released and decreases with distance from the causative fault or epicenter. Soft soils can further amplify ground motion.[41]

Seismic shaking can be strong enough to result in widespread devastation or virtually undetectable by the average person. The intensity of seismic shaking is a result of the release by the fault rupture (how much of the accumulated stress was released), the length of the rupture (the longer the slip along the fault line, the greater the shaking), and the depth at which the rupture occurs (ruptures that occur closer to the surface often cause stronger shaking). Usually, areas closest to the site of the rupture experience the greatest shaking, although differences in geology and soil can also have an impact.

Seismic shaking can damage or destroy buildings and structures and may cause partial or total collapse. Ground movement can damage or destroy infrastructure on or beneath the surface, such as roads, rail lines, and utility lines and pipes. This in turn, can cause hazardous materials releases, water main breaks, and other dangerous situations resulting from infrastructure failure. Falling debris and structures also create a risk of personal injury or death.

Surface Faulting

Surface faulting is the differential movement of two sides of a fracture, where the ground breaks apart. The length, width, and displacement of the ground characterize surface faults, which occur based on the type of underlying fault.

Faults occur at the boundaries between large sections of the earth's surface, called tectonic plates. Most of California sits on the North American plate, but coastal areas (including Rancho Santa Margarita) are on the Pacific plate. The San Andreas Fault is the main boundary between North American and Pacific plates, but other fault lines can be found up to 200 miles away. The presence of the San Andreas Fault and other faults is the reason for California's frequent seismic shaking and other tectonic activity.

Liquefaction

Liquefaction is a phenomenon that occurs when ground shaking causes saturated soils, primarily clay-free deposits such as sand or silt, to lose strength and act like a viscous fluid. Certain soils are more susceptible to liquefaction, particularly younger and looser sediment closer to the water table. According to FEMA, liquefaction causes three types of ground failure, as described below:[42]

- Lateral spreads involve the lateral movement of large blocks of soil as a result of liquefaction of an underlying layer. They generally develop on gentle slopes, most commonly between 0.3 and 3 degrees. Horizontal movements commonly are as much as 10 to 15 feet. However, where slopes are particularly favorable, and the duration of ground shaking is long, lateral movement may be as much as 100 to

[41] Ibid.
[42] Federal Emergency Management Agency, *Multi-Hazard Identification and Risk Assessment - Subpart D: Seismic Hazards*, published January 1, 1997.

150 feet. Lateral spread usually breaks up internally, forming numerous fissures and scarps.

- Flow failures consist of liquefied soil or blocks of intact material riding on a layer of liquefied soil and are the most catastrophic type of ground failure caused by liquefaction. They commonly move several feet and up to dozens of miles under certain conditions. Flow failures usually form in loose saturated sands or silts on slopes greater than three degrees.

- Loss of bearing strength occurs when the soil supporting buildings or other structures liquefies. When large deformations occur, structures settle and tip. The general subsurface geometry required for liquefaction-caused bearing failures is a layer of saturated, cohesionless soil that extends from near the ground surface to a depth equal to about the width of the building.

Landslides

Earthquakes can create stresses that contribute to landslides. Landslides can include a variety of ground movement, such as rock falls, slope failures, and debris flows. While earthquakes can cause landslides, other causes can include erosion, soil saturation, excess weight from accumulation of rain or snow, or man-made structures weakening slopes. Thus, landslides are profiled separately.

LOCATION AND EXTENT

The City is located within the southern California region, known to be seismically active. No active faults are known to pass through Rancho Santa Margarita. The closest active faults are the Elsinore-Glen Ivy fault (10.1 miles away), the Chino fault (11.1 miles away), and the Newport-Inglewood fault (14.4 miles away), as discussed below.

- Elsinore Fault Zone (Elsinore-Glen Ivy Fault). The Elsinore Fault follows a general line easterly of the Santa Ana Mountains into Mexico. The main trace of the Elsinore Fault zone is approximately 112 miles long. The last major earthquake on this fault occurred in 1910 (magnitude 6.0), and the interval between major ruptures is estimated to be about 250 years. The Southern California Earthquake Center (SCEC) reports probable earthquake magnitudes for the main trace of the Elsinore fault to be in the range of 6.5 to 7.5.

- Chino Fault. The Chino Fault is a right reverse fault and is part of the Whittier-Elsinore Fault system which is located northeast of Chino Hills. The fault is approximately 17.4 miles long and extends from the Santa Ana Mountains northwest to the City of Pomona, where it joins the San Jose Fault. SCEC reports probable earthquake magnitudes for the Chino fault to be in the range of 6.0 to 7.0. The last earthquake reported was on July 29, 2008, with a magnitude of 5.4.

- Newport-Inglewood Fault Zone. The Newport-Inglewood Fault extends from the Santa Monica Mountains southeastward through the western part of Orange County to the offshore area near Newport Beach and was the source of the destructive 1933 Long Beach earthquake (magnitude 6.4), which caused 120

deaths and considerable property damage. During the past 60 years, numerous aftershocks ranging from magnitude 3.0 to over 5.0 have been recorded. SCEC reports probable earthquake magnitudes for the Newport-Inglewood fault to be in the range of 6.0 to 7.4.

The two known local faults outside the City, the Aliso and Cristianitos, are thought to be inactive and are not zoned under the State's Alquist-Priolo Earthquake Fault Zone Act.

Liquefaction susceptibility is located along Trabuco Canyon and Tijeras Canyon Creek traversing through the City; refer to Figure 4-10, *Liquefaction Hazard Zones*. Additionally, most of the low-lying areas in Rancho Santa Margarita (primary located around surface waterways depicted in Figure 4-1) have a high liquefaction potential because of shallow ground water, within 50 feet of the ground surface. Liquefaction zones identify areas where the potential for liquefaction is relatively high, and in the event of development, would require detailed site-specific geotechnical investigations.

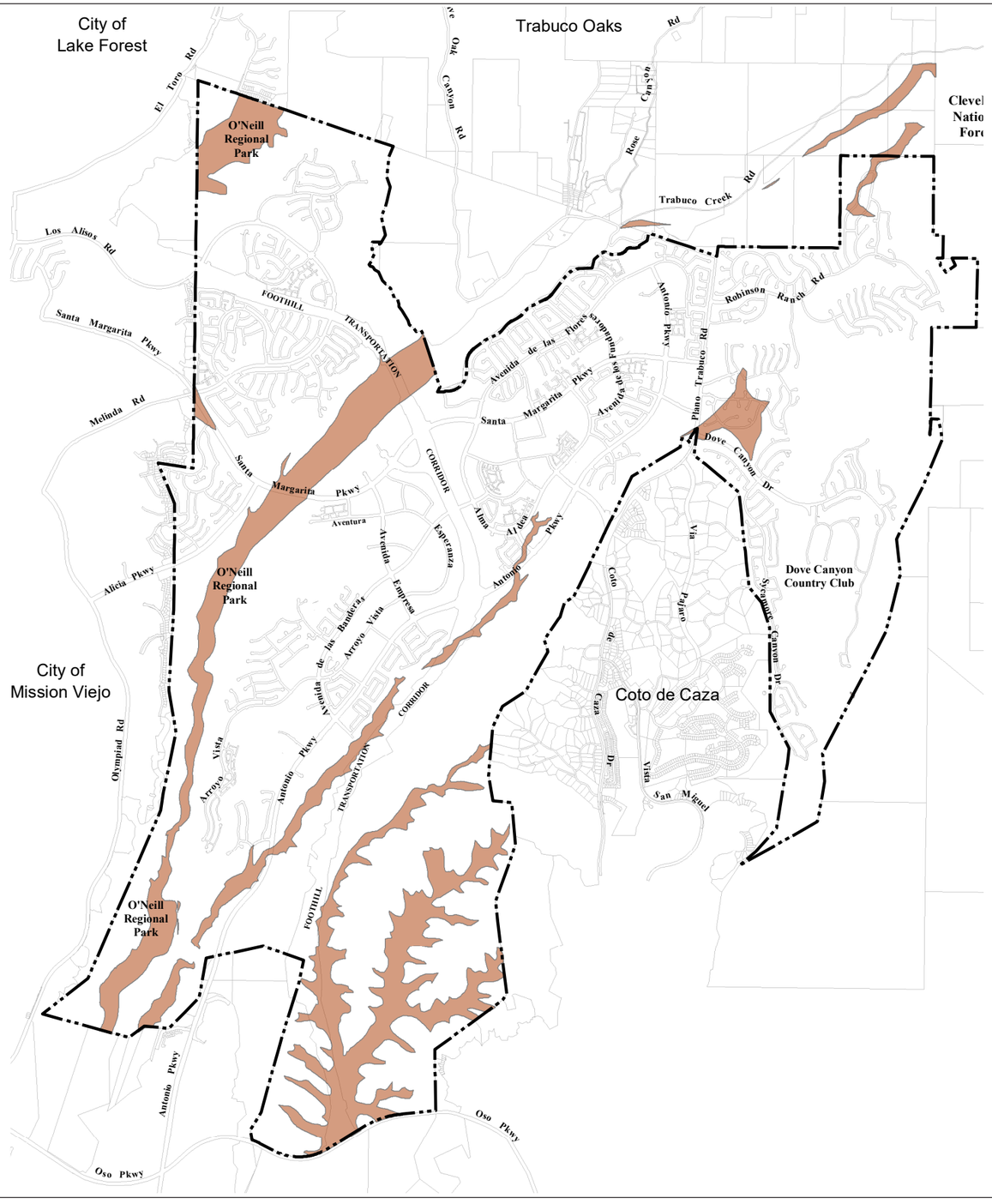
Ground shaking would be particularly damaging to residential buildings constructed of wood or reinforced masonry construction, and to mobile homes. Other buildings that do not typically perform well in earthquakes are soft-story buildings. These types of buildings have a story (typically the first floor) that lacks adequate strength or toughness due to too few shear walls. The most common measures of ground shaking during an earthquake event, the Richter Magnitude and Modified Mercalli Intensity scales are described below.

Richter Magnitude Scale

Seismic waves are vibrations from earthquakes that travel through the earth and are recorded on seismographs. Seismographs record a zigzag trace that shows the varying amplitude of ground oscillations beneath the instrument. The time, locations, and magnitude of an earthquake can be determined from the data recorded.

The Richter Magnitude Scale was developed by Charles Richter of the California Institute of Technology in 1935 to compare the size of earthquakes. The magnitude of an earthquake is determined from the logarithm of the amplitude of waves created by seismographs. Adjustments are included for variation in the distance between the various seismographs and the epicenter of earthquakes. Magnitude is expressed in whole numbers and decimal fractions beginning at zero with no upper limit, as described in Table 4-10, *Richter Scale of Earthquake Magnitude*. It should be noted that the Richter Scale does not express damage. An earthquake in a densely populated urban area may be lower on the Richter Scale but cause considerable damage when compared to a higher magnitude earthquake in a remote location.[43]

[43] U.S. Geological Survey, *The Severity of an Earthquake*, https://pubs.usgs.gov/gip/earthq4/severitygip.html, accessed January 30, 2019.



LEGEND

- City Boundary
- 1 Critical Facilities
- 3 Facilities of Concern
- Liquefaction

Refer to Table 3-6 for details regarding Critical Facilities and Facilities of Concern

0 2,400 4,800 Feet

Source: City of Rancho Santa Margarita General Plan, February 2008; City of Rancho Santa Margarita Local Hazard Mitigation Planning Team, 2019

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09/19 | JN 169696

Liquefaction Hazard Zones

Figure 4-10

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Table 4-10
Richter Scale of Earthquake Magnitude

Magnitude Level	Category
1.0–2.9	Micro
3.0–3.9	Minor
4.0–4.9	Light
5.0–5.9	Moderate
6.0–6.9	Strong
7.0–7.9	Major
8.0 or higher	Great

Source: Encyclopedia Britannica, *Richter Scale*, https://www.britannica.com/science/Richter-scale, accessed February 6, 2019.

Modified Mercalli Intensity Scale

The effect of earthquakes on the earth's surface is referred to as intensity. The intensity scale consists of a series of certain key responses such as people awakening from sleep, movement of furniture, damage to chimneys, and destruction. Although numerous scales have been developed to evaluate earthquake effects, the scale currently used in the United States is the Modified Mercalli Intensity Scale (MMI Scale). The MMI Scale was developed in 1931 by American seismologists Harry Wood and Frank Neumann. This scale, composed of twelve increasing levels of intensity ranging from imperceptible shaking to catastrophic destruction, is designated by Roman numerals I through XII. It does not have a mathematical basis and is an arbitrary ranking based on observed effects. The MMI level of intensity assigned to a specific location is a more meaningful measure of severity to the nonscientist than the magnitude because intensity refers to the effects actually experienced. Refer to Table 4-11, *The Modified Mercalli Intensity Scale*, for lists abbreviated descriptions of the twelve MMI intensity levels.

Table 4-11
The Modified Mercalli Intensity Scale

Intensity	Shaking	Description/Damage
I	Not felt	Not felt except by a very few under especially favorable conditions.
II	Weak	Felt only be few persons at rest, especially on upper floors of buildings.
III	Weak	Felt quite noticeably by persons indoors, especially on upper floors of buildings. Many people do not recognize as an earthquake. Standing motor cars may rock slightly. Vibrations similar to the passing of a truck. Duration estimated.
IV	Light	Felt indoors by many, outdoors by few during the day. At night, some awakened. Dishes, windows, doors disturbed; walls make cracking sound. Sensation like heavy truck striking building. Standing motor cars rocked noticeably.
V	Moderate	Felt by nearly everyone; many awakened. Some dishes, windows broken. Unstable objects overturned. Pendulum clocks may stop.
VI	Strong	Felt by all, many frightened. Some heavy furniture moved; a few instances of fallen plaster. Damage slight.
VII	Very Strong	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.
VIII	Severe	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.
IX	Violent	Damage considerable in specifically designed structures; well-designed frame structures thrown out of plumb. Damage great in substantial buildings, with partial collapse. Buildings shifted off foundations.
X	Extreme	Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations. Rails bent.

Source: U.S. Geologic Survey, *The Modified Mercalli Intensity Scale*, https://earthquake.usgs.gov/learn/topics/mercalli.php, accessed January 31, 2019.

Magnitude Intensity Comparison

Magnitude and intensity measure different characteristics of earthquakes but often correlate. Magnitude measures the energy released at the source of the earthquake, determined by measurements on seismographs. Intensity measures the strength of shaking produced by an earthquake at a certain location and is determined by effects on people, structures, and the natural environment. Refer to Table 4-12, *Moment Magnitude and Modified Mercalli Intensity Scale Comparison*, lists the intensities that are typically observed at locations near the epicenter of earthquakes of different magnitudes.

Table 4-12
Moment Magnitude and Modified Mercalli Intensity Scale Comparison

Moment Magnitude	Typical Maximum Modified Mercalli Intensity
1.0–3.0	I
3.0–3.9	II–III
4.0–4.9	IV–V
5.0–5.9	VI–VII
6.0–6.9	VII–IX
7.0 or higher	VIII or higher

Source: US Geological Survey, Magnitude/Intensity Comparison, https://earthquake.usgs.gov/learn/topics/mag_vs_int.php, accessed January 31, 2019.

PREVIOUS OCCURRENCES

As discussed above, a variety of faults are located near the City of Rancho Santa Margarita. Table 4-13, *Major Earthquake Faults of Particular Concern*, identifies faults of concern and last major ruptures.

Table 4-13
Major Earthquake Faults of Particular Concern

Fault Name	Type of Faulting	Last Major Rupture	Slip Rate	Interval Between Major Ruptures	Probable Magnitudes
Elsinore	Right-lateral strike-slip	May 15, 1910 Magnitude 6.0 (no surface rupture)	Roughly 4.0 mm/year	Roughly 250 years	6.5–7.5
Newport-Inglewood	Right-lateral; local reverse slip	March 10, 1933 Magnitude 6.4 (no surface rupture)	0.6 mm/year	Unknown	6.0–7.4
San Andreas	Right lateral strike-slip	April 18, 1906 Magnitude 7.9	20 to 35 mm/year	Varies; between 20 and 300 years	6.8–8.0
San Jacinto	Right-lateral strike-slip; minor right-reverse	April 9, 1968 Magnitude 6.5	7 to 17 mm/year	Varies; between 100 and 300 years	6.5–7.5
San Joaquin Hills	Blind thrust	Unknown; potentially 1855	0.42 to 0.79 mm/year	Unknown	>7.0

Sources: Southern California Earthquake Center, *Significant Earthquakes and Faults,* http://scedc.caltech.edu/significant/fault-index.html, accessed February 6, 2019. Grant, Lisa B. et al, *Coastal Uplift of the San Joaquin Hills, Southern Los Angeles Basin, California, by a Large Earthquake since A.D. 1635,* Bulletin of the Seismological Society of America, Volume 92, No. 2, pp 590–599, March 2002.

