**FINAL DRAFT REPORT**

# ORANGE COUNTY REGIONAL WATER AND WASTEWATER MULTI-HAZARD MITIGATION PLAN
ORANGE COUNTY, CALIFORNIA

PREPARED FOR:

**MUNICIPAL WATER DISTRICT OF ORANGE COUNTY**

URS PROJECT NO. 27655113.07000

**SEPTEMBER 29, 2006**

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# ORANGE COUNTY, CALIFORNIA

*Prepared for*

Municipal Water District of Orange County
10500 Ellis Avenue
Fountain Valley, CA 92728

URS Project No. 27655113.07000

September 29, 2006

URS

1615 Murray Canyon Road, Suite 1000
San Diego, CA 92108-4314
619.294.9400 Fax: 619.293.7920

# TABLE OF CONTENTS


**Section 1 Introduction**

1.1 Plan Description/Purpose of Plan ..... 1-1
1.2 Plan Purpose and Authority ..... 1-2
1.3 Participating Water Jurisdictions Backgrounds. ..... 1-3
1.4 Participating Wastewater Jurisdictions……...1-16

**Section 2 Multi-Jurisdictional Participation**

2.1 List of Participating Water Districts and City Public Utilities ……....2-1

**Section 3 Planning Process Documentation**

3.1 Description of Each Jurisdiction's Participation in the Planning Process.....3-1
3.2 Description of Planning Committee Formation..... 3-2
3.3 Name of Planning Committee and its Members ..... 3-2
3.4 Hazard Mitigation Working Group Meetings..... 3-4
3.5 Planning Process Milestones ..... 3-5
3.6 Public Involvement..... 3-6
3.7 Existing Plans or Studies Reviewed ..... 3-7

**Section 4 Risk Assessment**

4.1 Overview of the Risk Assessment Process ..... 4-1
4.2 Hazard Identification and Screening..... 4-2
4.3 Hazard Profiles ..... 4-7
4.4 Vulnerability Assessment ..... 4-43
4.5 Multi-Jurisdictional Assessment..... 4-59

**Section 5 General Overview of Assets, Goals and Objectives**

5.1 Purpose of the Plan ..... 5-1
5.2 Regional Considerations ..... 5-3
5.3 Regional Goals and Objectives for Hazard Mitigation Planning for Water…….....5-4
5.4 Regional Goals and5 Objectives for Hazard Mitigation Planning for Wastewater…..5-7
5.5 Implementation Through Existing Programs…….....5-10
5.6 Buena Park, City of – Objectives, Goals and Actions ..... 5-13
5.7 El Toro Water District – Objectives, Goals and Actions..... 5-23
5.8 Garden Grove, City of – Objectives, Goals and Actions..... 5-38
5.9 Laguna Beach County Water District – Objectives, Goals and Actions ..... 5-46
5.10 La Habra, City of – Objective, Goals and Actions ..... 5-54
5.11 Mesa Consolidated Water District– Objective, Goals and Actions..... 5-63
5.12 Moulton Niguel Water District – Objective, Goals and Actions ..... 5-71
5.13 Municipal Water District of Orange County– Objective, Goals and Actions ..... 5-81
5.14 Newport Beach, City of – Objective, Goals and Actions ..... 5-88
5.15 Orange County Sanitation District – Objectives, Goals and Actions ..... 5-100
5.16 Orange County Water District – Objective, Goals and Actions ..... 5-106
5.17 Orange, City of– Objective, Goals and Actions ..... 5-112
5.18 Santa Margarita Water District – Objective, Goals and Actions ..... 5-120

# TABLE OF CONTENTS

5.19 Serrano Water District – Objectives, Goals and Actions..... 5-129
5.20 South Coast Water District – Objective, Goals and Actions ..... 5-139
5.21 South Orange County Wastewater Authority- Objectives, Goals and Actions .....5-146
5.22 Trabuco Canyon Water District – Objective, Goals and Actions…….5-153
5.23 Tustin, City of – Objective, Goals and Actions..... 5-161
5.24 Westminster, City of – Objective, Goals and Actions..... 5-171
5.25 Yorba Linda Water District – Objective, Goals and Actions……...5-180