Table 4-14, *Significant Historical Earthquakes in Southern California*, identifies major earthquakes that have occurred in southern California. Several of these earthquakes occurred prior to the City's incorporation in 2000; therefore, specific data regarding impacts to the City from these incidents is not available. However, the Northridge Earthquake and the Whittier Narrows Earthquake both resulted in major disaster declarations from the federal government, which included Orange County as a designated area.[44]

Table 4-14
Significant Historical Earthquakes in Southern California

Earthquake Name	Year	Estimated Magnitude
Wrightwood	1812	7.5
Los Angeles	1855	6.0
San Bernardino	1858	6.0
Elsinore	1910	6.0
San Jacinto	1918	6.8
North San Jacinto	1923	6.3
Long Beach	1933	6.4
San Fernando	1971	6.5
Whittier Narrows	1987	5.8
Newport Beach	1989	4.7
Northridge	1994	6.7
Chino Hills	2008	5.4

Source: Southern California Earthquake Data Center, *Significant Earthquakes and Faults*, http://scedc.caltech.edu/significant/index.html, accessed February 6, 2019.

The California Geological Survey does not identify any previous instances of liquefaction within the City limits or the larger Santiago Peak Quadrangle. [45]

Most recently, southern California experienced groundshaking during an earthquake on July 4, 2019 with an epicenter in Ridgecrest, CA (eastern California). The local magnitude of the earthquake was 6.4 and included a series of foreshocks and aftershocks. On July 6th, 2019, magnitude 7.1 earthquake occurred in the same location. The cause of the earthquake was determined to be a shallow strike slip faulting in the crust of the North America Plate. Minor groundshaking was experienced in Rancho Santa Margarita, and no damage in the City was reported. [46]

PROBABILITY OF FUTURE OCCURRENCES

Rancho Santa Margarita is in a known seismically active area, and thus the probability for future seismic hazard occurrences is considered high. Given the significant seismic shaking events in the region, it is certain that such events will continue. The southern California region has many fault lines (including major faults), and it is almost inevitable that a regional fault line will rupture in the foreseeable future and cause a major seismic shaking event. The USGS Uniform Earthquake Rupture Forecast Version 3 released in 2017

[44] Federal Emergency Management Agency, *California Northridge Earthquake (DR-1008)*, https://www.fema.gov/disaster/1008, accessed January 29, 2019.
[45] California Department of Conservation, Division of Mines and Geology, *Seismic Hazard Zone Report for the Santiago Peak 7.5-Minute Quadrangle, Orange County, California,* published 2002.
[46] United States Geological Survey, *M 7.1 – 18km W of Searles Valley, CA*, https://earthquake.usgs.gov/earthquakes/eventpage/ci38457511/executive, accessed July 8, 2019.

provides a perspective of the likelihood each California region will experience a magnitude 6.7 or larger earthquake in the next 30 years; refer to Table 4-15, *Los Angeles Region Earthquake Probabilities*, and Table 4-16, *Likelihood of One or More Earthquakes Occurring in the Next 30 Years in Orange County Region by Fault*.

Table 4-15
Los Angeles Region Earthquake Probabilities

Magnitude (greater than or equal to)	Average Repeat Time (years)	30-Year Likelihood of One or More Events
5.0	1.4	100%
6.0	10	96%
6.7	40	60%
7.0	61	46%
7.5	109	31%
8.0	532	7%

Notes:
1. M≥5 means magnitude greater than or equal to 5.0, and likewise for the other two magnitude thresholds.
2. The 30-year period measured by this report is 2014 to 2044.
3. A 30-year period is used as it is the typical duration of a homeowner mortgage.
4. Actual repeat times will exhibit a high degree of variability and will almost never exactly equal the average listed in the table above.

Source: U.S. Department of the Interior and U.S. Geological Survey, UCERF3: A New Earthquake Forecast for California's Complex Fault System Fact Sheet 2015-3009, March 2015.

Table 4-16
Likelihood of One or More Earthquakes Occurring in the Next 30 Years in Orange County Region by Fault

Magnitude	Elsinore Fault	Newport-Inglewood Fault	Southern San Andreas Fault	San Jacinto Fault	San Joaquin Hills Fault
M≥6.7	3.66%	0.70%	19.21%	5.41%	0.42%
M≥7.0	1.82%	0.63%	12.86%	5.39%	0.40%
M≥7.5	0.90%	0.20%	10.21%	5.28%	0.24%
M≥8.0	<0.01%	--	3.24%	2.75%	--

Notes:
1. M≥6.7 means magnitude greater than or equal to 6.7, and likewise for the other magnitude thresholds.
2. The 30-year period measured by this report is 2014 to 2044; a 30-year period is the typical duration of a homeowner mortgage.
3. Percentages for fault sections closest to Rancho Santa Margarita.

Source: U.S. Department of the Interior and US Geological Survey, *The Third California Earthquake Rupture Forecast (UCERF3)*, Google Earth file with fault probabilities, March 2015.

Based on the data above, and the historic occurrences of earthquake activity in southern California, it is concluded there is a high probability of future activity impacting the City of Rancho Santa Margarita.

CHANGING WEATHER PATTERNS

Earthquakes are caused by seismic activity, which is not correlated with changing weather patterns. However, changing weather patterns could bring more severe rain events increasing the amount of water saturation in loose soils. The increased saturation combined with an earthquake event could cause liquefaction or landslides to occur in the City.

4.2.8 SEVERE WEATHER

DESCRIPTION

Heavy Rains

According to the National Weather Service/National Oceanic and Atmospheric Administration, a severe thunderstorm must have at least one of the following: 1) hail that is one inch in diameter or larger; or 2) winds of 58 miles per hour or greater.[47] About 10 percent of thunderstorms in Orange County are classified as severe. They usually occur when cool, moist air moves in to break a prolonged hot spell. The storms are usually short-lived and infrequent. They are usually no more than a quarter of a mile wide. Over the interior mountain areas, storms are more intense, and they may become unusually severe on occasion at intermediate and high elevations. Although not defined as severe weather, Rancho Santa Margarita experiences heavy rain events that can result in localized flooding, mudflows, and fallen tree limbs or brush that block roadways and drainage systems.

Santa Ana Winds

Santa Ana winds push dry air from the inland deserts of California and the Southwest over the mountains between coastal California and the deserts. They are created when high pressure over the high desert of the Great Basin region causes winds on the southern side of high to blow from the east, toward the Pacific Ocean and lower air pressure offshore. The phenomenon occurs during the fall and early winter. These hot and very dry winds dry out vegetation, increasing the fuel available to feed fires. Gusty winds also fan flames and spread fire.[48]

Extreme Heat

Extreme heat conditions are defined as weather that is much hotter than average for a particular time and place, and sometimes more humid. The heat index is a measure of how hot it feels when relative humidity is factored into the actual temperature. High humidity can cause the heat index to increase drastically and create dangerous health conditions.[49]

Typically, the National Weather Service (NWS) issues Excessive Heat Warning/Advisory when the heat index is predicted to be 105°F or greater for two or more consecutive days, although the temperature cut-off varies for different regions.[50] Cal-Adapt identifies

[47] National Weather Service, *What Constitutes a Severe Thunderstorm*, https://www.weather.gov/bmx/outreach_svr, accessed February 4, 2019.
[48] Los Angeles Times, *Etymology of the name "Santa Ana winds"*, http://people.atmos.ucla.edu/fovell/LATimes_SantaAna.html, published January 2008, accessed February 4, 2019.
[49] Environmental Protection Agency and Center for Disease Control, *Climate Change and Extreme Heat: What You Can Do to Prepare*, https://www.epa.gov/sites/production/files/2016-10/documents/extreme-heat-guidebook.pdf, access February 4, 2019.
[50] California Environmental Protection Agency and California Department of Public Health, *Preparing California for Extreme Heat: Guidance and Recommendations*,

an extreme heat day or warm night as a day in a year when the daily maximum/minimum temperature exceeds the 98th historical percentile of daily maximum/minimum temperatures based on the historical data from 1961-1990 between April and October. For the City of Rancho Santa Margarita, the 98th percentile would be 93.3°F. Additionally, Cal-Adapt defines a heat wave as periods of four consecutive extreme days or warm nights when the daily temperature is above the extreme heat threshold.[51]

Power Outage

Power outages are a major secondary effect of severe weather events in Rancho Santa Margarita. During severe weather incidents, such as high winds Southern California Edison (SCE) may implement an operational practice called Public Safety Power Shutoffs (PSPS), to preemptively shut off power in high risk areas during potentially dangerous fire conditions. This program is designed to proactively prevent SCE facilities from starting a wildfire when winds and temperatures are high.

Strong Santa Ana winds, high temperatures, and low humidity are all severe weather conditions that could trigger a PSPS event. The frequency of PSPS events depends on weather and environmental factors, and SCE makes decisions based on internal thresholds, assessment of real-time information, and situational awareness data. SCE has met with the City of Rancho Santa Margarita and applicable community first responders to inform about PSPS protocol, including the location of circuits in the jurisdiction that may be shut off during a PSPS event.

When possible, SCE intends to notify customers prior to a PSPS event. When weather forecasts indicate extreme fire conditions, SCE begins predictive modeling to assess potential impact while monitoring weather watch alerts from the National Weather Service. Two days prior to extreme fire conditions forecasted, SCE would coordinate first with the local government, emergency management community, and first responders. A first notification would go out to customers 48 hours prior to the shut off, a second notification 24 hours prior, and a final notification with power shut off. It is noted that actual or sudden onset of extreme weather conditions could impact coordination and notification efforts.[52]

Outside of the PSPS events, there is the potential for power outages to occur within the City. SCE defines a major outage as a large unexpected outage caused by either accidents or natural disasters. While uncommon, loss of electrical power is a potential secondary effect of severe weather events.

https://www.climatechange.ca.gov/climate_action_team/reports/Preparing_California_for_Extreme_Heat.pdf, accessed February 4, 2019.

[51] Cal-Adapt, *Extreme Heat Days & Warm Nights*, https://cal-adapt.org/tools/extreme-heat/, accessed Feburary 4, 2019.

[52] Southern California Edison, *Public Safety Power Shutoffs*, https://www.sce.com/safety/wildfire/psps, accessed March 20, 2019.

LOCATION AND EXTENT

A heavy rain, Santa Ana wind, or extreme heat event would occur throughout the entire City of Rancho Santa Margarita. While PSPS would only affect certain circuits within the City, a major power outage could affect the entirety of the City, including public infrastructure such as water/wastewater, transportation facilities, and emergency services. Although most of Rancho Santa Margarita powerlines are located underground, they are connected to regional lines which are located aboveground. Therefore, power outages or interruptions could occur from events not directly impacting the City.

Heavy Rains

One of the indicators for a heavy rain season is the Oceanic Niño Index (ONI), used to monitor the El Niño-Southern Oscillation (ENSO). To calculate the ONI, scientists from the National Oceanic and Atmospheric Administration's (NOAA) Climate Prediction Center calculate the average sea surface temperature in the El Niño 3.4 region (area of the east-central equatorial Pacific Ocean) for each month, and then average it with values from the previous and following months. This running 3-month average is compared to a 30-year average. The observed difference from the average temperature in that region, whether warmer or cooler, is the ONI value for that 3-month "season". Based on the ONI, the El Niño (warm) and La Niña (cool) events in the tropical Pacific are categorized as weak, moderate, strong, or very strong.[53]

According to NOAA, Rancho Santa Margarita experiences an average of 16 inches of rain per year with a monthly average of 1.4 inches. Typically, the City's drainage systems have been able to accommodate heavy rain events, as the City proactively inspects, cleans, and clears catch basins and flow lines to prevent flooding and other issues in anticipation of a storm. Trabuco Canyon and Holy Jim Canyon are often proactively closed in anticipation of a rain event.

However, as discussed above under the Landslide/Mudflow Profile, in December 2010 an isolated slope failure, caused in part by heavy rains, occurred in Bell Canyon. During the week of December 16 – 23, 2010, record and historic rain levels were recorded in Orange County. During that week, Rancho Santa Margarita received over 19 inches of rain. In December 2018, the City experienced its wettest day with approximately 6.5 inches of rain. While some standing water occurred on local roadways/bridges, no major damage resulted. Heavy rains in combination with the Holy Fire burn scar, did result in mud, ash, and debris within Trabuco Creek, resulting in damage to Trabuco Canyon Road.

[53] National Oceanic and Atmospheric Administration, *Climate Variability: Oceanic Niño Index*, https://www.climate.gov/news-features/understanding-climate/climate-variability-oceanic-ni%C3%B1o-index, accessed February 6, 2019.

Santa Ana Winds

Hurricane winds are measured using the Saffir-Simpson Hurricane Wind Scale. Although hurricane events are not typical within Rancho Santa Margarita, the scale can be used to measure strong winds that are not associated with a hurricane event. The scale uses measurements in pressure, wind speed, and damage potential to identify the types of damage associated with sustained wind events; refer to Table 4-17, *Saffir-Simpson Hurricane Wind Scale*.

Table 4-17
Saffir–Simpson Hurricane Wind Scale

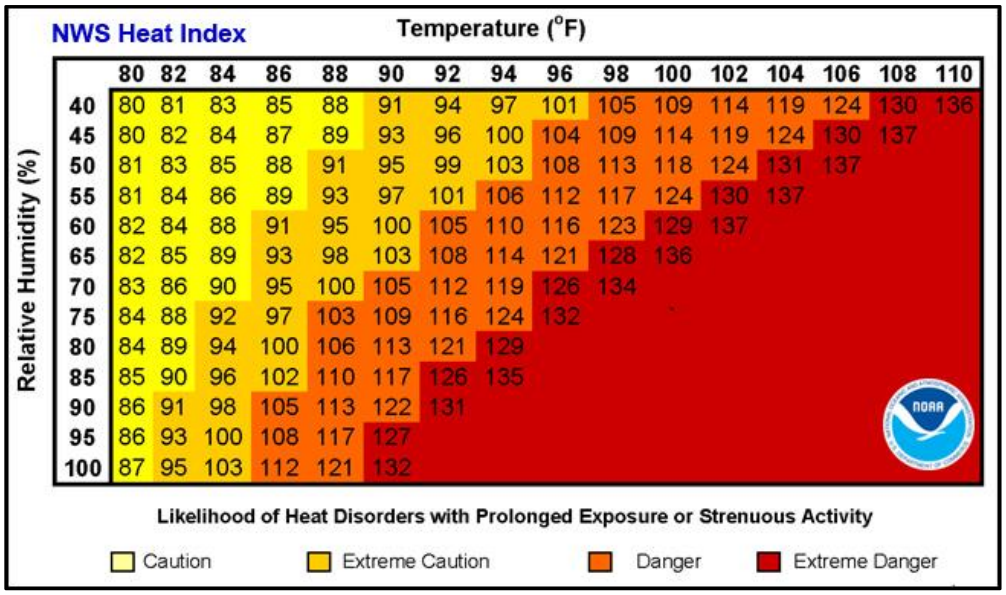
Category	Sustained Wind Speed	Description of Damages
1	74–95 mph	**Very dangerous winds will produce some damage:** Well-constructed frame homes could have damage to roof, shingles, vinyl siding, and gutters. Large branches of trees will snap, and shallowly rooted trees may be toppled. Extensive damage to power lines and poles likely will result in power outages that could last a few to several days.
2	96–110 mph	**Extremely dangerous winds will cause extensive damage:** Well-constructed frame homes could sustain major roof and siding damage. Many shallowly rooted trees will be snapped or uprooted and block numerous roads. Near-total power loss is expected with outages that could last from several days to weeks.
3	111–129 mph	**Devastating damage:** Well-built framed homes may incur major damage or removal of roof decking and gable ends. Many trees will be snapped or uprooted, blocking numerous roads. Electricity and water will be unavailable for several days to weeks after the storm passes.
4	130–156 mph	**Catastrophic damage:** Well-built framed homes can sustain severe damage with loss of most of the roof structure and/or some exterior walls. Most trees will be snapped or uprooted and power poles downed. Fallen trees and power poles will isolate residential areas. Power outages will last weeks to possibly months. Most of the area will be uninhabitable for weeks or months.
5	157 mph or higher	**Catastrophic damage:** A high percentage of framed homes will be destroyed, with total roof failure and wall collapse. Fallen trees and power poles will isolate residential areas. Power outages will last for weeks to possibly months. Most of the area will be uninhabitable for weeks or months.

Source: National Hurricane Center, *Saffir-Simpson Hurricane Wind Scale*, https://www.nhc.noaa.gov/aboutsshws.php, accessed February 6, 2019.

Extreme Heat

The Heat Index, which measures the "apparent temperature" when considering both air temperature and humidity, is used by the NWS to identify extreme heat days. Extreme heat is particularly dangerous when occurring for a prolonged period (heat waves). Figure 4-11, *Heat Index*, shows the likelihood of heat disorder with prolonged exposure or strenuous activity associated with various temperatures and relative humidity. As described above, the NWS indicates alert procedures when the Heat Index is expected to exceed 105°–110°F (depending on local climate).

Figure 4-11
Heat Index



Power Outage

SCE designates High Fire Risk Areas as areas with circuits within California Public Utilities Commission's (CPUC) Tier 2 (elevated risk) and Tier 3 (extreme risk) Fire Threat Areas. The CPUC Fire-Threat Map was developed with input from the U.S. Forest Service, California Department of Forestry and Fire Protection, and the State's investor-owned utilities, including SCE. SCE uses their own thresholds prior to initiating a PSPS event. When evaluating weather and environmental conditions, SCE considers a variety of factors which include but are not limited to:

- National Weather Service Red Flag Warnings
- SCE meteorological assessments
- SCE Fire Potential Index
- SCE Fire Scientist assessments
- Real-time situational awareness information
- SCE Fire Management/Office of Emergency Management input
- Concerns from local or State fire authorities
- Mandatory or voluntary evacuation orders in place
- Expected impact of de-energizing circuits on essential services (including public safety agencies, water pumps, traffic controls, etc.)
- Other operational considerations to minimize wildfire ignitions

PREVIOUS OCCURENCES

Heavy Rains

The rainy season in Rancho Santa Margarita traditionally occurs between November into early May; although severe rains have occurred during other times of the year when weather conditions permit. Refer to the Flood Hazard Profile for a summary of specific

regional storms that caused heavy rains in the City. In 2018/2019, the City experienced several rain events involving consecutive days of heavy rains. These events resulted in the proactive closure of Trabuco Canyon due to mudflows and areas of localized flooding because of the intensity and prolonged nature of the rain events.

Santa Ana Winds

Santa Ana winds occur annually between September to May in the City of Rancho Santa Margarita. These events have caused tree limbs to fall and debris to scatter, at times resulting in blocked roadways and storm drain systems.

Extreme Heat

Rancho Santa Margarita experiences an average of four extreme heat days per year, although some years over the past decades have seen as few as one or as many as 12 extreme heat days.[54] Most recently, in July and August 2018, the NWS issued excessive heat warnings throughout Orange County. Table 4-18, *Orange County Extreme Heat Events*, summarizes recent notable extreme heat events identified by the NWS in and around the forecast area. Some events from Los Angeles and surrounding areas are included. Events were included based on infrequency, severity and impact.

Table 4-18
Orange County Extreme Heat Events

Dates	Description
June 28–June 30, 2013	A heat wave on the order of a 20-year event enveloped the west and southern California. Death Valley reached the highest June temperature ever recorded in the United States: 129°F on June 30. Other desert cities like Palm Springs, Thermal, and Borrego Springs tied or set new June records and came within 1 degree of the all-time highest temperature on record on June 29.
April 30–May 1, 2014	On April 30, temperatures soared past 90°F along the coast, breaking many daily high temperature records. Winds kept the minimum temperature in Anaheim at 77°F. On May 1, temperatures at all lower-elevation stations were in the 90s, with Chula Vista topping the list at 100°F.
May 13–May 15, 2014	Strong high pressure and a strong late-season Santa Ana wind event combined to bring record high temperatures exceeding 100°F to most of the lower elevations on these days. Many all-time high temperature records for the month of May were broken. The hottest day was May 15 when it was 106°F in Yorba Linda and the San Diego Wild Animal Park.
March 13–March 16, 2015	Strong high pressure and Santa Ana conditions boosted temperatures into the 90s across the coast and valleys each day, with cooling only into the 60s at night. Numerous daily high maximum and daily high minimum records were set. The warmest day, on March 13, was 96°F in Santa Ana. Highest minimum temperatures were 68°F in Santa Ana and San Diego on March 15.
September 1-September 3, 2017	A strong high-pressure system stalled over the western US and allowed temperatures to rise into the triple digits. This heatwave was documented as the greatest statewide heat wave ever recorded in California (at the time). Readings soared above 110°F across the Central Valley, while in southern California, days of triple-digit heat fueled the largest wildfire on record in the City of Los Angeles (La Tuna Fire).
July 1 – July 6, 2018	A strong high-pressure system obliterated heat wave records across southern California, as part of the larger North American Heat Wave. Santa Ana recorded 114°F on July 6; Riverside tied a record at 118°F and UCLA recorded an all-time hottest record at 111°F. The Chino automated weather station recorded 120°F – the highest temperature ever recorded by any automated weather station in the valleys or coastal areas around Orange, Riverside, San Bernardino and San Diego counties. Additionally, several hottest all-time overnight low temperatures were recorded in Burbank (82°F) and Los Angeles (79°F).
Source: National Weather Service, A History of Significant Weather Events in Southern California, updated May 2017; Climate Signals beta, Southern California Heat Wave July 2018 and September 2017.	

[54] Cal-Adapt, *Extreme Heat Days and Warm Nights*, http://cal-adapt.org/tools/extreme-heat/, accessed February 4, 2019.

Power Outage

Rancho Santa Margarita has never experienced a City-wide power outage due to severe weather within the community. Most recently, on March 20, 2019 SCE conducted a planned power outage affecting 359 residential customers, 31 commercial customers and one traffic control meter. Advance notice was provided to SCE customers on March 14, advising that power could be off for the whole period; turned off more than once; may not begin exactly at the announced plan outage started time; and conditions may require the planned outage to be postponed. SCE provided a courtesy notice to the City which was posted on the City website "Newsflash" section.[55]

PROBABILITY OF FUTURE OCCURENCES

Based on previous occurrences and weather trends in southern California and the location of Rancho Santa Margarita in south Orange County, there is a medium probability that heavy rains, Santa Ana winds and extreme heat will occur within the City in the future.

CHANGING WEATHER PATTERNS

Changing weather patterns have direct effects on heavy rain events. According to research conducted by UCLA, California will experience extremely wet and extremely dry seasons by the end of the century. Climate scientists predict that "over the next 40 years, the State will be 300 to 400 percent more likely to have a prolonged storm sequence as severe as the one that caused the legendary California flood more than 150 years ago." With the population density and urbanization of Orange County, such a flood could be devastating for the City of Rancho Santa Margarita.

According to the California Adaptation Planning Guide, local heat waves are likely to occur much more frequently. Climate models project a significant rise in the number of days exceeding what is not considered extremely hot for Rancho Santa Margarita. The number of heat waves is very likely to increase because of changing weather patterns, reflecting the global trend.

SCE reports that increased power outages are directly related to changing weather patterns, and states on their website that PSPS will become "the new normal during high fire/wind events." PSPS will become increasingly required to mitigate fire risk as increased severity and duration of extreme weather events occur.

Additionally, changing weather patterns may result in storm events, Santa Ana winds and heat waves occurring outside of traditional seasons of the year. This could increase secondary effects, such as flooding, erosion, or wildfire events.

[55] City of Rancho Santa Margarita, *Planned Power Outage – Wednesday, March 20th*, http://www.cityofrsm.org/CivicAlerts.aspx?AID=378, accessed March 21, 2019.

4.2.9 WILDFIRE

DESCRIPTION

A wildfire is defined as an unplanned and unwanted wildland fire, including unauthorized human-caused fires, escaped wildland fire use events, escaped prescribed fire projects, and all other wildland fire where the object is to extinguish the fire. Wildfire is a natural part of the southern California ecosystem, helping to clear brush and debris, and is a necessary part of the various species' life cycles. Wildfires can be sparked by lightning, accidents, or arson.

At the same time, human activity has changed the buffer zone between urbanized and undeveloped areas, known as the wildland-urban interface, where naturally fire-prone landscapes abut developed neighborhoods. The natural setting of a wildland-urban interface can make these areas highly desirable places to live, and many of these areas in California are now developed. This development has brought more people into wildfire-prone areas. The availability of fuel and increasing encroachment into the wildland-urban interface have made wildfires a common and dangerous hazard in California. Certain development patterns pose more difficult fire problems. These include multi-story, wood frame, high-density apartment developments; multi-story research developments; large continuous developed areas with combustible roofing materials; and facilities that use and/or store hazardous materials. Features of structural conditions that affect fire control include the type and use of structure, area of building, number of stories, roof covering, and exposures to the building.

During wildfire season, SCE monitors weather conditions in fire prone areas. To prevent strong winds and extreme heat from causing fire accidents, SCE may proactively turn off power in a PSPS. Power outages as a secondary effect is discussed in detail within the Severe Weather Hazard Profile.

LOCATION AND EXTENT

CAL FIRE prepares wildfire hazard severity maps including mapping areas of significant fire hazards based on fuels, terrain, weather, and other relevant factors. These zones, referred to as Fire Hazard Severity Zones (FHSZ), define the application of various mitigation strategies and influence how people construct buildings and protect property to reduce risk associated with wildland fires. While FHSZ do not predict when or where a wildfire will occur, they do identify areas where

wildfire hazards could be more severe and therefore are of greater concern. Zones are designated on varying degrees from moderate, high, and very high. A large portion of land within the City is open space and includes rugged topography with highly flammable native vegetation, making wildland fires a significant risk to the community and within the City's sphere of influence (SOI). Very High Fire Hazard Severity Zones (VHFHSZs) are located in the west, south, and east areas of the City; refer to Figure 4-12, *Fire Hazard Severity Zones*. Additionally, these Fire Hazard Severity Zones are not limited to the City of Rancho Santa Margarita. Land designed within the VHFSZ is also located within the City of Mission Viejo and City of Lake Forest, immediately west of Rancho Santa Margarita. The Cleveland National Forest is located to the northeast of the City and is also designated a VHFSZ within the State Responsibility Area.

Fire protection challenges within Rancho Santa Margarita occur where development is located within and directly adjacent to wildland urban interface areas. As the number of structural features increase, so does the risk of incidence of fire. Wildfires are not measured on a specific scale and are usually classified by size or impact. The size and severity of any fire depends on the availability of fuel, weather conditions, and topography, although wildfires in the wildland urban interface do not need to be identified as large to be damaging. Due to the location of development within and adjacent to Moderate, High, and Very High Fire Hazard Severity Zones, there is the potential for a wildfire to spread quickly and through a large portion of the City, depending on the conditions and nature of the fire.

PREVIOUS OCCURRENCES

Major Fires in Orange County History

Fire season in southern California traditionally has occurred between May and September. However, it should be noted that Orange County has experienced some of its most devastating fires during the fall (outside of the traditional fire season), including the Laguna Fire and Freeway Complex Fire described below.

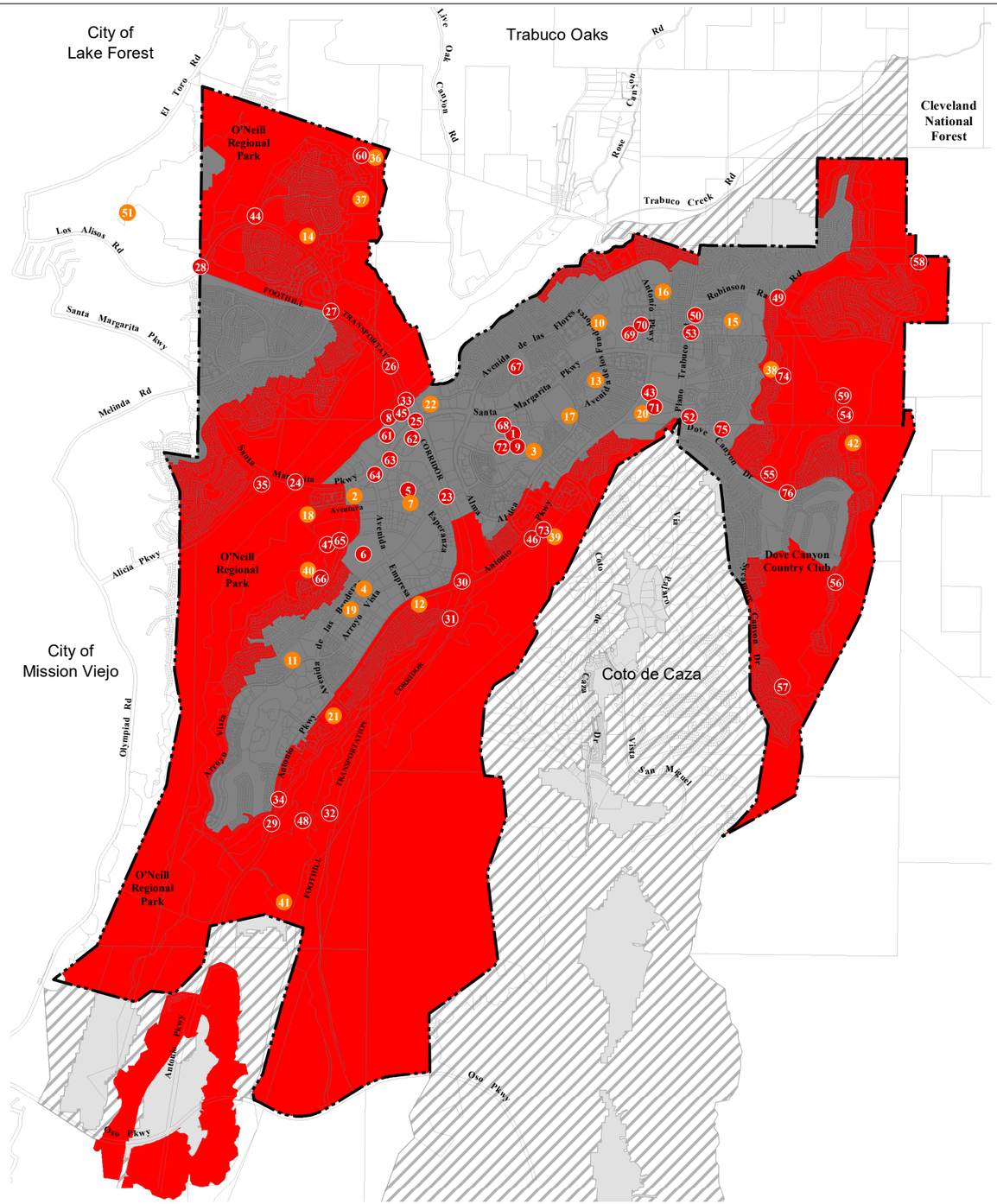
Table 4-19, *Recent Fires in Orange County*, summarizes wildfire activity in Orange County dating back to 1996. These fires have resulted in varying impacts with the amount of acreage ranging from three acres to over 23,000 acres. These fires have occurred both within and outside of what has been referred to as the traditional wildfire season.

In comparison to Table 4-19, Table 4-20, *Major Wildfires in Orange County History*, identifies the most significant historical fires in Orange County dating back to 1948 in terms of the amount of acreage claimed. As seen in Tables 4-19 and 4-20, the most recent fire, the Holy Fire, occurred in 2018 and claimed over 23,000 acres of land. As discussed below, the Holy Fire originated near Rancho Santa Margarita.

Table 4-19
Recent Fires in Orange County

Location	Name	Begin Date	Acres Claimed
Lemon Heights	N/A	10/21/1996	Unknown
El Toro MCAS	N/A	10/13/1997	6,000
Santiago Canyon	N/A	8/31/1998	9,000
Fountain Valley	N/A	12/9/1998	Unknown
Mission Viejo	N/A	12/27/1999	38
San Clemente	N/A	8/22/2000	Unknown
San Clemente	N/A	9/11/2000	500
Laguna Beach	N/A	8/7/2001	Unknown
El Toro MCAS	N/A	9/9/2001	30
Trabuco	N/A	1/23/2002	Unknown
Anaheim	N/A	2/9/2002	2,400
Yorba Linda	N/A	4/21/2002	Unknown
Mission Viejo	N/A	5/13/2002	1,100
Los Alamitos	N/A	5/14/2002	Unknown
Mission Viejo	N/A	5/14/2002	Unknown
Costa Mesa	N/A	7/16/2002	30
Garden Grove	N/A	7/29/2002	Unknown
Yorba Linda	N/A	11/20/2002	477
Mission Viejo	N/A	11/26/2002	3
Santa Ana Mountains	Sierra Fire	2/6/2006	10,854
Santa Ana Mountains	Windy Ridge Fire	3/11/2007	2,036
Santa Ana Mountains	Santiago Fire	10/21/2007	28,400
Santa Ana Canyon	Freeway Complex Fire	11/15/2008	30,305
Santa Ana Mountains	Long Canyon	9/23/2010	40
Santa Ana Mountains	Falls Fire	8/5/2013	1,416
Santa Ana Mountains	Silverado Fire	9/12/2014	1,600
Santa Ana Mountains	Canyon Fire	9/25/2017	2,662
Anaheim Hills	Canyon 2 Fire	10/9/2017	9,000
Aliso Viejo Canyon Park	N/A	6/2/2018	200
Trabuco Canyon	Holy Fire	8/6/2018	23,136

Sources: NOAA National Centers for Environmental Information, *Storm Events Database*, https://www.ncdc.noaa.gov/stormevents/, accessed January 29, 2019; InciWeb – Incident Information System, *Holy Fire*, https://inciweb.nwcg.gov/incident/6106/, accessed January 29, 2019.