**Section 6 Plan Maintenance**

6.1 Monitoring, Evaluating and Updating the Plan ..... 6-1

**Section 7 References**

**Section 8 Appendices**

## Tables


Table 1.3-1 Existing Water Supply Sources for Water Utilities in Orange County
Table 1.3-2 Sources of Potable Water for OC Retail Agencies by Sub-Region
Table 1.3-3 Orange County Potable Water Demands and Supplies, Current/Future
Table 1.3-4 Existing Potable Water Storage Volume and Portion Available for Emergency
Table 1.3-5 Potable Well Water Production Capacity to Year 2025 by Producer
Table 3-1 Planning Representatives for Participating Jurisdictions
Table 4.2.2-1 Summary of Hazard Identification Results
Table 4.2.4-1 Summary of Hazards Excluded from Hazard Profiling
Table 4.3.4.3-1 Palmer Drought Severity Index
Table 4.3.5.3-1 Partial List of Earthquake Events in the Southern California Region
Table 4.3.11.2-1 Historic Tornado Events in Orange County (1958-2005)
Table 4.4.2-1 Abbreviation of Costs
Table 4.4.2-2 Summary of Assets
Table 4.4.2-3 Moderate Earthquake Threat – Inventory of Critical Facilities and Infrastructure of Exposure Value by Jurisdiction
Table 4.4.2-4 High Earthquake Threat - Inventory of Critical Facilities and Infrastructure of Exposure Value by Jurisdiction
Table 4.4.2-5 Extreme Earthquake Threat - Inventory of Critical Facilities and Infrastructure of Exposure Value by Jurisdiction
Table 4.4.2-6 500 Year Flood Plain - Inventory of Critical Facilities and Infrastructure of Exposure Value by Jurisdiction
Table 4.4.2-7 Slope over 25%: Landslide Hazard - Inventory of Critical Facilities and Infrastructure of Exposure Value by Jurisdiction
Table 4.4.2-8 Liquefaction – Moderate - Inventory of Critical Facilities and Infrastructure of Exposure Value by Jurisdiction
Table 4.4.2-9 Liquefaction – High - Inventory of Critical Facilities and Infrastructure of Exposure Value by Jurisdiction
Table 4.4.2-10 Liquefaction – Very High - Inventory of Critical Facilities and Infrastructure of Exposure Value by Jurisdiction
Table 4.4.2-11 Low Fire Threat - Inventory of Critical Facilities and Infrastructure of Exposure Value by Jurisdiction
Table 4.4.2-12 High Fire Threat - Inventory of Critical Facilities and Infrastructure of Exposure Value by Jurisdiction
Table 4.4.2-13 Extreme Fire Threat - Inventory of Critical Facilities and Infrastructure of Exposure Value by Jurisdiction
Table 4.4.2-14 Moderate to Extreme Earthquake – Inventory of Potable Water Line and Waste Water Line by Jurisdiction
Table 4.4.2-15 Flood: 100 Year and 500 Year – Inventory of Potable Water Line and Waste Water Line by Jurisdiction
Table 4.4.2-16 Landslide – Inventory of Potable Water Line and Waste Water Line by Jurisdiction

| | |
|---|---|
| Table 4.4.2-17 | Moderate to Very High Liquefaction – Inventory of Potable Water Line and Waste Water Line by Jurisdiction |
| Table 4.4.2-18 | Low to Extreme Wildlife/Structure Fire – Inventory of Potable Water Line and Waste Water Line by Jurisdiction |
| Table 4.5.1.1-1 | Characteristics of Imported Geologic Faults in Orange County, CA |
| Table 4.4.2.2-1 | Possible Loss of Local Water Supply due to Earthquake in/near Orange County by Retail Agency as a Percentage of Normal Local Supply Rate |
| Table 4.4.2.2 -2 | Possible Water Shortages in Event of a Major Earthquake in Orange County by Retail Water Agency |
| Table 5.5-1 | Joint Loss Estimation Table |
| Table 5.5-2 | MET Loss Estimation Table |
| Table 5.6.2-1 | City of Buena Park Legal and Regulatory Capability |
| Table 5.6.3-1 | City of Buena Park Administrative and Technical Capacity |
| Table 5.6.4-1 | City of Buena Park Fiscal Capability |
| Table 5.6.5-1 | City of Buena Park Local Mitigation Capability Assessment |
| Table 5.6-1 | City of Buena Park Loss Estimation Table |
| Table 5.7.3-1 | El Toro Water District Legal and Regulatory Capability |
| Table 5.7.4-1 | El Toro Water District Administrative and Technical Capacity |
| Table 5.7.5-1 | El Toro Water District Fiscal Capability |
| Table 5.7.6-1 | El Toro Water District Local Mitigation Capability Assessment |
| Table 5.7-1 | El Toro Water District Loss Estimation Table |
| Table 5.8.3-1 | City of Garden Grove Legal and Regulatory Capability |
| Table 5.8.4-1 | City of Garden Grove Administrative and Technical Capacity |
| Table 5.8.5-1 | City of Garden Grove Fiscal Capability |
| Table 5.8-1 | City of Garden Grove Loss Estimation Table |
| Table 5.9.3-1 | Laguna Beach County Water District Legal and Regulatory Capability |
| Table 5.9.4-1 | Laguna Beach County Water District Administrative and Technical Capacity |
| Table 5.9.5-1 | Laguna Beach County Water District Fiscal Capability |
| Table 5.9.6-1 | Laguna Beach County Water District Local Mitigation Capability Assessment |
| Table 5.9-1 | Laguna Beach County Water District Loss Estimation Table |
| Table 5.10.2-1 | City of La Habra Legal and Regulatory Capability |
| Table 5.10.3-1 | City of La Habra Administrative and Technical Capacity |
| Table 5.10.4-1 | City of La Habra Fiscal Capability |
| Table 5.10.5-1 | City of La Habra Local Mitigation Capability Assessment |
| Table 5.10-1 | City of La Habra Loss Estimation Table |
| Table 5.11.2-1 | Mesa Consolidated Water District Legal and Regulatory Capability |
| Table 5.11.3-1 | Mesa Consolidated Water District Administrative and Technical Capacity |
| Table 5.11.4-1 | Mesa Consolidated Water District Fiscal Capability |
| Table 5.11-1 | Mesa Consolidated Water District Loss Estimation Table |
| Table 5.12.3-1 | Moulton Niguel Water District Legal and Regulatory Capability |
| Table 5.12.4-1 | Moulton Niguel Water District Administrative and Technical Capacity |