LEGEND

- City Boundary
- Critical Facilities
- Facilities of Concern

Local Responsibility Area

- VHFHSZ
- Non-VHFHSZ

State and Federal Responsibility Area

- VHFHSZ
- Non-VHFHSZ

Refer to Table 3-6 for details regarding Critical Facilities and Facilities of Concern

Sources: CAL Fire FRAP October 2011; City of Rancho Santa Margarita Local Hazard Mitigation Planning Team, 2019

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Fire Hazard Severity Zone

Figure 4-12

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Table 4-20
Major Wildfires in Orange County History

Fire Name	Year	Acres Claimed
Green River	1948	53,079
Steward	1958	69,444
Paseo Grande	1967	51,075
Indian	1980	28,408
Owl	1980	18,332
Gypsum	1982	19,986
Laguna	1993	16,682
Ortega	1993	21,010
Sierra	2006	10,584
Santiago	2007	28,517
Freeway Complex	2008	30,305
Holy Fire	2018	23,136

Source: County of Orange and Orange County Fire Authority, *Local Hazard Mitigation Plan*, adopted November 2015.
NOTE: Major fires in Orange County are defined as burning more than 10,000 acres in total.

Some of the most significant fires in Orange County and within the Rancho Santa Margarita area are described below.

Holy Fire

The most recent fire in Orange County, the Holy Fire, originated in Trabuco Canyon/Holy Jim community in August 2018 and burned over 23,000 acres. The Holy Fire began on August 6, 2018, about 0.25-miles east-northeast from the confluence of Trabuco Canyon and Holy Jim Canyon and spread quickly to the rest of Trabuco Canyon and Riverside County toward Lake Elsinore, and north into Cold Water Canyon and Santiago Peak. Warm weather, low humidity, and Santa Ana winds contributed to the spread of the Holy Fire. Additionally, because the State was battling several fires in northern California, it took time for outside firefighting personnel to report in Orange County. The temperatures and low humidity, combined with the often steep and difficult terrain of the Santa Ana Mountains, created additional challenges in fighting the fire. Approximately 7,400 homes and 21,000 people were evacuated in these communities. Governor Jerry Brown declared a state of emergency for Orange and Riverside Counties.

The cause of the Holy Fire was determined to be arson; arson as a hazard is specifically discussed in the Human-Induced Hazards Profile. Five firefighters sustained injuries battling the fire, and at least 12 structures were destroyed. The fire did not ultimately reach Rancho Santa Margarita, as winds moved the fire through the Cleveland National Forest to Riverside County and away from Rancho Santa Margarita. Nevertheless, the City's air quality was degraded for several days, and flames and smoke from the Holy Fire were highly visible.[56]

Ultimately, out of the total of 22,877 acres, 3,290 acres were high soil burn severity (14 percent), 16,258 acres were moderate soil burn severity (71 percent), 1,780 acres were low burn severity (8 percent), and 1,549 acres were very low burn severity or unburned (7 percent). The fire removed vegetation that helps keep slopes intact, changed the structure and erosion potential of the soil, and altered the stability of the landscape. The

[56] CBS Local Los Angeles, *Crews Make Progress Against Arson-Sparked Holy Fire,* https://losangeles.cbslocal.com/2018/08/11/crews-make-progress-against-arson-sparked-holy-fire/, accessed January 29, 2019.

Holy Fire assessment concluded that slope instability within the burn area is associated with channels containing significant amounts of sediment or fire debris. Ground surveys and observations have determined that most drainages in the Holy Fire burn area are loaded with unsorted, unconsolidated materials, which is discussed further in the Landslide/Mudflow Hazard Profile.[57]

Canyon and Canyon 2 Fires

The Canyon fire began near Highway 91 in Orange County on September 25, 2017. The fire spread rapidly due to dry fuel conditions and very low humidity, and firefighting efforts were hindered by a transition from light Santa Ana Winds to onshore flow. This initially pushed the fire into the foothills before sending it back eastward toward Corona. The fire was estimated at 1700+ acres and was threatening residences; however, no structures were damaged. Winds calmed over the following days and the fire was quickly contained at 2,662 acres. The cause of the wildfire was determined to be a roadside flare.

The Canyon 2 fire began near the 91 Freeway and Gypsum Canyon Road in Anaheim Hills on October 9, 2017. The fire spread rapidly threatening numerous structures. In the first 24 hours the fire consumed more than 7,000 acres. In total, 25 structures were destroyed, 55 were damaged and 9,217 acres burned. Four injuries were also reported. The cause of the fire was reported to be embers from the Canyon Fire which began September 25 and was contained October 4, 2017.

Freeway Complex Fire

On November 15, 2008 a vegetation fire began at westbound State Route (SR) 91 and Green River Road. Erratic Santa Ana winds and low humidity caused the fire to spread in several directions, including north into Chino Hills State Park, south across SR 91 toward Anaheim, west into Yorba Linda, and northwest into the Carbon Canyon/Diamond Bar area. A secondary fire began at the Olinda Alpha Landfill, eventually merging with the Freeway Fire to become known as the Freeway Complex Fire.

The Freeway Complex Fire was contained in four days on November 2008, after burning over 30,000 acres and damaging/destroying over 381 homes, commercial structures, and other buildings. Numerous vehicles, municipal parks, and sensitive ecological areas were also damaged or destroyed. The cause of the fire is believed to be a faulty catalytic converter. At that time, the Freeway Complex Fire was the fourth largest fire in Orange County History.[58]

Laguna Fire

On October 27, 1993, a brush fire began near Laguna Canyon Road about one mile north of El Toro Road. Santa Ana winds pushed the fire in several directions including north into Crystal Cove State Park and south into Laguna Beach. By the time the fire was contained, 366 homes were destroyed, over 500 were damaged, and 17,000 acres were

[57] Schwartz and Stempniewicz, *Burned Area Emergency Response Assessment FINAL Specialist Report – Geologic Hazards for the Holy Fire, Cleveland National Forest*, published August 27, 2018.
[58] Orange County Fire Authority, *After Action Report Freeway Complex Fire*, November 15, 2008.

burned. While the Laguna Fire was not the largest fire to occur in Orange County, it is the deadliest fire in County history. Investigators determined that the fire was likely the result of arson but were ultimately unable to determine who started the fire.[59]

The Laguna Fire occurred several years prior to the incorporation of the City of Rancho Santa Margarita and the formation of the Orange County Fire Authority. The fire did not encroach into Rancho Santa Margarita; however, the fire was visible and smoke inundation was heavy.

Historical Wildfires Near Rancho Santa Margarita

Prior to the City of Rancho Santa Margarita's incorporation in 2000, several historical wildfires occurred within the vicinity; refer to Table 4-21, *Historical Wildfires in the Vicinity of Rancho Santa Margarita (1914–1980)*. While these fires occurred prior to urbanization of the community, it is important to document historical wildfire patterns within the area.

Table 4-21
Historical Wildfires in the Vicinity of Rancho Santa Margarita (1914–1980)

Fire Name	Alarm Date	Acres	Cause	Location/Vicinity
Unknown	1919	2,224.92	Unknown	Northeast of Rancho Santa Margarita
Unnamed	1925	8,649.89	Unknown	East of Rancho Santa Margarita (Riverside County)
Unnamed	1926	9,934.25	Unknown	North of Rancho Santa Margarita
Green River	11/09/1948	53,078.93	Unknown	North of Rancho Santa Margarita
Toro	07/23/1950	729.37	Unknown	Southeast of Rancho Santa Margarita
Jameson	08/30/1954	7,880.90	Unknown	East of Rancho Santa Margarita (Riverside County)
Cornwell	09/11/1956	3,172.69	Unknown	East of Rancho Santa Margarita (Riverside County)
Steward	12/14/1958	69,444.69	Equipment Failure	East of Rancho Santa Margarita
Indian	07/24/1966	1,404.84	Unknown	Northeast of Rancho Santa Margarita (Riverside County)
Nelson	05/15/1970	3,585.96	Unknown	Within and West of Rancho Santa Margarita

Source: OCFA Wildland GIS Application, *Historical Fires 1914–1980*, accessed March 20, 2019.

PROBABILITY OF FUTURE OCCURRENCES

Wildfires have a high probability of occurring due to the developed nature and geographic extent of the VHFHSZ within the City. Rancho Santa Margarita is continually exposed to Santa Ana winds during the fall season; however, these winds can occur at other times of the year as well. Additionally, with the recent Holy Fire, it is highly probable that fires of regional significance will occur in South Orange County, Riverside County, and San Bernardino County, that could impact the City of Rancho Santa Margarita. The wildland-urban interface is likely to experience wildfires in future years.

Further, Rancho Santa Margarita is located adjacent to other urbanized areas, and fires in neighboring jurisdictions could extend into the City. The recent fires in Orange County demonstrate the ability for a wildfire to begin in one place and spread to other cities or cross county lines.

[59] Laguna Beach County Water District, *1993 Fire Storm*, http://www.lbcwd.org/about-us/1993-firestorm#ad-image-0, accessed January 29, 2019.

CHANGING WEATHER PATTERNS

Several of the largest California wildfires have occurred in the past two years, including the Mendocino Complex Fire, Thomas Fire, and Carr Fire. During 2018, the Camp Fire became the deadliest wildfire in California history, killing 86 civilians and burning 153,000 acres in Butte County.[60] Southern California experienced several severe fires in recent history, including the Woolsey Fire and the Holy Fire.

Changing weather patterns are expected to cause an increase in temperatures, as well as more frequent and intense drought conditions. As mentioned previously, the severity of a wildfire is dependent on the amount of oxygen, heat, wind, relative humidity, and fuel. Excessive heat and low humidity during the summer and fall months are likely to occur. It is possible that higher temperatures could cause local native chaparral and scrub ecosystems to change to grasslands. This would increase dry plant matter, which could cause wildfires to move more quickly or spread into developed areas of Rancho Santa Margarita.

It is well documented that regional wildfires will likely become an increased threat, which could have secondary consequences for the City. Specifically, parts of Riverside and San Bernardino County could see wildfire risk increase between 50 and 100 percent. Wildfires release smoke, ash, and other particulate matter that substantially degrade air quality. Thus, fires located in different parts of Orange, Riverside, or San Bernardino counties can negatively impact air quality in the City.

4.3 VULNERABILITY/RISK ASSESSMENT

METHODOLOGY

For each of the hazards profiled in the previous section, a vulnerability/risk assessment is provided in this section. The vulnerability/risk assessment gives equal weight to all hazards, regardless of the hazards' probability. The specific hazard and its probability are considered as part of the mitigation prioritization, discussed in Section 5.0. It should be noted that the actual losses will depend on the type, location, magnitude, and extent of the hazard event.

This assessment considers the physical threat to the critical facilities and facilities of concern, as well as the physical threat to residential and non-residential structures. The threat to residential and non-residential structures is considered cumulatively; individual residences and non-residential buildings are not specifically identified. Similarly, the social threat to residents is generally discussed, as specific population data pertaining to vulnerable populations is not readily available. However, a hazard event may have different impacts on different people. Age, socioeconomic status, access to services, physical and mental conditions, and other conditions affect the ability to prepare for and respond to a hazard event. Senior citizens and those with disabilities are more likely to need assistance during and after a hazard event due to physical and/or mental

[60] CalFire, *Incident Information: Camp Fire,* http://cdfdata.fire.ca.gov/incidents/incidents_details_info?incident_id=2277, published January 4, 2019, accessed January 29, 2019.

disabilities, lower income levels, and reduced mobility/accessibility to services and resources. Disabled persons typically are unable to care for themselves completely and they rely on others. Lower-income households are less likely to have the financial resources to implement mitigation actions in their homes, and less likely to have the financial means to recover as a result of a hazard event. Due to the dynamic nature of hazards, the extent of impact can vary greatly. The assessment provides an overview and understanding of the risks and vulnerabilities associated with the hazards and serves as a basis for the mitigation actions.

The critical facilities and facilities of concern listed in Section 3.0, *Community Profile*, were mapped in GIS and overlaid with mapped hazard areas (those hazards that have a specific geographic area) to determine which assets are located in each hazard area. In addition to critical facilities, the number of residents and residential and non-residential structures within each of the mapped hazard areas was calculated. Hazard area and critical facility overlays were conducted for liquefaction, landslide (specific to seismic conditions), flood, and wildfires.

Due to the nature of the hazards and availability of information, hazard overlays were not prepared for dam/reservoir failure, drought, human-induced hazards, landslide/mudflow, pest management and disease, and severe weather.

Based on recent requirements, dam owners are required to submit inundation maps to the Department of Water Resources (DWR). Development of inundation mapping is currently underway and not available for incorporation into this LHMP. Available maps will be incorporated, as appropriate, upon the next LHMP update.

Drought, human-induced hazards, pest management and disease, seismic hazards (ground shaking), and severe weather are not geographically defined and have the potential to affect the entire community. There are no defined hazard areas for moisture-induced landslides and mudflows, although as discussed in the hazard profile, they have historically occurred along hillside areas and within the Trabuco Creek area, respectively.

For purposes of this LHMP, it is assumed dam/reservoir failure, drought, human-induced hazards, landslide/mudflow, pest management and disease, and severe weather could potentially impact the entire community, including the critical facilities.

Replacement and contents values for the facilities and the number of residents and residential and non-residential structures in each hazard area are provided to estimate the potential losses based on the method described above.

VULNERABILITY/RISK ASSESSMENT

Dam/Reservoir Failure

Dam and reservoir failures have the capacity to cause environmental damage, damage property, threaten human life, and displace persons residing in the inundation path. Because inundation mapping is not currently available, the area of potential impact is not currently known. The threat and extent of damage will depend upon the location of the dam or reservoir and the size and severity of the failure. A failure could damage

critical facilities and infrastructure (e.g., roads, water, wastewater, electricity, natural gas), resulting in short-term interruption or extended loss of surface, loss of business income, and displacement of individuals and businesses. A catastrophic dam failure, depending on the size of the dam and the population downstream, could exceed the response capability of public safety personnel and resources, or significantly impair their ability to respond.

A dam or reservoir failure could also impact more vulnerable populations, such as senior citizens and those who are disabled, as they may not have access to transportation to evacuate the area. Those with limited income and resources may experience greater difficulties in the event they need to leave the area for an extended period. Even if the City of Rancho Santa Margarita is not within an inundation path, there is the potential for the community to be impacted as damage to utility transmission lines and infrastructure could also impact communities outside of the immediate hazard area.

Drought

Drought conditions would affect all of Rancho Santa Margarita; therefore, all critical facilities, infrastructure systems, structures, and residents within the City are within the drought hazard area. Droughts do not typically result in physical damage to buildings and infrastructure. Prolonged drought conditions often result in stricter conservation measures, potentially impacting residents and business owners. Stricter conservation measures usually involve higher water rates or penalties for use above a specific threshold. These higher rates or penalties could disproportionately impact lower-income households and those residents on a fixed income.

Prolonged drought conditions can also cause impacts to the environment, resulting in dead or dried vegetation, drier soils, damage to wildlife habitat, and degradation of landscape quality. These conditions can increase the vulnerability of other hazards within the community, such as wildfires, insect infestations, and wind erosion.

Flood

Flood-prone areas within Rancho Santa Margarita, as identified by FEMA, are primarily located within and adjacent to creeks traversing the City. There are no buildings located within the 100-year floodplain. Four critical facilities are identified within the flood hazard area. These facilities consist of portions of roadways that bridge (span) the creeks and provide access in and out of the City. Table 4-22, *Facilities in a Flood Hazard Zone*, identifies the critical facilities within the flood hazard zone; there are no facilities of concern located within the flood hazard zone.

Table 4-22
Facilities in a Flood Hazard Zone

Map ID	Name	Type	Owner/Responsible Agency
24	Santa Margarita Bridge (1)	Transportation	City
26	241 Toll Road Bridge	Transportation	Caltrans
29	Antonio Parkway Bridge (1)	Transportation	Caltrans
31	241 Toll Road/Tijeras Creek Bridge	Transportation	Caltrans

A significant flood resulting in damage to any of these critical facilities could impact the entire community, as these structures provide the primary access into and out of the community. Residents with mobility challenges and those without access to transportation may have difficulty evacuating from a flood event. Damage to the roadways could hinder emergency response service and evacuations. Because the flood zones occur within and around the creeks, a flood could also result in debris flow downstream.