Table 5.12.5-1 Moulton Niguel Water District Fiscal Capability
Table 5.12.6-1 Moulton Niguel Water District Local Mitigation Capability Assessment
Table 5.12-1 Moulton Niguel Water District Loss Estimation Table
Table 5.13.3-1 Municipal Water District of Orange County Legal and Regulatory Capability
Table 5.13.4-1 Municipal Water District of Orange County Administrative and Technical Capacity
Table 5.13.5-1 Municipal Water District of Orange County Fiscal Capability
Table 5.13.6-1 Municipal Water District of Orange County Local Mitigation Capability Assessment
Table 5.13-1 Municipal Water District of Orange County Loss Estimation Table
Table 5.14.3-1 City of Newport Beach Legal and Regulatory Capability
Table 5.14.4-1 City of Newport Beach Administrative and Technical Capacity
Table 5.14.5-1 City of Newport Beach Fiscal Capability
Table 5.14.6.1-1 City of Newport Beach Local Mitigation Capability Assessment
Table 5.14-1 City of Newport Beach Loss Estimation Table
Table 5.15.2-1 Orange County Sanitation District Legal and Regulatory Capability
Table 5.15.3-1 Orange County Sanitation District Administrative and Technical Capacity
Table 5.15.4-1 Orange County Sanitation District Fiscal Capability
Table 5.15.5-1 Orange County Sanitation District Local Mitigation Capability Assessment
Table 5.15-1 Orange County Sanitation District Loss Estimation Table
Table 5.16.2-1 Orange County Water District Legal and Regulatory Capability
Table 5.16.3-1 Orange County Water District Administrative and Technical Capacity
Table 5.16.4-1 Orange County Water District Fiscal Capability
Table 5.16 Orange County Water District Local Mitigation Capability Assessment
Table 5.16-1 Orange County Water District Loss Estimation Table
Table 5.17.2-1 City of Orange Legal and Regulatory Capability
Table 5.17.3-1 City of Orange Administrative and Technical Capacity
Table 5.17.4-1 City of Orange Fiscal Capability
Table 5.17.5-1 City of Orange Local Mitigation Capability Assessment
Table 5.17-1 City of Orange Loss Estimation Table
Table 5.18.2.1-1 Santa Margarita Water District Legal and Regulatory Capability
Table 5.18.3-1 Santa Margarita Water District Administrative and Technical Capacity
Table 5.18.4-1 Santa Margarita Water District Fiscal Capability
Table 5.18.5-1 Santa Margarita Water District Local Mitigation Capability Assessment
Table 5.18-1 Santa Margarita Water District Loss Estimation Table
Table 5.19.2-1 Serrano Water District Legal and Regulatory Capability
Table 5.19.3-1 Serrano Water District Administrative and Technical Capacity
Table 5.19.4-1 Serrano Water District Fiscal Capability
Table 5.19.5-1 Serrano Water District Local Mitigation Capability Assessment
Table 5.19-1 Serrano Water District Loss Estimation Table
Table 5.20.2-1 South Coast Water District Legal and Regulatory Capability
Table 5.20.3-1 South Coast Water District Administrative and Technical Capacity
Table 5.20.4-1 South Coast Water District Fiscal Capability

Table 5.20.5-1 South Coast Water District Local Mitigation Capability Assessment
Table 5.20-1 South Coast Water District Loss Estimation Table
Table 5.21.3-1 South Orange County Wastewater Authority Legal and Regulatory Capability
Table 5.21.4-1 South Orange County Wastewater Authority Administrative and Technical Capacity
Table 5.21.5-1 South Orange County Wastewater Authority Water District Capability
Table 5.21 South Orange County Wastewater Authority Local Mitigation Capability Assessment
Table 5.21-1 South Orange County Wastewater Authority Loss Estimation Table
Table 5.22.3-1 Trabuco Canyon Water District Legal and Regulatory Capability
Table 5.22.4-1 Trabuco Canyon Water District Administrative and Technical Capacity
Table 5.22.5-1 Trabuco Canyon Water District Fiscal Capability
Table 5.22.6-1 Trabuco Canyon Water District Local Mitigation Capability Assessment
Table 5.22-1 Trabuco Canyon Water District Loss Estimation Table
Table 5.23.3-1 City of Tustin Legal and Regulatory Capability
Table 5.23.4-1 City of Tustin Administrative and Technical Capacity
Table 5.23.5-1 City of Tustin Fiscal Capability
Table 5.23.6-1 City of Tustin Local Mitigation Capability Assessment
Table 5.23-1 City of Tustin Loss Estimation Table
Table 5.24.3-4 City of Westminster Legal and Regulatory Capability
Table 5.24.4-1 City of Westminster Administrative and Technical Capacity
Table 5.24.5-1 City of Westminster Fiscal Capability
Table 5.24.6-1 City of Westminster Local Mitigation Capability Assessment
Table 5.24-1 City of Westminster Loss Estimation Table
Table 5.25.4-1 Yorba Linda Water District Legal and Regulatory Capability
Table 5.25.5-1 Yorba Linda Water District Administrative and Technical Capacity
Table 5.25.6-1 Yorba Linda Water District Fiscal Capability
Table 5.25.7-1 Yorba Linda Water District Local Mitigation Capability Assessment
Table 5.25-1 Yorba Linda Water District Loss Estimation Table

## Figures


| | |
|---|---|
| Figure 1.3-1 | Orange County Retail Agencies & Regional Water Facilities |
| Figure 1.3-2 | Orange County Retail Agencies & Sub-Areas |
| Figure 1.3.4.1-1 | Orange County Water District Basin Areas |
| Figure 1.4.1.1-1 | Orange County Sanitation District Service Area |
| Figure 1.4.2-1 | SOCWA Regional Wastewater System |
| Figure 2-1 | Participating Jurisdictions MWDOC Mitigation Plan |
| Figure 2-2 | MWDOC's Service Area and Member Utilities |
| Figure 4.31a | Tsunami Inundation Maps for Orange County |
| Figure 4.31b | Tsunami Inundation Maps for Orange County |
| Figure 4.31c | Tsunami Inundation Maps for Orange County |
| Figure 4.31d | Tsunami Inundation Maps for Orange County |
| Figure 4.31e | Tsunami Inundation Maps for Orange County |
| Figure 4.31f | Tsunami Inundation Maps for Orange County |
| Figure 4.3-2 | Earthquake-Orange County MWDOC Hazard Mitigation Plan |
| Figure 4.3-3 | Liquefaction-Orange County MWDOC Hazard Mitigation Plan |
| Figure 4.3-4 | Flood-Orange County MWDOC Hazard Mitigation Plan |
| Figure 4.3-5 | Slopes Greater Than 25% Landslide – Orange County MWDOC Hazard Mitigation Plan |
| Figure 4.3-6 | Urban/Wildland Fire Threat-Orange County MWDOC Hazard Mitigation Plan |
| Figure 4.4.2.1-1 | Active Geologic Faults in/near Orange County |
| Figure 4.4.2.1-2 | Shaking Pattern Due to a Simulated Earthquake Magnitude 6.9 Newport Inglewood Fault |
| Figure 4.4.2.1-3 | Shaking Pattern Due to a Simulated Earthquake Magnitude 6.8 Peralta Hills Fault |
| Figure 4.4.2.1-4 | Shaking Pattern Due to a Simulated Earthquake Magnitude 7.5 Puente Hells Fault |
| Figure 4.4.2.1-5 | Shaking Pattern Due to a Simulated Earthquake Magnitude 6.6 San Joaquin Hills Fault |
| Figure 4.4.2.1-6 | Shaking Pattern Due to a Simulated Earthquake Magnitude 6.8 Whittier Fault |
| Figure 5.6-1 | Buena Park Water Assets |
| Figure 5.7-1 | El Toro Water District Water Assets |
| Figure 5.8-1 | Garden Grove Water and Wastewater Assets |
| Figure 5.9-1 | Laguna Beach County Water District Water Assets |
| Figure 5.10-1 | La Habra Water Assets |
| Figure 5.11-1 | Mesa Consolidated Water District Water and Wastewater Assets |
| Figure 5.12-1 | Moulton Niguel Water District Water and Wastewater Assets |
| Figure 5.13-1 | MWDOC, Joint and MET Water Assets |
| Figure 5.14-1 | Newport Beach Water and Wastewater Assets |
| Figure 5.15-1 | Orange County Sanitation District Wastewater Assets |
| Figure 5.16-1 | Orange County Water District Water Assets |
| Figure 5.17-1 | City of Orange Water District |

Figure 5.18-1 Santa Margarita Water District Water and Wastewater Assets
Figure 5.19-1 South Orange County Wastewater Authority Wastewater Assets
Figure 5.20-1 Serrano Canyon Water District Water Assets
Figure 5.21-1 South Coast Water District Water and Wastewater Assets
Figure 5.22-1 City of Tustin Water Assets
Figure 5.23-1 Trabuco Canyon Water District Water Assets
Figure 5.24-1 City of Westminster Water Assets
Figure 5.25-1 Yorba Linda Water and Wastewater Assets

## List of Acronyms and Abbreviations

| | |
|---|---|
| ACOE | Army Corps of Engineers |
| ADM | Administration |
| AF/yr | Acre Feet/ year |
| ALERT | Automated Level Evaluation in Real Time |
| AMP | Allen-McColloch Pipeline |
| AQMD | Air Quality Management District |
| ATM | Aufdenkamp Transmission Main |
| BPP | Basin Production Percentage |
| CA DHS | California Department of Health Services |
| CATIC | California Anti-Terrorism Information Center |
| CDBG | Community Development Block Grants |
| CDF-FRAP | California Department of Forestry-Fire and Resource Assessment Program |
| CDFG | California Department of Fish and Game |
| CDR | Center for Demographic Research |
| CFR | Code of Federal Regulations |
| cfs | cubic feet per second |
| CGS | California Geological Survey |
| CIP Plan | Capital Improvement Plan |
| CISN | California Integrated Seismic Network |
| COE | Corps of Engineers |
| CRS | |
| CSSC | California Seismic Safety Commission |
| DHS | Department of Homeland Security |
| DMA 2000 | Disaster Mitigation Act of 2000 |
| EIT | Emergency Interties |
| EMS | Emergency Medical Services |
| EOC | Emergency Operations Center |
| EPA | U.S. Environmental Protection Agency |
| EPA- VA | Environmental Protection Agency- Vulnerability Assessment |
| EPCRA | Emergency Planning and Community-Right-To-Know |
| ERP | Emergency Response Plan |
| ESRI | a Geographic Information System software development firm |
| FBI | Federal Bureau of Investigation |
| FEMA | Federal Emergency Management Agency |
| FIRM | FEMA Flood Insurance Rate Maps |
| GIS | Geographic Information System |
| gpm | gallons per minute |
| GWR System | Groundwater Replenishment System |
| HAZUS | (pg 4-97) |
| HCA | (p 4-125) |
| HMGP | Hazard Mitigation Grant Program |
| HMP | Hazard Mitigation Plan |
| HMWG | Hazard Mitigation Working Group |
| How-to Guide | *FEMA State and Local Mitigation Planning How-to Guide* |
| IRWD | Irvine Ranch Water District |
| ISPU | Interim Strategic Plan Update |