Repetitive Loss and Severe Repetitive Loss

Addressing risk to repetitive loss and severe repetitive loss structures is an important step in reducing the financial impact of flooding as repetitive losses require extensive disaster management resources and high NFIP claims.

FEMA defines a repetitive loss as any NFIP-insured structure that has had at least two (2) paid flood losses of more than $1,000 each in any 10-year period since 1978.

FEMA defines a severe repetitive loss as any NFIP-insured structure that has met one of the following paid flood loss criteria since 1978:

- four (4) or more separate claim payments of more than $5,000 each (Including building and contents payments); or
- two (2) or more separate claim payments (building payments only) where the total of the payments exceeds the current value of the property.

The City of Rancho Santa Margarita does not have any repetitive loss or severe repetitive loss properties.

Human-Induced Hazards

Human-induced hazards have the potential to affect all of Rancho Santa Margarita; therefore, all critical facilities, infrastructure systems, structures, and residents within the City are within the human-induced hazards area. Arson and terrorism are more likely to cause damage to structures and infrastructure systems. Although hazardous materials could result in damage to structures, it is more likely that a hazardous material spill would result in potential health hazards or closure of roadways or areas within the community surrounding the spill. Unexploded ordnances could cause damage to physical structures if they are moved from the O'Neill Regional Park area and are detonated. However, it is more likely that detonation would occur in the area of O'Neill Regional Park where it is discovered, and away from the built environment.

Anyone in the community is susceptible to harm associated with a human-induced hazard. The extent of harm or injury is highly dependent upon the nature of the hazard. Arson, terrorism, or hazardous materials could also damage the environment, impair air quality, and interfere with water quality. Damage to infrastructure systems, including water supplies and water/wastewater conveyance, power transmission, and natural gas systems could interrupt service or cause long-term outages. Damage to transportation systems could limit the ability for emergency services and other service providers to reach areas of the community.

Landslide/Mudflow

Within Rancho Santa Margarita, areas of steep slopes are at risk for landslides. Table 4-23, *Facilities in a Landslide Hazard Zone*, identifies the critical facilities and facilities of concern located within areas having the potential for earthquake-induced landslides.

Table 4-23
Facilities in a Landslide Hazard Zone

Map ID	Name	Type	Owner/ Responsible Agency	Total Loss Potential
Critical Facilities				
27	Melinda Road Bridge	Transportation	Caltrans	Not Available
32	Cañada Chiquita Bridge	Transportation	Caltrans	Not Available
44	Altisima Pump Station	Water Facility	SMWD	$1,908,092
47	Island Pump Station	Water Facility	SMWD	$2,091,587
55	Dove Dam	Dam	TCWD	$20,000,000
56	Bell Canyon Lift Station	Wastewater Facility	TCWD	$2,000,000
59	Robinson Ranch Wastewater Treatment Plant	Wastewater Facility	TCWD	$20,000,000
65	Macro Wireless Facility	Communications	Sprint, T-Mobile, Verizon, AT&T	Not Available
66	Macro Wireless Facility	Communications	Sprint	Not Available
73	Macro Wireless Facility	Communications	Metro PCS, Sprint, AT&T	Not Available
76	Golf Club Lift Station	Wastewater Facility	TCWD	$2,000,000
Facilities of Concern				
14	Melinda Heights Elementary	Public School	SVUSD/State	$37,300,000
39	Foothill Reservoir	Reservoir	SMWD	$20,000,000
40	Island Pasture Reservoir	Reservoir	SMWD	$20,000,000

SMWD = Santa Margarita Water District; TCWD = Trabuco Canyon Water District; Caltrans = California Department of Transportation
Total Loss Potential includes estimated replacement and content values, if applicable. If not provided, values are not currently available.

There are approximately 4,180 dwelling units with a population of approximately 12,280 people residing within earthquake-induced landslide hazard areas. There are also approximately 890,000 square feet of non-residential development located within these hazard areas. There are also areas within the community that may be susceptible to moisture-induced landslide conditions that are not reflected in the numbers above. Further, areas susceptible to mudflow conditions are not specifically defined, but have historically occurred in the creeks that convey surface runoff from the community.

Landslide and mudflows could result in damage to structures. Roadways could also be damaged, impeding access and hindering emergency response. Underground utilities may be damaged during a landslide or mudflow event, causing service interruptions or complete outages. Landslide or mudflows may require evacuation of people from the area. Lower income households or those with mobility challenges or no access to transportation may have difficulty evacuating the area in the event of a landslide or

mudflow. Lower income households or those on fixed incomes may have more difficulty in the event of displacement or recovering from a landslide or mudflow event.

Pest Management and Disease

Structures and infrastructure are not typically vulnerable to pests and disease likely to impact Rancho Santa Margarita. The Invasive Shot Hole Borer (ISHB) attacks native and landscape trees, which could indirectly damage a structure or infrastructure if the tree fell due to decline or death. Similarly, a person could be injured as a result of a tree or limb falling. Although ISHB has been concentrated within O'Neill Regional Park, there have been instances of infestation of ornamental landscaping outside of the regional park boundary. Therefore, pest management could affect all of Rancho Santa Margarita. Extensive loss of trees and landscaping could also impact the aesthetic character of the area and result in significant removal and replacement costs. Although this would not directly impact critical facilities, if not removed, it could result in a greater risk associated with wildfires.

Disease could affect specific populations or be transmitted throughout a community. All of Rancho Santa Margarita is vulnerable to disease. Disease could disproportionally affect the elderly, youth, and persons with preexisting health conditions. In the event of a major outbreak, local and regional health care facilities and services could be impacted.

Seismic Hazards

The entire community is at risk to seismic ground shaking. Critical facilities, residential and non-residential buildings and infrastructure could be damaged in the event of an earthquake. The extent of damage would depend upon the location and magnitude of the earthquake. Depending upon the damage, emergency services, communication systems, and utility services may all be hindered. Senior citizens and those will disabilities may be harmed if they are unable to react quickly and seek out areas of safety from falling debris. Further, extended interruptions in services, including power outages, would disproportionately affect people with medical conditions requiring power for medical equipment.

The City is also susceptible to seismic-induced liquefaction and landslides (landslides are discussed above). Table 4-24, *Facilities in a Liquefaction Hazard Zone*, identifies the critical facilities located within a liquefaction hazard area; there are no facilities of concern located within the hazard area.

Table 4-24
Facilities in a Liquefaction Hazard Zone

Map ID	Name	Type	Owner/ Responsible Agency	Total Loss Potential
Critical Facilities				
24	Santa Margarita Bridge (1)	Transportation	City	Not Available
26	241 Toll Road Bridge	Transportation	Caltrans	Not Available
29	Antonio Parkway Bridge (1)	Transportation	Caltrans	Not Available
52	Via Allegre Lift Station	Wastewater Facility	TCWD	3,000,000
75	Macro Wireless Facility	Communication	AT&T	Not Available

TCWD = Trabuco Canyon Water District; Caltrans = California Department of Transportation
Total Loss Potential includes estimated replacement and content values, if applicable. If not provided, values are not currently available.

There are approximately 545 dwelling units with a population of approximately 1,600 people residing within liquefaction hazard areas. There are also approximately 77,400 square feet of non-residential development located within this hazard area. Liquefaction can damage buildings and infrastructure, including pipelines within soils subject to liquefaction. Damage to transportation infrastructure can impede access and hinder emergency response and evacuation. Damaged utilities can result in service interruptions or complete outages. Lower income households, those on fixed incomes, and those with mobility challenges or no access to transportation may have difficulty evacuating and may have more difficulty in the event of displacement.

Severe Weather

Severe weather includes heavy winds (Santa Ana winds), rain events, and extreme heat. Any of these events could impact the entire community; therefore, all critical facilities, infrastructure systems, structures, and residents within the City are within the severe weather hazard area. Santa Ana wind and rain events can cause damage to buildings and infrastructure, although it is not usually significant enough to impact operations of services and critical facilities. Extreme heat conditions experienced in Rancho Santa Margarita do not typically result in physical damage to buildings.

Severe weather conditions can result in downed trees and debris that block roadways, making it more difficult for emergency responders. They can also cause injury. Debris can also clog storm drain systems, resulting in localized flooding during a rain event. Power outages are more likely to occur during a severe weather event. Proactive power outages are more common during a high heat event due to the risk of wildfires. Extreme heat conditions and associated power outages can disproportionately affect senior citizens, young children, and those with medical conditions.

Wildfire

A large portion of the City is located within a fire hazard zone. Table 4-25, *Facilities in a Fire Hazard Zone*, identifies the critical facilities and facilities of concern located within fire hazard zones. These include water and wastewater facilities, dams, communication facilities, schools, government facilities, and reservoirs. Any of these facilities could be damaged or destroyed in the event of a wildfire.

Table 4-25
Facilities in a Fire Hazard Zone

Map ID	Name	Type	Owner/ Responsible Agency	Total
Critical Facilities				
24	Santa Margarita Bridge (1)	Transportation	City	Not Available
26	241 Toll Road Bridge	Transportation	Caltrans	Not Available
27	Melinda Road Bridge	Transportation	Caltrans	Not Available
28	Los Alisos Bridge	Transportation	Caltrans	Not Available
29	Antonio Parkway Bridge (1)	Transportation	Caltrans	Not Available
30	Antonio Parkway Bridge (2)	Transportation	Caltrans	Not Available
31	241 Toll Road/Tijeras Creek	Transportation	Caltrans	Not Available
32	Cañada Chiquita Bridge	Transportation	Caltrans	Not Available
33	Pedestrian Bridge	Transportation	Caltrans	Not Available
44	Altisima Pump Station	Water Facility	SMWD	$1,908,092
46	Foothill Pump Station	Water Facility	SMWD	$1,172,519
47	Island Pump Station	Water Facility	SMWD	$2,000,000
48	Antonio Pump Station	Water Facility	SMWD	$2,091,587
49	Robinson Ranch Pump Station	Water Facility	TCWD	$2,000,000
54	Trabuco Dam	Dam	TCWD	$20,000,000
55	Dove Dam	Dam	TCWD	$20,000,000
56	Bell Canyon Lift Station	Wastewater Facility	TCWD	$2,000,000
57	Barneburg Lift Station	Wastewater Facility	TCWD	$2,000,000
58	Trabuco Reservoirs (2)	Water Reservoir	TCWD	$5,000,000
59	Robinson Ranch Wastewater Treatment Plant	Wastewater Facility	TCWD	$20,000,000
60	Macro Wireless Facility	Communications	AT&T	Not Available
65	Macro Wireless Facility	Communications	Sprint, T-Mobile, Verizon, AT&T	Not Available
66	Macro Wireless Facility	Communications	Sprint	Not Available
73	Macro Wireless Facility	Communications	Metro PCS, Sprint, AT&T	Not Available
74	Macro Wireless Facility	Communications	Sprint, Verizon	Not Available
Facilities of Concern				
2	RSM Post Office	Government	Federal	Not Available
3	RSM Library	Government	County	Not Available
4	RSM Postal Annex	Government	Federal	Not Available
6	Cox Cable Switch	Communications	Not Available	Not Available
7	Pac Bell Central Switch	Communications	Not Available	Not Available
10	RSM Beach Club and Lake	Community	SAMLARC	Not Available
11	Arroyo Vista K-8	Public School	CUSD/State	Not Available
12	Tijeras Creek Elementary	Public School	CUSD/State	Not Available
13	Cielo Vista Elementary	Public School	SVUSD/State	$37,200,000
14	Melinda Heights Elementary	Public School	SVUSD/State	$37,300,000
15	Robinson Elementary	Public School	SVUSD/State	$45,300,000
16	Trabuco Mesa Elementary	Public School	SVUSD/State	$39,800,000
17	RSM Intermediate	Public School	SVUSD/State	$83,300,000
18	Mission Hills Christian School	Private School	Not Available	Not Available
19	Rancho Viejo Montessori School	Private School	Not Available	Not Available
20	Santa Margarita Catholic High School	Private School	Not Available	Not Available
21	St. Junipero Serra Catholic School	Private School	Not Available	Not Available
22	St. John's Episcopal School	Private School	Not Available	$5,281,788
34	Plano Lift Station	Sanitary Sewer	SMWD	$3,920,631
35	Trabuco Lift Station and Pump Station	Sanitary Sewer Water Facility	SMWD	Not Available
36	Rancho Trabuco Reservoir	Reservoir	SMWD	Not Available
37	Trabuco Ridge Reservoirs (2)	Reservoir	SMWD	Not Available
38	Starr Reservoir	Reservoir	SMWD	Not Available
39	Foothill Reservoir	Reservoir	SMWD	$20,000,000
40	Island Pasture Reservoir	Reservoir	SMWD	$20,000,000
41	South County Regulating Reservoir	Reservoir	SMWD	$20,000,000
42	Dove Canyon Reservoir	Reservoir	TCWD	Not Available

Table 4-25
Facilities in a Fire Hazard Zone (Continued)

Map ID	Name	Type	Owner/ Responsible Agency	Total
51	Upper Oso Reservoir (with Compressor Building)	Reservoir	SMWD	$20,420,338

SAMLARC = Rancho Santa Margarita Landscape and Recreation Corporation; CUSD = Capistrano Unified School District; SVUSD = Saddleback Valley Unified School District; SMWD = Santa Margarita Water District; TCWD = Trabuco Canyon Water District; Caltrans = California Department of Transportation
Total Loss Potential includes estimated replacement and content values, if applicable. If not provided, values are not currently available.

There are approximately 6,870 dwelling units with a population of approximately 20,200 people residing within a fire hazard zone. There are also approximately 1,306,550 square feet of non-residential development located within this hazard area. A wildfire within the City could damage buildings and infrastructure, impacting residents as well as business owners and their employees. Impacts to businesses could affect the local economy.

Depending upon the location and extent of the fire, transportation routes could be impaired or inaccessible, which could impede evacuation and hinder emergency response. Evacuation and shelter areas may not be available to evacuees depending upon the location of the wildfire. People with limited mobility or lack of access to transportation could be at a higher risk due to their inability to evacuate quickly. Wildfires within the area, even if not within the City can also impact people's health due to the poor air quality. Senior citizens, youth, and people with preexisting medical conditions are most at risk.

Utility systems could be damaged or interrupted. Controlled and proactive power outages are highly likely during a wildfire event to reduce the risk for additional fires to be initiated. These power outages can extend beyond the area of the fire.

SUMMARY OF VULNERABILITY

Table 4-26, *Risk Assessment Summary*, shows a summary of critical facilities that intersect with hazard areas in the City. Those critical facilities that intersect with a hazard area are indicated with a "Y" and a red-shaded cell. Critical facilities that do not fall within the hazard area are designated with an "N" and a green-shaded cell. The risks of groundshaking, severe weather, drought, pest management/disease, dam/reservoir failure, and human-induced hazards are equal throughout the community.

Table 4-26
Risk Assessment Summary

Map ID	Facility	Ground shaking	Liquefaction	Wildfires	Flood	Landslide/ Mudflow	Severe Weather	Drought	Pest Management/ Disease	Dam/Reservoir Failure	Human- Induced Hazards
24	Santa Margarita Bridge (1)	Y	Y	Y	Y	N	Y	Y	Y	Y	Y
26	241 Toll Road Bridge	Y	Y	Y	Y	N	Y	Y	Y	Y	Y
27	Melinda Road Bridge	Y	N	Y	N	Y	Y	Y	Y	Y	Y
28	Los Alisos Bridge	Y	N	Y	N	N	Y	Y	Y	Y	Y
29	Antonio Parkway Bridge (1)	Y	Y	Y	Y	N	Y	Y	Y	Y	Y
30	Antonio Parkway Bridge (2)	Y	N	Y	N	N	Y	Y	Y	Y	Y
31	241 Toll Road/Tijeras Creek	Y	N	Y	Y	N	Y	Y	Y	Y	Y
32	Cañada Chiquita Bridge	Y	N	Y	N	Y	Y	Y	Y	Y	
33	Pedestrian Bridge	Y	N	Y	N	N	Y	Y	Y	Y	Y
44	Altisima Pump Station	Y	N	Y	N	Y	Y	Y	Y	Y	Y
46	Foothill Pump Station	Y	N	Y	N	N	Y	Y	Y	Y	Y
47	Island Pasture Pump Station	Y	N	Y	N	Y	Y	Y	Y	Y	Y
48	Antonio Pump Station	Y	N	Y	N	N	Y	Y	Y	Y	Y
49	Robinson Ranch Pump Station	Y	N	Y	N	N	Y	Y	Y	Y	Y
52	Via Allegre Lift Station	Y	Y	N	N	N	Y	Y	Y	Y	Y
54	Trabuco Dam	Y	N	Y	N	N	Y	Y	Y	Y	Y
55	Dove Dam	Y	N	Y	N	Y	Y	Y	Y	Y	Y
56	Bell Canyon Lift Station	Y	N	Y	N	Y	Y	Y	Y	Y	Y
57	Barneburg Lift Station	Y	N	Y	N	N	Y	Y	Y	Y	Y
58	Trabuco Reservoirs (2)	Y	N	Y	N	N	Y	Y	Y	Y	Y
59	Robinson Ranch Wastewater Treatment Plant	Y	N	Y	N	Y	Y	Y	Y	Y	Y
60	Macro Wireless Facility	Y	N	Y	N	N	Y	Y	Y	Y	Y
65	Macro Wireless Facility	Y	N	Y	N	Y	Y	Y	Y	Y	Y
66	Macro Wireless Facility	Y	N	Y	N	Y	Y	Y	Y	Y	Y
73	Macro Wireless Facility	Y	N	Y	N	Y	Y	Y	Y	Y	Y
75	Macro Wireless Facility	Y	Y	N	N	N	Y	Y	Y	Y	Y
76	Golf Club Lift Station	Y	N	N	N	Y	Y	Y	Y	Y	Y

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SECTION 5.0: MITIGATION STRATEGY

Hazard mitigation strategies are used to reduce hazard impacts on residents, employment centers, public infrastructure, and critical facilities. This section of the LHMP is derived from an in-depth review of the vulnerabilities and capabilities described in this plan. Overall, the actions represent the City's risk-based approach for reducing and/or eliminating the potential losses as identified in the Vulnerability/Risk Assessment section.