| | |
|---|---|
| JRWSS | Joint Regional Water Supply System |
| JTM | Joint Regional Transmission Main |
| LADWP | Los Angeles Department of Water and Power |
| LAFCO | Local Agency Formation Committee |
| LBCWD | Laguna Beach Canyon Water District |
| LPG | Local Planning Groups |
| LS | Lift Station |
| Mesa | Mesa Consolidated Water District |
| MET | Metropolitan Water District of Southern California |
| MNWD | Moulton Niguel Water District |
| MOA | Memorandum of Agreement |
| MSL | Mean Sea Level |
| MWDOC | Municipal Water District of Orange County |
| NCCP | National Communities Conservation Plan |
| NIMS | National Incident Management System |
| NOAA | National Oceanographic and Atmospheric Administration |
| NRCS | Natural Resources Conservation Service |
| NWD | National Weather Service |
| OC | Orange County |
| OC-44 | name of a potable water service connection |
| OC-88 | name of a potable water service connection |
| OCBC | Orange County Business Council |
| OCFA | Orange County Fire Authority |
| OCJTTF | Orange County Joint Terrorism Task Force |
| OC-MAIN | table 4.4.3-2 -additional section 4 insert |
| OCSD | Orange County Sanitation District |
| OCWD | Orange County Water District |
| OES | California Office of Emergency Services |
| OSHA | Occupational Safety and Health Administration |
| PDD | Presidential Decision Directive |
| PDSI | "Palmer Drought Severity Index" |
| PGA | Peak Ground Acceleration |
| PP | Power Plant |
| PRS | Pressure Reducing Station |
| PS | Pump Station |
| PSTRG | Private Sector Terrorism Response Group |
| PW | potable water |
| PWU | Participating Water and Wastewater Utilities |
| R-6 | Name of a reservoir |
| RDMD | County of Orange Resource Development and Management Department |
| RES | Reservoir |
| RMS | Reservoir Management Systems |
| RWQCB | Regional Water Quality Control Board |
| SAMP | Special Area Master Plan |
| SAR | Santa Ana River |
| SARA | Superfund Amendments and Reauthorization Act |
| SAWPA | Santa Ana Watershed Project Authority |
| SC | Service Connectors |
| SCADA | Supervisory Control and Data Acquisition |

| | |
|---|---|
| SCEC | Southern California Earthquake Center |
| SCEDC | Southern California Earthquake Data Center |
| SCP | South County Pipeline |
| SCWD | South Coast Water District |
| SEMS | Standardized Emergency Management System |
| SMWD | Santa Margarita Water District |
| SOCWA | South Orange County Wastewater Authority |
| SONGS | San Onofre Nuclear Generating Station |
| STAPLEE | Social, Technical, Administrative, Political, Legal, Economic, and Environmental Considerations |
| TCWD | Trabuco Canyon Water District |
| TDS | Total Dissolved Solids |
| TEWG | Terrorism Early Warning Working Group |
| Title M&22 (potable) | California Drinking Water Regulation |
| TRI | Toxic Release Inventory |
| TWG | Terrorism Working Group |
| USACE | United States Army Corps of Engineers |
| USFS | United States Forest Service |
| USFWS | United States Fish and Wildlife Service |
| USGS | United States Geological Survey |
| W.I.S.E. | (pg 4-39) |
| WD | Water District |
| WELL | Well |
| WEROC | Water Emergency Response Organization of Orange County |
| WMD | Weapons of Mass Destruction |
| WRP Lab | (pg 4-182) |
| WST | Water Storage Tank |
| WTP | Water Treatment Plant |
| WUE | Water Use Efficiency |
| WW | waste water |
| WWTP | Wastewater Treatment Plant |
| YLWD | Yorba Linda Water District |

# SECTION 1 INTRODUCTION

Across the United States, natural and manmade disasters have led to increasing levels of death, injury, property damage, and interruption of business and government services. The impact on families and individuals can be immense and damages to businesses can result in regional economic consequences. The time, money, and effort to respond to and recover from these disasters divert public resources and attention from other important programs and problems. Correspondingly, the Municipal Water District of Orange County prepared a Hazard Mitigation Plan that identified critical facilities in the county, and mitigation actions in the form of projects and programs to reduce the impact of natural and manmade hazards. This Multi-Hazard Mitigation Plan (the Plan) is being prepared for the MWDOC and 19 other participating water and wastewater utilities (PWU). As such, the Plan focuses on water and wastewater facilities in Orange County, California and identifies mitigation actions to reduce the impact of natural and manmade hazards on these critical facilities. The Plan was prepared with input from county residents, responsible officials, URS Corporation consultants, and with the support of the State of California Office of Emergency Services (OES) and the Federal Emergency Management Agency (FEMA). The process to develop the Plan included nearly a year of coordination with representatives from MWDOC and all of the PWU. The Plan will guide MWDOC and the PWU toward greater disaster resistance in harmony with the character and needs of the community.

This section of the Plan includes an overview of the Plan, a discussion of the Plan's purpose and authority, and a description of the relationship between MWDOC and the PWU within Orange County.