5.1 HAZARD MITIGATION OVERVIEW

FEMA'S NATIONAL FLOOD INSURANCE PROGRAM

The National Flood Insurance Program (NFIP) provides affordable insurance to property owners, renters and businesses by encouraging communities to adopt and enforce floodplain management regulations. Participation in the NFIP is optional; however, property owners who live in a non-participating community with flood-prone areas are not able to buy flood insurance through the program. Communities with mapped floodplains cannot receive federal grants or loans for development activities in flood-prone areas and cannot receive federal disaster assistance to repair flood damaged buildings in mapped floodplains if they are not participants of the NFIP.

The City of Rancho Santa Margarita is a participant in the National Flood Insurance Program (NFIP). The City plans to continue its participation in the NFIP and comply with the requirements. Implementation of LHMP Mitigation Actions 7 and 38 would assist with compliance. Mitigation Action 7 addresses future updates to the City's General Plan to ensure that current floodplain information is incorporated, and that goals and policies adequately respond to floodplain conditions within the City in order to reduce vulnerability to flood hazards. Mitigation Action 38 requires continued evaluation of flood hazards for any development proposed within a flood hazard zone; consistent with the City's floodplain ordinance.

Additionally, it should be noted that the City's General Plan Land Use map identifies where specific land uses are allowed within the City. The City's Open Space designation is applied to streams and washes, open space easements, and other private and public open spaces. The Regional Open Space designation is applied to the portions of O'Neill Regional Park within the City. The City's floodplains are generally limited to land designated Open Space and Regional Open Space and does not allow for habitable development. The City will continue to use its General Plan land use designations to control development within these areas.

HAZARD MITIGATION GOALS

The mitigation goals, presented in Section 1.0, serve as the basis for direction to promote sound public policy designed to protect citizens, critical facilities, infrastructure, private property, and the environment from hazards. The plan goals guide the direction of future activities aimed at reducing risk and preventing loss from hazards. The goals also serve as checkpoints as agencies and organizations begin implementing mitigation action items.

The hazard mitigation actions identified below list those activities that the City will use to reduce their risk of potential hazards. These mitigation actions were identified through discussions and collaboration with the LHMP Planning Team. Some of these actions may be eligible for funding through federal and State grant programs and other funding sources as made available to the City. The mitigation actions are intended to address the comprehensive range of identified hazards. Some actions may address risk reduction from multiple hazards.

HAZARD MITIGATION PRIORITIZATION

The Planning Team discussed each mitigation action to identify the priority, using the following as guidance:

- High Priority: Top organizational priority and is generally a well-detailed project idea. Protects population, resource or property at high risk. Uses feasible methods, techniques or technology.

- Medium Priority: A good idea that needs more information or is an action that addresses a moderate hazard.

- Low Priority: An idea that needs a lot more information or will take a lot of preliminary action to build support.

The hazard ranking completed as part of the first Planning Team meeting and additional discussion by the Planning Team also influenced the priority of the specific mitigation action. For example, some actions although possibly in need of more information, were identified as a high priority due to current conditions, the risk of the hazard, and the probability of its occurrence. The Planning Team considered the frequency and severity of the hazard; the vulnerability of the community; the impacts the mitigation action would avoid or reduce; the benefits of the action on the community; the critical facilities that would benefit; the environmental benefits of the action; and the capability of the City and its partner agencies to implement the action.

The Planning Team reviewed the STAPLE/E (Social, Technical, Administrative, Political, Legal, Economic, and Environmental) criteria, as described in Table 5-1, *STAPLE/E Review and Selection Criteria*, when considering and prioritizing the mitigation actions. This methodology, as endorsed by FEMA, requires that social, technical, administrative, political, legal, economic, and environmental factors are considered when reviewing potential actions.

HAZARD MITIGATION BENEFIT – COST REVIEW

FEMA requires local governments to analyze the benefits and costs of a range of mitigation actions that can reduce the effects of each hazard within their communities. Benefit-cost analysis is used in hazard mitigation to show if the benefits to life and property protected through mitigation efforts exceed the cost of the mitigation activity. Conducting benefit-cost analysis for a mitigation activity can assist communities in determining whether a project is worth undertaking now in order to avoid disaster-related

damages later. The analysis is based on calculating the frequency and severity of a hazard, avoiding future damages, and risk.

Table 5-1
STAPLE/E Review and Selection Criteria

STAPLE/E REVIEW	SELECTION CRITERIA
Social	• Is the proposed action socially acceptable to the jurisdiction and surrounding community? • Are there equity issues involved that would mean that one segment of the jurisdiction and/or community is treated unfairly? • Will the action cause social disruption?
Technical	• Will the proposed action work? • Will it create more problems than it solves? • Does it solve a problem or only a symptom? • Is it the most useful action in light of other jurisdiction goals?
Administrative	• Can the jurisdiction implement the action? • Is there someone to coordinate and lead the effort? • Is there sufficient funding, staff, and technical support available? • Are there ongoing administrative requirements that need to be met?
Political	• Is the action politically acceptable? • Is there public support both to implement and to maintain the project?
Legal	• Is the jurisdiction authorized to implement the proposed action? • Are there legal side effects? Could the activity be construed as a taking? • Will the jurisdiction be liable for action or lack of action? • Will the activity be challenged?
Economic	• What are the costs and benefits of this action? • Do the benefits exceed the costs? • Are initial, maintenance, and administrative costs considered? • Has funding been secured for the proposed action? If not, what are the potential funding sources (public, nonprofit, and private)? • How will this action affect the fiscal capability of the jurisdiction? • What burden will this action place on the tax base or local economy? • What are the budget and revenue effects of this activity? • Does the action contribute to other jurisdiction goals? • What benefits will the action provide?
Environmental	• How will the action affect the environment? • Will the action need environmental regulatory approvals? • Will it meet local and State regulatory requirements? • Are endangered or threatened species likely to be affected?

A hazard mitigation plan must demonstrate that a process was employed which emphasized a review of benefits and costs when prioritizing the mitigation actions. The benefit-cost review must be comprehensive to the extent that it can evaluate the monetary as well as the nonmonetary benefits and costs associated with each action. The benefit-cost review should at least consider the following questions:

- How many people will benefit from the action?
- How large an area is impacted?
- How critical are the facilities that benefit from the action (e.g., which is more beneficial to protect, the fire station or the administrative building)?

- Environmentally, does it make sense to do this project for the overall community?

These questions were considered to help determine the appropriateness of mitigation actions. Those actions that did not have adequate benefits were excluded from the list of mitigation actions.

5.2 HAZARD MITIGATION ACTIONS

The process used by the Planning Team to identify hazard mitigation actions for this plan included the following:

- Review of the vulnerability and risk assessment presented in Section 4.0;
- Review of the capabilities assessment presented in Subsection 5.3;
- Review of the City's previous (unapproved) hazard mitigation plan mitigation actions;
- Review of the results of the community survey and feedback received as part of the focus outreach meetings; and
- The Planning Team's discussion of concerns/issues that need to be addressed to reduce hazards to critical facilities and the community.

Table 5-2, *Hazard Mitigation Actions*, identifies the mitigation action, hazard(s) it addresses, City Department and/or partner agency/stakeholder responsible for implementation, potential funding sources, priority, and the timeline for implementation. The timeline for implementation is defined as follows:

- Ongoing: 1-2 years and ongoing thereafter
- Short-Term: 1 to 2 years
- Medium-Term: 3 years
- Long-Term: 4 to 5 years

Table 5-2
Hazard Mitigation Actions

Mitigation Reference Number	Mitigation Action	Hazard(s) Addressed	Responsible Department(s)	Potential Funding Sources	Priority	Timeline
1	Capitalize on City-sponsored events, such as Rancho Family Fest, Summer Concert Series, and the Great Shakeout to inform and educate the public regarding hazards with the potential to affect the community and ways they can protect themselves and reduce impacts from the hazards.	Multiple Hazards	Development Services and Risk Management	Staff Time	High	Ongoing
2	Coordinate with partner agencies, such as Orange County Sheriff's Department (OCSD), Orange County Fire Authority (OCFA), American Red Cross, Trabuco Canyon Water District, Santa Margarita Water District, RSM Chamber of Commerce, AgeWell, HOAs, and public and private schools to create and disseminate educational materials for residents/business owners to identify their risk to multi-hazards; identify mitigation actions they can implement; provide additional sources and resources for information; and provide classes/seminars, etc.	Multiple Hazards	Development Services and Risk Management	Staff Time; Federal, State, and Local Funding Sources as Available	High	Ongoing
3	In coordination with OCSD's current program, develop and implement a public outreach campaign to inform the public on warning expectations, including emergency sheltering and evacuation procedures, including pre-planned maps for distribution to employers and residents, and what alert systems and information sources are available to reduce conveyance of misinformation.	Multiple Hazards	Risk Management and Public Information Officer, in coordination with OCSD	Staff Time	High	Ongoing
4	Continue to partner with the American Red Cross, the County, neighboring cities, public and private schools, and HOAs to provide evacuation and reunification locations and shelters in an emergency.	Multiple Hazards	Community Services	Staff Time; Federal, State, and Local Funding Sources as Available	High	Ongoing
5	Work with Caltrans and neighboring jurisdictions to ensure emergency transportation routes are maintained, repaired, and strengthened, as necessary.	Multiple Hazards	Public Works	Staff Time; Federal, State, and Local Funding Sources as Available, OC Go Funding	High	Ongoing
6	Seek funding to hire an additional staff person and establish a Community Emergency Response (CERT) Team program.	Multiple Hazards	Risk Management	Staff Time; Emergency Performance Management Grant	Medium	Medium- to Long-Term
7	When updating the City's General Plan, review natural hazards information and mapping (e.g., liquefaction, landslide, floodplains, fire hazard zones) to ensure the most current information is reflected and updated as necessary. Incorporate new and/or revised goals and policies specific to reducing vulnerability to natural hazards. The City will formally adopt the approved City of Rancho Santa Margarita Local Hazard Mitigation Plan into its General Plan Safety Element to ensure compliance with AB 2140, making the City eligible for additional funding under the California Disaster Assistance Act (CDAA).	Multiple Hazards	Development Services	General Fund – contract completion 2020	Low	Long-Term
8	Support utility providers' efforts to harden and strengthen critical lifeline systems to reduce vulnerability, maintain service, and improve recovery times in the event of a hazard event. *Examples – utility pole reinforcements, backup generators, modeling scenarios to analyze resilience of distribution network.*	Multiple Hazards	Public Works, Development Services, in coordination with applicable utility providers	Staff Time; FEMA Grant Funding	High	Ongoing
9	Monitor changes/updates to building codes and seismic regulations to determine if City-owned critical facilities may need seismic retrofits as they age and building codes are updated.	Seismic Hazards	Development Services	Staff Time	Medium	Long-term
10	If any City-owned critical facility is determined to be seismically vulnerable, identify a plan to conduct structural retrofitting, including funding sources.	Seismic Hazards	Development Services	Staff Time; General Fund; Federal, State, and Local Funding Sources as Available; FEMA Grant Funding	Medium	Long-term
11	Inform owners of all critical facilities of changes/updates to building codes and seismic regulations and encourage them to evaluate the need for structural retrofits.	Seismic Hazards	Development Services and Public Works	Staff Time	Medium	Long-term
12	If any critical facilities are determined to be seismically vulnerable, work with the owner to identify potential funding sources to implement seismic retrofits.	Seismic hazards (earthquakes and liquefaction)	Development Services and Public Works	Staff Time; Federal, State, and Local Funding Sources as Available; FEMA Grant Funding	Medium	Long-term
13	Educate and encourage property owners to secure furnishings, storage cabinets, and utilities to prevent injuries from damage. Examples include anchoring bookcases, dressers, and file cabinets, installing latches on drawers and cabinet doors, securing desktop computers and appliances, using flexible connections on gas water lines, and securely mounting framed pictures and mirrors.	Seismic hazards (earthquakes)	Development Services and Risk Management	Staff Time; Federal, State, and Local Funding Sources as Available; FEMA Grant Funding	High	Ongoing

Table 5-2
Hazard Mitigation Actions (Continued)

Mitigation Reference Number	Mitigation Action	Hazard(s) Addressed	Responsible Department(s)	Potential Funding Sources	Priority	Timeline
14	Partner with the OCFA to perform outreach programs to increase awareness about fires, identify potential vulnerabilities, and implement fire mitigation techniques.	Wildfire; Human-induced hazards (arson)	Development Services and Risk Management, in coordination with OCFA	Staff Time	High	Ongoing
15	Reduce wildfire risks by enforcing fire-related requirements pertaining to evacuation routes, minimum road widths, clearances around structures, and peak load water supply for fire response.	Wildfire; Human-induced hazards (arson)	Development Services (Code Enforcement), Public Works, in coordination with OCFA and US Forest Service	Staff Time	High	Ongoing
16	Coordinate with the HOAs and property owners to ensure the creation of defensible spaces and fuel modification around homes and neighborhoods to reduce vulnerability and increase the success potential of fire fighters in the case of a wildfire emergency. Partner with the OCFA to ensure enforcement.	Wildfire; Human-induced hazards (arson)	Development Services (Code Enforcement), Public Works, in coordination with OCFA and US Forest Service	Staff Time; Federal, State, and Local Funding Sources as Available; FEMA Grant Funding	High	Ongoing
17	Partner with HOAs to pursue grant funding for defensible space and fuel modification and to disseminate information to homeowners.	Wildfire; Human-induced hazards (arson)	Development Services (Code Enforcement), Public Works, in coordination with OCFA and US Forest Service	Staff Time; Federal, State, and Local Funding Sources as Available; FEMA Grant Funding	High	Ongoing
18	Coordinate with Cal Fire, OCFA, and OCSD during wildfire events to ensure areas of evacuation are clearly articulated to the community using local naming conventions and understanding.	Multiple Hazard	Development Services (Code Enforcement), Public Information Officer, Public Works, in coordination with OCFA and US Forest Service	Staff Time	High	Ongoing
19	Encourage HOAs and property owners to install fire-resistant vegetation.	Wildfire; Human-induced hazards (arson)	Development Services (Code Enforcement), Public Works, in coordination with OCFA and US Forest Service	Staff Time	High	Ongoing
20	Partner with Orange County Mosquito and Vector Control District to implement education programs regarding vector issues and coordinate with HOAs to distribute information and educate property owners.	Pest Management/Disease	Public Information Officer	Staff Time; Federal, State, and Local Funding Sources as Available	High	Ongoing
21	Monitor and remove or treat any standing water susceptible to mosquitos within City-owned facilities.	Pest Management/Disease	Public Works	Public Works Staff Time	High	Ongoing
22	Coordinate with Orange County Health, local hospitals, clinics, medical groups, employers and HOAs to distribute information about the effects and transmission of diseases.	Pest Management/Disease	Public Information Officer	Staff Time	High	Ongoing
23	Partner with OC Parks and Department of Fish and Wildlife and HOA's to educate the community on the bore beetle, including what it is, how to identify it, and proper removal and disposal of infested trees.	Pest Management/Disease	Public Information Officer	Staff Time	Medium	Medium-Term
24	Proactively monitor drought conditions or water conservation warnings issued by State agencies or the water districts.	Drought	Development Services and Public Works	Staff Time	Medium/High	Ongoing
25	Work with the water districts to develop a drought communication plan and early warning system to facilitate timely communication of relevant information to the public concerning water conservation needs and to educate citizens regarding water conservation and encourage implementation of water-saving measures.	Drought	Public Information Officer, in coordination with water districts	Staff Time	Medium/High	Ongoing
26	Require State-mandated water conservation measures during drought emergencies.	Drought	Development Services and Public Works	Staff Time	Medium	Ongoing
27	Prior to and during heavy rain events, close/limit access to Trabuco Canyon Road and other roadways determined vulnerable to the potential for flooding and mudflow.	Severe Weather (heavy rains); Flood; Landslide; Mudflow	Public Works in coordination with OCSD and OC Parks	Public Works Staff Time	High	Ongoing
28	Seek funding to purchase mobile digital traffic signs and proactively use the signs to warn drivers of road closures and areas that are closed or should be avoided along the creeks and channels.	Severe Weather (heavy rains); Flood; Landslide; Mudflow	Public Works in coordination with OCSD	Federal, State, and Local Funding Sources as Available	Medium	Ongoing

Table 5-2
Hazard Mitigation Actions (Continued)

Mitigation Reference Number	Mitigation Action	Hazard(s) Addressed	Responsible Department(s)	Potential Funding Sources	Priority	Timeline
29	Coordinate with the OCSD and OCFA to proactively notify people to leave areas along creeks and channels prior to heavy rain events and to continue to monitor areas during events.	Severe Weather (heavy rains); Flood; Landslide; Mudflow	Public Information Officer and Risk Management, in coordination with OCSD and OCFA	Staff Time	High	Ongoing
30	Continue to work with HOAs to ensure removal of fallen limbs prior to and during a high wind event.	Severe Weather (Santa Ana winds)	Public Works	Staff Time	Medium	Ongoing
31	Monitor conditions during a high wind event to ensure fallen tree limbs or debris do not block roadways or the storm drain system.	Severe Weather (Santa Ana winds)	Public Works	Staff Time	High	Ongoing
32	Educate citizens, especially vulnerable populations, regarding the dangers of extreme heat and the steps they can take to protect themselves when extreme heat events occur, including the location of cooling centers in the community.	Severe Weather (extreme heat)	Public Information Officer and Community Services; FEMA Grant Funding	Staff Time	High	Ongoing
33	Seek funding to purchase a generator for the Bell Tower Regional Community Center.	Seismic (earthquake); Wildfire; Severe Weather (heavy rains, Santa Ana winds, extreme heat)	Public Works, Community Services and Risk Management	Staff Time; Federal, State, and Local Funding Sources as Available; FEMA Grant Funding	High	Short-Term
34	Work with age-restricted and assisted living facilities to obtain grant funding for backup generators in the event of a power outage. Ensure backup generators have enough fuel to last at least four days to ensure continuous coverage in case of a sustained power outage.	Seismic (earthquake); Wildfire; Severe Weather (heavy rains, Santa Ana winds, extreme heat)	Public Works, Community Services and Risk Management	Staff Time; Federal, State, and Local Funding Sources as Available; FEMA Grant Funding	High	Short-Term
35	Coordinate with Southern California Edison during any planned or unplanned power outage to ensure citizens are informed and regularly updated, especially at-risk populations that may be exceptionally vulnerable in the event of a long-term power outage.	Seismic (earthquake); Wildfire; Severe Weather (heavy rains, Santa Ana winds, extreme heat); Human-induced hazards (arson; terrorism)	Public Works and Public Information Officer	Staff Time	High	Ongoing
36	Continue to proactively monitor and perform regular drainage system maintenance including removal of debris prior to storm events and similarly encourage HOAs and other property owners to proactively remove debris from their drainage systems	Severe Weather (heavy rains, Santa Ana winds); Flood; Landslide; Mudflow	Public Works	Staff Time	Medium/High	Ongoing
37	Educate citizens about safety during flood conditions, including the dangers of driving on flooded roads.	Severe Weather (heavy rains); Flood; Landslide; Mudflow	Public Information Officer	Staff Time	High	Ongoing
38	Require evaluation of flood hazards associated with development in flood hazard zones.	Flood	Development Services	Staff Time	Low	Ongoing
39	Following wildfire events, continue to partner with Cal Fire, Orange County Office of Emergency Preparedness, OCFA, and OCSD, to identify the potential and location for landslide and/or mudflow events associated with heavy rainfall.	Severe Weather (heavy rains); Landslide; Mudflow	Public Works and Public Information Officer, in coordination with OCSD	Staff Time	High	Ongoing
40	Actively communicate with OCFA and support the Fire Watch Program, which provides consistent monitoring of canyons and high fire hazard areas to prevent fires from being ignited and spreading.	Wildfire; Human-induced hazards (arson)	Risk Management and Public Information Officer	Staff Time	Medium/High	Ongoing
41	Provide information to the community regarding the proper handling, storage and disposal of hazardous materials.	Human-induced hazards (hazardous materials)	Development Services and Public Works	Staff Time	Low/Medium	Ongoing
42	Support and publicize County locations and events for disposal of household hazardous waste items.	Human-induced hazards (hazardous materials)	Public Works and Public Information Officer	Staff Time	Low/Medium	Ongoing
43	Continue to provide education materials to the community regarding the potential for unexploded ordnances and what to do in the event of discovery.	Human-induced hazards (hazardous materials)	Public Information Officer	Staff Time	Low/Medium	Ongoing
44	Incorporate updated hazard information from the Dam Inundation and Emergency Action Plans being prepared for dams/reservoirs identified as critical facilities into the next update to this LHMP and the City's General Plan Safety Element.	Dam/reservoir failure	Development Services and Risk Management	Staff Time	Medium	Medium- to Long-Term

Table 5-2
Hazard Mitigation Actions (Continued)

Mitigation Reference Number	Mitigation Action	Hazard(s) Addressed	Responsible Department(s)	Potential Funding Sources	Priority	Timeline
45	Coordinate with dam owners to notify property owners if located within an inundation area, as determined by the Dam Inundation and Emergency Actions Plans and provide education information and resources in the event of an emergency.	Dam/reservoir failure	Development Services and Risk Management	Staff Time	Medium	Medium- to Long-Term
46	Partner with the HOAs to seek funding for the installation of permanent bollards or barricades around areas vulnerable to vehicles where large community events occur.	Human-induced hazards (terrorism)	Development Services, Public Works, in coordination with HOA's	Staff Time; Federal, State, and Local Funding Sources as Available	Medium	Long-term
47	Partner with the HOAs to seek funding to prepare a Community Wildfire Protection Plan (CWPP).	Wildfire	Development Services and Risk Management, in coordination with HOA	Staff Time; Federal, State, and Local Funding Sources as Available; FEMA Funding	High	Medium-term
48	Fund equipment for motorcycle officers that have completed certified critical incident response training.	Multiple hazards	Risk Management in coordination with OCSD	OCSD; Federal, State, and Local Funding Sources as Available	High	Short-term
49	The City should implement an Energy Action Plan (EAP). The EAP should: • Evaluate the City's current green building requirements every three years, consistent with Building Code updates, to consider additional requirements for new residential and nonresidential development to ensure that new development meets or exceeds adopted green building measures in the State. • Establish a program to encourage and incentivize existing development to install solar panels. • Encourage the use of electric equipment for City construction contracts. • When feasible, the City should offer incentives for use of energy reduction measures such as expedited permit processing and reduced fees. • Coordinate periodic community outreach to leverage community involvement, interest and perspectives in implementing energy reduction measures. • Review and evaluate the availability of renewable energy sources for consumers within Rancho Santa Margarita. • Encourage the business community to reduce energy consumption through innovative technologies such as the use of cogeneration facilities. • Work with large employers and retail shopping centers to ensure access to EV charging stations. In addition, to implement the EAP, the City should appoint an Implementation Coordinator to oversee the successful implantation of all selected EAP strategies. The primary functions of the Implementation Coordinator should be to create a streamlined approach to manage implementation of the EAP.	Multiple hazards	Development Services	Staff Time, Available Funding through Utility Companies/Public Charge Funding	Medium	Medium-term

Ongoing: 1-2 years and ongoing thereafter
Short-Term: 1 to 2 years
Medium-Term: 3 years
Long-Term: 4 to 5 years

5.3 CAPABILITIES ASSESSMENT

This capabilities assessment is designed to identify existing local agencies, personnel, planning tools, public policy and programs, technology, and funds that have the capability to support hazard mitigation activities and strategies outlined in this plan. To create this capability assessment, the Planning Team collaborated to identify capabilities and mechanisms available to the City and partner agencies for reducing damage from future hazard events. After initial identification, the capabilities were reviewed again and updated in the context of developing the mitigation actions.

The capabilities assessment considered the following types of resources:

- Planning and regulatory capabilities are based on the implementation of ordinances, policies, local laws and State statutes, and plans and programs that relate to guiding and managing growth and development.
- Administrative and technical capabilities refer to the community's staff and their skills and tools that can be used for mitigation planning and to implement specific mitigation actions. It also refers to the ability to access and coordinate these resources effectively.
- Financial capabilities are the resources that a jurisdiction has access to or is eligible to use to fund mitigation actions.
- Education and outreach capabilities are programs and methods already in place that could be used to implement mitigation activities and communicate hazard-related information.

Table 5-3, Capabilities Assessment, summarizes the capabilities assessment for Rancho Santa Margarita.

Table 5-3
Capabilities Assessment

Resource	Description and Ability to Support Mitigation
Planning and Regulatory	
General Plan Responsible Department: City of Rancho Santa Margarita Development Services Department	The Rancho Santa Margarita General Plan establishes the overall vision for future growth and development. As a blueprint for the future, the plan contains policies and programs designed to provide a solid basis for decisions related to land use and development. The General Plan provides the framework for the implementation of the LHMP mitigation actions. The Safety Element identifies hazards that could impact the community and establishes policy for the preparation and update of the LHMP. The City will formally adopt the approved City of Rancho Santa Margarita Local Hazard Mitigation Plan into its General Plan Safety Element to ensure compliance with AB 2140, making the City eligible for additional funding under the California Disaster Assistance Act (CDAA).
Zoning Ordinance Responsible Department: City of Rancho Santa Margarita Development Services Department	The Rancho Santa Margarita Zoning Code implements the General Plan by establishing regulations for land use control within the City, including where and how development occurs. Zoning is used to protect the public health, safety and welfare of a community. The City can use the Zoning Code to implement mitigation actions to reduce risks associated with future development.

Table 5-3
Capabilities Assessment (Continued)

Resource	Description and Ability to Support Mitigation
Subdivision Ordinance Responsible Department: City of Rancho Santa Margarita Development Services **Department**	The City's subdivision ordinance regulates development of housing, commercial, industrial or other uses, including associated public infrastructure, as land is subdivided into buildable lots. The subdivision ordinance can ensure future subdivisions account for the risk of hazards on future development.
Building Code Responsible Department: City of Rancho Santa Margarita Development Services Department	The Rancho Santa Margarita Building Code regulates how buildings are constructed. The City adopts the State Building Code with amendments, as applicable. Mitigation actions to construct buildings to safer standards to better resist damage during a hazard event could be considered as part of future building code updates.
Emergency Operations Plan Responsible Department: City of Rancho Santa Margarita City Administration Department and Public Safety Providers	The Emergency Operations Plan (EOP) addresses the City of Rancho Santa Margarita's planned response to extraordinary situations associated with natural disasters and/or technological incidents including both peacetime and national security operations. Although its primary focus is the provision of coordinated mutual aid within the City of Rancho Santa Margarita and fulfilling reporting requirements to the Orange County Operational Area, the EOP also provides an overview of the operational concepts relating to various emergency situations. The EOP identifies components of the City of Rancho Santa Margarita's emergency response organization and describes the overall responsibilities of the City in protecting life and property and assuring the overall well-being of the population. Together, the EOP and LHMP provide a mitigation and response strategy to hazard events.
Capital Improvement Plan Responsible Department: City of Rancho Santa Margarita Public Works Department	The Capital Improvement Program (CIP) is established to provide for the planning, funding, design, construction, maintenance and repair of City facilities and infrastructure. The CIP is a "roadmap" that provides direction and guidance to the City to carefully plan and manage its capital and infrastructure assets. Typical improvement and maintenance projects included within the CIP include Street Improvement/Maintenance Projects; Traffic Improvement Projects; Special Projects; Landscaping/Renovation Projects; City Hall and Bell Tower Regional Community Center Building Projects; and Bridge Projects. The CIP identifies and funds mitigation actions related to City facilities and infrastructure.
Stormwater Management Plan Responsible Department: City of Rancho Santa Margarita Public Works Department	The City's Stormwater Management Plan is designed to avoid flooding associated with stormwater runoff. It focuses on design and construction measures that are intended to reduce the impact of frequent urban nuisance flooding. Thus, the plan can incorporate mitigation actions to address flooding associated with hazard events.
Storm Drain Master Plan Public Works	The City will develop a Storm Drain Master Plan for the City's Storm Drain System. This Plan will identify deficiencies with the system and prioritize the mitigation actions. A long term Maintenance Plan will also be created to update the current schedule of maintenance efforts.
Urban Water Management Plan Responsible Agencies: Santa Margarita Water District (SMWD) Trabuco Canyon Water District (TCWD)	SMWD and TCWD prepare Urban Water Management Plans (UWMP) every five years. An UWMP provides long-term resource planning to ensure that adequate water supplies are available to meet existing and future water needs. UWMP addresses drought conditions and the ability to provide water to its customers. The UWMP can be used to coordinate and implement mitigation actions associated with drought and water supply reliability.
Mutual Aid Agreements Responsible Agencies: City of Rancho Santa Margarita, Orange County Fire Authority (OCFA), Orange County Sheriff's Department (OCSD)	The City and its public safety providers maintain agreements with emergency responders to lend assistance across jurisdictional boundaries when an emergency response exceeds local resources. Access to these resources provides opportunities to implement mitigation actions to reduce damage and risk of injury during an event. It also provides for collaboration and sharing of information specific to hazards. • Fire – Federal State and local agreements • Police – State and local agreements • City – State and county agreements

Table 5-3
Capabilities Assessment (Continued)

Resource	Description and Ability to Support Mitigation
Orange County Emergency Operations Center Responsible Agency: County of Orange	The Orange County Emergency Operations Center (EOC) functions as the communication and coordination center for both the County and Operational Area emergency response organization and disaster preparedness, providing a central point for coordinating operational, administrative, and support needs of the county and Operational Area Members. It also assists in coordination and communication between Mutual Aid Coordinators and the State Office of Emergency Services during county-wide and State-wide emergency response and recovery operations. The OC EOC can be used to gather and process information to and from the County, cities, school and special districts, business and industry, volunteer organizations, individuals, and State and federal government agencies. It has the ability to function as a virtual EOC so that Operational Area Members may communicate between EOCs without co-location. WebEOC is a crisis information management system and provides secure real-time information sharing. Accurate and timely communication is critical during a hazard event and can reduce more significant damage and injury. Mitigation actions specific to communications and information can be implemented through the communication systems and response efforts to reduce risk of injury and damage.
Administrative and Technical	
City Administration	The City Administration Department includes City Attorney's Office, City Clerk's Office, City Manager's Office, Human Resources, and Risk Management. Staff within these departments will be involved in mitigation actions by providing support for their establishment and implementation.
Development Services Department	The Development Services Department includes (in part) Building & Safety; Code Enforcement; Economic Development, GIS; and Planning. Together, staff in these departments are responsible for regulating the construction, alteration, use and occupancy of buildings; maintaining and improving the health and safety, general welfare of the City; implementing the goals and policies of the General Plan and enforcing the Zoning Code related to land use and development; and maintaining data and preparing maps regarding various conditions within the City, including hazard areas. Mitigation actions related to ensuring development requirements along with plans and programs are updated to reflect most current hazard information, including GIS mapping, education programs and activities, enforcement of fire-related requirements, implementation of water conservation measures, and others that may be implemented by or in coordination with Development Services staff.
Public Safety Providers	Public Safety includes (in part) Emergency Management, Fire Services provided by OCFA, and Police Services provided by OCSD. Emergency Management supports citizens, first responders, and City staff in building and sustaining the City's ability to mitigate, prepare, protect, respond, and recover from the effects of natural and human-caused disasters. As a division of Police Services, staff works closely with the OCSD Emergency Management Division, OCFA, OC Health Care Agency, American Red Cross, and surrounding cities and county departments and agencies to provide preparedness and coordination during a disaster. The OCSD provides police protection services and OCFA provides fire protection services to the City. Both OCSD and OCFA also provide community programs and education campaigns. Public Safety Providers are a key component of implementing mitigation actions, including but not limited to, coordinating and communicating with the public and other agencies, ensuring safe and efficient evacuations, if necessary, providing or participating in public education and preparedness activities that support mitigation of risks, reducing wildfire risks and enforcing fire-related requirements.
Public Works & Engineering Department	The Public Works Department is responsible for engineering design and construction of capital improvement projects, maintaining municipal facilities, reviewing development applications, and issuing various permits.. Mitigation actions pertaining to capital improvements, maintenance of transportation systems, maintenance of storm drain systems, maintenance and removal of tree limbs or debris.
Finance Department	The Finance Department is responsible for all aspects of the City's accounting process, including preparation of the City Budget. Although the Finance Department does not directly implement mitigation actions, it plays an important role to facilitate implementation by working with the various departments to ensure mitigation actions are incorporated into the City budget and to administer grant support.