## 1.1 PLAN DESCRIPTION/PURPOSE OF PLAN

Federal legislation has historically provided funding for disaster relief, recovery, and some hazard mitigation planning. The Disaster Mitigation Act of 2000 (DMA 2000) is the latest legislation to improve this planning process (Public Law 106-390). The new legislation reinforces the importance of mitigation planning and emphasizes planning for disasters before they occur. As such, DMA 2000 establishes a pre-disaster hazard mitigation program and new requirements for the national post-disaster Hazard Mitigation Grant Program (HMGP).

Section 322 of DMA 2000 specifically addresses mitigation planning at the state and local levels. It identifies new requirements that allow HMGP funds to be used for planning activities, and increases the amount of HMGP funds available to states that have developed a comprehensive, enhanced mitigation plan prior to a disaster. States and communities must have an approved mitigation plan in place prior to receiving pre or post disaster funds. Local mitigation plans must demonstrate that their proposed mitigation measures are based on a sound planning process that accounts for the risk to and the capabilities of the individual communities.

State governments have certain responsibilities for implementing Section 322, including:

- Preparing and submitting a standard or enhanced state mitigation plan;
- Reviewing and updating the state mitigation plan every three years;

- Providing technical assistance and training to local governments to assist them in applying for HMGP grants and in developing local mitigation plans; and
- Reviewing and approving local plans if the state is designated a managing state and has an approved enhanced plan.

DMA 2000 is intended to facilitate cooperation between state and local authorities, prompting them to work together. It encourages and rewards local and state pre-disaster planning and promotes sustainability as a strategy for disaster resistance. This enhanced planning network is intended to enable local and state governments to articulate accurate needs for mitigation, resulting in faster allocation of funding and more effective risk reduction projects.

FEMA prepared an Interim Final Rule, published in the Federal Register on February 26, 2002 (44 CFR Parts 201 and 206), which establishes planning and funding criteria for states and local communities.

For federal approval, the following criteria must be met during the planning process:

- Complete documentation of the planning process.
- Detailed risk assessment of hazard exposures in the community.
- Comprehensive mitigation strategy, describing goals and objectives, proposed strategies, programs and actions to avoid long-term vulnerabilities.
- A planned maintenance process will describe the method and schedule of monitoring, evaluating and updating the plan, and the integration of the Hazard Mitigation Plan into other planning mechanisms.
- The formal adoption of the Plan by the Board of Directors for each PWU and City Council for each participating city water utility.
- Plan review by both State OES and FEMA.

The Plan has been prepared to meet FEMA and OES requirements, thus making MWDOC and the PWU eligible for funding and technical assistance for state and federal hazard mitigation programs.

## 1.2 PLAN PURPOSE AND AUTHORITY

As the cost of the damage from natural disasters continues to increase, the PWU realizes the importance of identifying effective ways to reduce vulnerability to disasters. Hazard mitigation plans assist communities in reducing risk from natural hazards by identifying resources, information, and strategies for risk reduction, while guiding and coordinating mitigation activities throughout the County.

The Orange County Water and Wastewater Multi-Jurisdictional Hazard Mitigation Plan provides a framework for water and wastewater utilities to plan for natural and man-made hazards in Orange County. The resources and background information in the Plan are applicable countywide, providing the groundwork for goals and recommendations for other local mitigation plans and partnerships.

The Plan is intended to serve many purposes, including:

- *Enhance Public Awareness and Understanding* – to help residents of the County better understand the natural and manmade hazards that threaten public health, safety, and welfare; economic vitality; and the operational capability of important facilities;
- *Create a Decision Tool for Management* – to provide information so that water and wastewater managers and leaders of local government, may take action to address vulnerabilities to future disasters;
- *Promote Compliance with State and Federal Program Requirements* – to ensure that MWDOC/PWU can take full advantage of state and federal grant programs, policies, and regulations that encourage or mandate that local governments and special districts develop comprehensive hazard mitigation plans;
- *Enhance Local Policies for Hazard Mitigation Capability* – to provide the policy basis for mitigation actions that should be promulgated by MWDOC/PWU to create a more disaster-resistant future;
- Provide *Inter-Jurisdictional Coordination of Mitigation-Related Programming* – to ensure that proposals for mitigation initiatives are reviewed and coordinated among MWDOC/PWU within the County*;* and
- Achieve *Regulatory Compliance* – to qualify for certain forms of federal aid for pre- and post-disaster funding, local jurisdictions must comply with the federal DMA 2000 and its implementing regulations (44 CFR Section 201.6). DMA 2000 intends for hazard mitigation plans to remain relevant and current. Therefore, it requires that state hazard mitigation plans are updated every three years and local plans, including MWDOC/PWU, every five years. This means that the Hazard Mitigation Plan for MWDOC uses a "five-year planning horizon." It is designed to carry MWDOC/PWU through the next five years, after which its assumptions, goals, and objectives will be revisited and the Plan resubmitted for approval.

The Plan provides action items to reduce risk from natural hazards by fostering the development of partnerships and implementation of preventative activities.

The resources and information within the Plan:

- Establish a basis for coordination and collaboration among MWDOC/PWU and the public in the County of Orange;
- Identify and prioritize future mitigation projects; and
- Assist in meeting the requirements of federal assistance programs.

## 1.3 PARTICIPATING WATER JURISDICTIONS BACKGROUND

Orange County relies on numerous sources of water and water purveyors to meet the needs of its growing population. There are thirty-two retail water utilities in Orange County. A retail water utility can be a city

water department, a water district, or a private water company. Each has a distinct service area and sources of potable water supply. Figure 1.3-1 shows the locations of water utilities and regional facilities in Orange County.