Table 5-3
Capabilities Assessment (Continued)

Resource	Description and Ability to Support Mitigation
Community Services Department	The Community Services Department provides residents with recreation classes, special events, senior services, and facility accommodations. In conjunction with other departments, Community Services may implement mitigation actions specific to community outreach and education activities and partner with neighboring cities, public and private schools, HOAs and other organizations to provide evacuation and reunification locations and shelters.
Community Emergency Preparedness Academy	The Community Emergency Preparedness Academy (CEPA) provides classroom and hands-on training for residents to improve their ability to respond to large-scale disasters when first responders may be overwhelmed, and to assist during regular emergencies until first responders arrive. The goal is for graduates of CEPA to be able to care for themselves, loved ones, and neighbors in the aftermath of a disaster. Mitigation actions specific to training may be implemented through expansion of the CEPA program to a Community Emergency Response Team.
Emergency Response Team	Rancho Santa Margarita staff are on-call as part of their employment agreement and are trained through FEMA, along with OCFA and OCSD. Any mitigation pertaining to training, education, and communication will likely involve staff.
Santa Margarita Water District and Trabuco Canyon Water District	Santa Margarita Water District (SMWD) and Trabuco Canyon Water District (TCWD) provide water and wastewater service to the City. SMWD and TCWD are part of the Orange County Regional Water and Wastewater Multi-jurisdictional Hazard Mitigation Plan (MJHMP) which identifies district-specific mitigation actions pertaining to hardening and protecting water and wastewater infrastructure and service reliability and resiliency. Mitigation actions related to water conservation and hardening of critical facilities specific to water and wastewater will be implemented in coordination with SMWD and TCWD.
California Department of Transportation	The California Department of Transportation (Caltrans) has jurisdiction, owns, operates, and maintains several of the roadways/bridges within Rancho Santa Margarita. Mitigation actions related to ensuring emergency transportation routes are maintained, repaired, and strengthened will require coordination and implementation by Caltrans.
Southern California Gas Company	Southern California Gas Company (Gas Company) provides natural gas service to Rancho Santa Margarita. The Gas Company owns and maintains natural gas conveyance infrastructure. Mitigation actions specific to the provision of these services will be implemented in coordination with the Gas Company.
Wireless Facilities	A variety of service providers provide communication services within Rancho Santa Margarita. Mitigation actions specific to the provision of these services will be implemented in coordination with these service providers.
Partnering Arrangements or Intergovernmental Agreements	The OCFA and OCSD have memoranda of understandings with other fire and law enforcement agencies to provide services in emergency events.
American Red Cross	The City of Rancho Santa Margarita has relationship with the local Red Cross office in Santa Ana. The Red Cross provides both technical and education/outreach support in the implementation of mitigation actions.
Financial	
Federal Emergency Management Agency	The Federal Emergency Management Agency (FEMA) is the federal agency responsible for hazard mitigation, emergency preparedness, and emergency response and recovery activities. It provides guidance to State and local governments on hazard mitigation activities, including best practices and how to comply with federal requirements. FEMA also provides funding for hazard mitigation actions through grant programs.
California Governor's Office of Emergency Services	The California Governor's Office of Emergency Services (Cal OES) is responsible for overseeing and coordinating emergency preparedness, response, recovery and homeland security activities within California. Cal OES regularly dispatches team members to join first responders, emergency leaders and those affected by disasters that threaten public safety, to provide information essential to the public. Cal OES can assist in obtaining funding for mitigation actions identified in the plan and providing guidance on future plan updates.

Table 5-3
Capabilities Assessment (Continued)

Resource	Description and Ability to Support Mitigation
Emergency Reserve Fund	The City maintains an emergency reserve fund for emergency needs.
EOC Activation	When the City's EOC is activated, costs are tracked for eligible reimbursement.
Education and Outreach	
AlertOC	AlertOC is a mass notification system designed to keep Orange County residents and businesses informed of emergencies and certain community events. By registering with AlertOC, time-sensitive voice messages from the County or City in which someone lives or works may be sent to their home, cell, or business phone. This system can be used to implement mitigation actions pertaining to public outreach and dissemination of accurate and timely information during a hazard event.
Orange County Crime Stoppers	This service allows citizens to anonymously report potential criminal activity and/or supply information regarding suspects of crimes. It allows people to report non-emergency information either by phone call, web or text. This program can be critical to mitigate a potential terrorist event.
Sherriff Explorer Program	The Explorer Program provides young adults (age 14-21) with the opportunity to assist the OCSD in Rancho Santa Margarita. Through weekly meetings, Explorers can broaden their knowledge and learn firsthand about the challenges and rewards of a career in law enforcement. Explorers receive training in a variety of topics including leadership, patrol procedures, first-aid, and laws of arrest.
Emergency Preparedness Outreach	Disasters cannot be prevented; however, the community can reduce the effects of disasters before they occur, prepare for what could happen, and improve response and recovery. Several mitigation actions pertain to outreach and information to the community and can be implemented through a variety of programs and events in coordination with the City and other partner agencies and stakeholders.
Neighborhood Watch	Crime prevention program enlists the active participation of citizens in cooperation with law enforcement to reduce crime in their neighborhood. This program involves neighbors getting to know each other and working together in a program of mutual assistance. Residents are trained to recognize and report suspicious activities in their neighborhoods and learn numerous crime prevention techniques and security measures. This can also be helpful in the event of a disaster or emergency for neighbors to help each other.
Great Shakeout Participation	The City annually hosts a Great Shakeout event. This event can be used to implement mitigation actions to inform and educate the public regarding hazards that affect the community and ways to reduce impacts from the hazards.
Police/Fire Community Awareness Events	Events are held annually and provide an opportunity to implement mitigation actions specific to educating and informing the community regarding hazards and ways to reduce impacts from the hazards and what to do during an emergency.
Homeowner Association's Outreach	The City of Rancho Santa Margarita is comprised of several Homeowner's Associations. The associations can help to implement mitigation actions through the distribution of information to their residents.
City Website, E-Newsletter, Social Media, Brochures and Pamphlets	These various forms of communication provide an opportunity to convey information and implement mitigation actions specific to educating and informing the community regarding all hazards and ways to reduce impacts from the hazards.

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SECTION 6.0: PLAN MAINTENANCE

This section identifies the formal process that will ensure that the LHMP remains an active and relevant document. The plan maintenance process includes a schedule for monitoring and evaluating the plan annually and producing an update every five years, so the City can maintain eligibility for federal and State hazard mitigation funding.

This section describes how the City will integrate public participation throughout the plan maintenance and implementation process. It also describes how the City intends to incorporate the mitigation actions outlined in this plan into existing planning mechanisms and programs. The plan's format allows the City to readily update sections when new data becomes available, ensuring the plan remains current and relevant.

6.1 PURPOSE OF THE PLAN AND AUTHORITY

COORDINATING BODY

Under the direction of the City's Project Management Team, which is comprised of the City of Rancho Santa Margarita Director of Development Services, Principal Planner, and Human Resources and Risk Management Administrator, the LHMP Planning Team (identified in Section 2.0, *Planning Process*) will be responsible for the on-going maintenance of this LHMP. The Project Management Team will take the primary lead in the LHMP maintenance by coordinating maintenance of this plan with the Planning Team, including undertaking the formal review process and updating the plan. Key City departments are identified below.

- City Administration
- Community Services
- Development Services
- Public Safety Providers (OCSD and OCFA)
- Public Works & Engineering

In addition to City staff, the following partner agencies, organization, and stakeholders who participated on the Planning Team during preparation of the plan should be included in the maintenance and update activities:

- Capistrano Unified School District
- City of Lake Forest
- City of Mission Viejo
- City of Yorba Linda
- Dove Canyon Emergency Preparedness[1]
- O'Neill Regional Park
- Orange County Emergency Management
- Orange County Fire Authority
- Orange County Health Care Agency
- Orange County Sheriff's Department

[1] The Chair of Dove Canyon Emergency Preparedness joined the Planning Team after the first meeting.

- Rancho Santa Margarita Landscape and Recreation Corporation (SAMLARC)
- Saddleback Valley Unified School District
- Santa Margarita Water District
- Southern California Edison
- Southern California Gas Company
- Trabuco Canyon Water District

Although specific Planning Team members may change, the City staff positions and departments and other partner agencies and organizations should continue to be included in the plan implementation and maintenance process.

The Project Management Team will facilitate the Planning Team meetings and will assign tasks such as updating and presenting the plan to other departments, stakeholder groups, and/or elected officials. The Planning Team will be responsible for maintaining and updating the plan and will coordinate implementation of the plan through their respective positions and agencies. Plan implementation and evaluation will be a shared responsibility among all Planning Team Members.

EVALUATION

At a minimum, an annual LHMP Planning Team meeting will be conducted to evaluate the progress of the plan and incorporate the actions into other planning documents. This review will include the following:

- Summary of any hazard events that occurred during the prior year and their impacts on the community.
- Review of successful mitigation initiatives identified in the plan.
- Brief discussion about why targeted mitigation actions were not completed.
- Reevaluation of the mitigation actions to determine if the timeline for identified projects needs to be amended (such as changing a long-term project to a short-term project due to funding availability).
- Recommendations for new mitigation actions.
- Changes in, or potential for, new funding options/grant opportunities.
- Integration of new data and maps that can be used to inform the plan.
- Evaluation of any other planning programs or initiatives within the City that involve hazard mitigation.

The purpose of the annual evaluation will be to ensure consideration and implementation of the LHMP and document progress in order to inform future LHMP updates.

6.2 METHOD AND SCHEDULE FOR UPDATING THE PLAN WITHIN FIVE YEARS

Section 201.6.(d)(3) of Title 44 of the Code of Federal Regulations requires that local hazard mitigation plans be reviewed, revised if appropriate, and resubmitted for approval in order to remain eligible for benefits awarded under the DMA. Monitoring the progress of the mitigation actions will be on-going throughout the five-year period between the adoption of the LHMP and the next update effort. The LHMP Planning Team will meet on an annual basis to monitor the status of the implementation of mitigation actions and develop updates as necessary.

The City intends to update the plan on a five-year cycle from the date of initial plan adoption. It is anticipated that this update process will be initiated at least one year prior to expiration of the existing plan. The cycle may be accelerated to less than five years based on the following triggers:

- A presidential disaster declaration that impacts the City.
- A hazard event that causes loss of life.

Should a significant disaster occur within the City, the LHMP Planning Team will reconvene to review and update the LHMP as appropriate.

PROCESS

The intent of the five-year update process will be to add new planning process methods, community profile data, hazard data and events, vulnerability analyses, mitigation actions, and goals to the adopted plan so that the LHMP will always be current and up to date. Based on the needs identified by the Planning Team, the update will, at a minimum, include the elements below:

1. The update process will be convened through a Planning Team identified by the City Project Management Team.

2. The hazard risk assessment will be reviewed and updated using best available information and technologies.

3. Based on new/updated information provided by facility owners and available funding, the evaluation of critical facilities and mapping will be updated and improved.

4. The mitigation actions will be reviewed and revised to account for any actions completed, deferred, or changed to account for changes in the risk assessment or new City policies identified under other planning mechanisms, as appropriate (such as the City's General Plan).

5. The draft update will be sent to appropriate agencies for comment.

6. The public will be given an opportunity to comment prior to adoption.

7. The City Council will adopt the updated LHMP.

The City's Project Management Team will coordinate with responsible City departments and agencies/organizations identified for each mitigation action. These responsible departments and agencies/organizations will monitor and evaluate the progress made on the implementation of mitigation actions and report to the LHMP Planning Team on an annual basis. Working with the LHMP Planning Team, these responsible departments and agencies/organizations will be asked to assess the effectiveness of the mitigation actions and modify the mitigation actions as appropriate. A LHMP Mitigation Action Progress Report worksheet or tracking mechanism will assist departments and agencies/organization responsible for implementing mitigation actions in reporting on the status and assessing the effectiveness of the mitigation actions.

Information from the departments and agencies/organizations will be used to monitor mitigation actions and inform the annual evaluation of the LHMP. The following questions will be considered as criteria for evaluating the plan's effectiveness:

- Has the nature or magnitude of hazards affecting the City changed?
- Are there new hazards that have the potential to impact the City?
- Do the identified goals and actions address current and expected conditions?
- Have mitigation actions been implemented or completed?
- Has the implementation of identified mitigation actions resulted in expected outcomes?
- Are current resources adequate to implement the LHMP?
- Should additional local resources be committed to address identified hazards?

An annual LHMP review questionnaire worksheet will be used to provide guidance to the LHMP Planning Team on what should be included in the evaluation. Future updates to the LHMP will account for any new hazard vulnerabilities, special circumstances, or new information that becomes available. Issues that arise during monitoring and evaluating the LHMP, which require changes to the risk assessment, mitigation strategy, and other components of the plan, will be incorporated into the next update of the LHMP in 2024. The questions identified above would remain valid during the preparation of the 2024 plan update.

6.3 ADOPTION

The LHMP Draft plan was presented to both the Rancho Santa Margarita Planning Commission and the City Council prior to transmittal to FEMA for review. The Rancho Santa Margarita City Council is responsible for adopting the LHMP. This formal adoption should take place every five years. Once the plan has received FEMA Approval Pending Adoption, the City Council will need to adopt the plan. Upon adoption, the City's Development Services Department will transmit the adopted plan to FEMA.

6.4 IMPLEMENTATION THROUGH EXISTING PROGRAMS

The effectiveness of the nonregulatory LHMP depends on the implementation of the plan and incorporation of the outlined mitigation action items into City plans, policies, and programs. The plan includes a range of action items that, if implemented, would reduce loss from hazard events in the City. Together, the mitigation action items in the LHMP provide the framework for activities that the City may choose to implement over the next five years. The City has prioritized the plan's goals and identified actions that will be implemented (resources permitting) through existing plans, policies, and programs.

The LHMP Project Manager (Principal Planner) is responsible for overseeing the plan's implementation and maintenance through the City's existing programs. The Principal Planner, or designated appointee, will assume lead responsibility for facilitating LHMP implementation and maintenance meetings. Although the Development Services Department will have primary responsibility for review, coordination, and promotion, plan implementation and evaluation will be a shared responsibility among all departments identified as lead departments in the mitigation action plan.

6.5 INCORPORATION INTO EXISTING PLANNING MECHANISMS

The information on hazards, risk, vulnerability, and mitigation contained in this plan is based on the best information and technology available at the time the LHMP was prepared. The City's General Plan is considered to be an integral part of this plan. The City, through adoption of its General Plan Safety Element goals, has planned for the impact of hazards. The LHMP process has allowed the City to review the policies contained in the General Plan Safety Element and identified mitigation actions that will further implement these policies. The City views the General Plan and the LHMP as complementary planning documents that work together to achieve the ultimate goal of the reduction of risk exposure to the citizens of the City. Many of the ongoing recommendations identified in the mitigation strategy further the goals and policies of the General Plan and other adopted plans. The City will coordinate the recommendations of the LHMP with other planning processes and programs including the following:

- Rancho Santa Margarita General Plan Updates
- Orange County Local Hazard Mitigation Plan
- Rancho Santa Margarita Capital Improvement Program
- Rancho Santa Margarita Building Codes

As a guidance document, implementation of the mitigation actions can be accomplished most effectively by integrating the LHMP into ongoing programs, policies, and practices. Opportunities to integrate the mitigation actions include the following:

- Integration of mitigation actions in emergency response and post-disaster recovery planning.

- Ongoing education and outreach programs to increase staff, resident, business owner, employees, and overall community awareness of the risks associated with natural hazards.

- Continued coordination with the City and other partner agencies and organizations on emergency operations and training opportunities.

6.6 CONTINUED PUBLIC INVOLVEMENT

The public will continue to be informed on LHMP actions through the City websites and through the annual progress report to the City Council. Upon initiation of the LHMP update, a new public involvement strategy will be developed based on guidance from the Planning Team. This strategy will be based on the needs and capabilities of the City at the time of the update. At a minimum, this strategy will include the use of the City website, email distribution lists, and social media, as well as coordination with partner agencies and organizations.

6.7 POINT OF CONTACT

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