Regional water management in Orange County is provided through MWDOC and the Orange County Water District (OCWD). Together, these utilities assist in the management of imported water, Santa Ana River water and the OCWD groundwater basin for over three million residents and businesses in Orange County.

MWDOC and OCWD work together to provide water to the thirty two retail utilities in the County. For hazard mitigation planning with respect to water systems, it is important to remember that each retail Utility may have different source mixes of potable water supply and thus different exposures to vulnerability from supply disruptions. It is also important to note that retail utilities with heavy reliance on the imported system can have their supplies disrupted by an outage of either the Diemer Filtration Plant in Yorba Linda or one of the several pipelines leading from the treatment plant. Outages of Metropolitan Water District of Southern California (MET) facilities bringing water to the County can also be the cause of imported service disruptions. Utilities relying on local supplies, especially when there are multiple sources such as wells within the OCWD groundwater basin, have a lower risk profile from imported system disruptions.

As will be discussed later in the report, the most extreme risk to the regional imported water system in Orange County is from earthquakes. Based on the risk profile of having the import system knocked out from an earthquake, the County can be grouped into three regions based on the availability of local groundwater resources to the region. The three regions are:

- Brea/La Habra
- OCWD (Orange County Water District) Basin
- South Orange County

The thirty two retail water utilities are shown in Figure 1.3-1 and are grouped by the three regions in Figure 1.3-2 and Table 1.3-1.

Table 1.3-2 shows the percentage of sources of potable water utilized by each retail water utility. Some of the water utilities have significantly reduced their potable water (drinking water) demands by creating a non-domestic water system that delivers non-potable water (usually recycled wastewater) for landscape irrigation and other non-drinking water uses. However, the majority of water demand in Orange County is for potable water. Local potable sources can be summarized for the three regions, as follows:

**Figure 1.3-1 Orange County Retail Agencies and Regional Water Facilities**

**Figure 1.3-2 Orange County Retail Agencies and Sub-Areas**

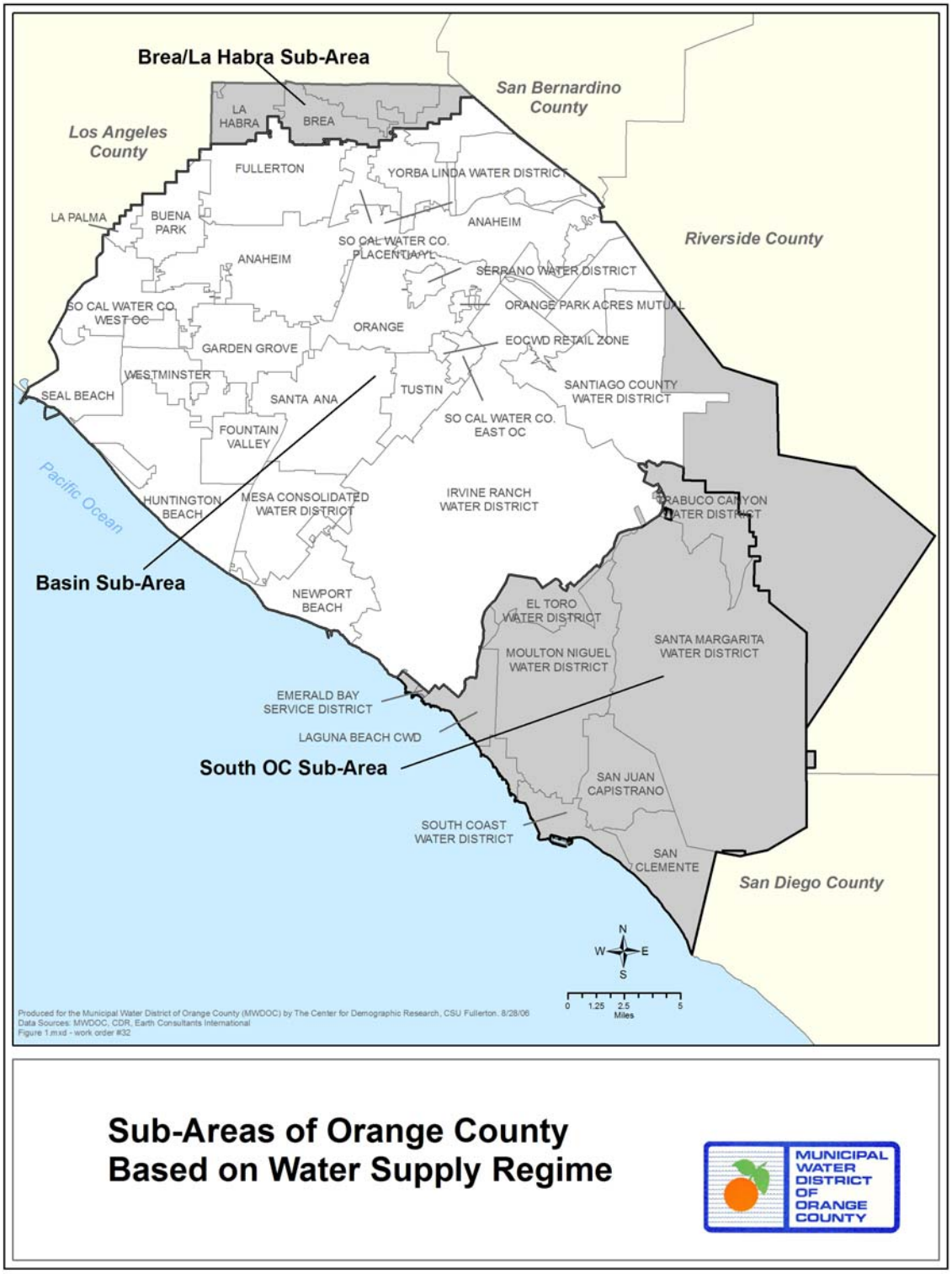


**Table 1.3-1**
**Sources of Potable Water for OC Retail Agencies by Sub-Region**

| Sub-Region | Retail Water Agency | OCWD Basin Wells | Own Wells not in OCWD | Ground Water from Others | Surface Water, Treated | Met Diemer Treat-ment Plant | Other Met Treat-ment Plants |
|---|---|---|---|---|---|---|---|
| Brea/ LaHabra | Brea, City of | | | X | | X | X |
| | La Habra, City of | | X | X | | X | X |
| OCWD Basin | Anaheim, City of | X | | | X | X | X |
| | Buena Park, City of | X | | | | X | X |
| | East Orange CWD | X | | | | X | |
| | Fountain Valley | X | | | | X | X |
| | Fullerton | X | | | | X | X |
| | Garden Grove | X | | | | X | X |
| | Golden State –East | X | | | | X | X |
| | " Plac./YL | X | | | | X | X |
| | " West OC | X | | | | X | X |
| | Huntington Beach | X | | | | X | X |
| | Irvine Ranch WD | X | X[1] | | | X | X |
| | La Palma | X | | | | X | X |
| | Mesa Consol. WD | X | | | | X | X |
| | Newport Beach | X | | | | X | X |
| | Orange | X | | | | X | X |
| | Orange Park Acres | X | | | | X | |
| | Santa Ana | X | | | | X | X |
| | Seal Beach | X | | | | X | X |
| | Serrano WD | X | | | X | | |
| | Tustin | X | | | | X | |
| | Westminster | X | | | | X | X |
| | Yorba Linda WD | X | | | | X | |
| South OC | El Toro WD | | | | | X | |
| | Emerald Bay SD | | | | | X | X |
| | Laguna Beach CWD | | | | | X | X |
| | Moulton Niguel WD | | | | | X | |
| | San Clemente | | X | | | X | |
| | San Juan Capo | | X | | | X | |
| | Santa Margarita WD | | X | | | X | |
| | South Coast WD | | X[2] | | | X | |
| | Trabuco Canyon WD | | X | | X | X | |
| Counts | 33 | 22 | 7 | 2 | 3 | 32 | 20 |

X = Agency can normally receive potable water from this source

1 = IRWD Harding Canyon production is groundwater under the influence of surface water, and must be treated

2 = SCWD brackish groundwater recovery plant is under construction

- The Brea/La Habra region receives about 12,000 AF/yr of groundwater from the San Gabriel Basin in Los Angeles County through California Domestic Water Company and about an equal amount from MET. La Habra also has a small groundwater well.
- The OCWD Basin utilities pump 64 to 75 percent of their annual needs from the OCWD groundwater Basin; most of the rest of their supply is MET treated water. Anaheim produces about 12,000 acre feet/yr from its treatment plant served by a MET raw water pipeline. Serrano WD produces potable water from local runoff captured in Irvine Lake, which is then processed through its treatment plant for its own use, as well as to sell to the City of Orange.
- The South Orange County area is about 95% dependent on MET for its potable water supply; local groundwater in the South Orange County area is typically, in much smaller amounts than the OCWD Basin, and is high in TDS (salt). Trabuco Canyon WD has a 6 cfs treatment plant which draws from a MET raw water pipeline for its own use and can provide limited potable water to Santa Margarita WD when needed.

**Table 1.3-2**
**Existing Water Supply Sources for Water Utilities in Orange County**

| Retailed Water Utility | Metropolitan Water [1] | Ground Water | Surface Water | Recycled/Non-Pot. Water [2] |
|---|---|---|---|---|
| City of Buena Park | 34% | 66% | | |
| El Toro WD | 95% | | | 5% |
| City of Garden Grove | 35% | 65% | | |
| City of La Habra | 30% | 70% | | |
| Laguna Beach CWD | 100% | 0% | | |
| Mesa Consolidated WD | 5% | 95% | | 4% |
| Moulton Niguel WD | 83% | 0% | | 17% |
| City of Newport Beach | 33% | 67% | | <1% |
| City of Orange | 32% | 66% | 2% | |
| Santa Margarita WD | 84% | | | 16% |
| Serrano WD | | 53% | 47% | |
| South Coast WD | 88% | | | 12% |
| Trabuco Canyon WD | 75% | 5% | 0% | 20% |
| City of Tustin | 16% | 84% | | |
| City of Westminster | 33% | 67% | | |
| Yorba Linda WD | 48% | 52% | | |

[1] Metropolitan Water District of Southern California import water to Southern California from the Colorado River Basin and from Northern California. Long-Term "In-Lieu" water deliveries included.

[2] Recycled municipal wastewater and/or Non-Potable surface.

### 1.3.1 Potable Water System Supplies – Current and Future

Orange County total water demands would have been about 735,000 AF/yr in 2005, however, water use efficiency efforts have shaved off about 58,000 AF/yr of demand. Recycling plus non-domestic supplies are at the 50,000 AF/yr level. This leaves about 627,000 AF/yr of potable water demand in 2005, growing to about 746,000 AF/yr by 2025. At present, about half of OC's potable water supplies are imported from MET. As shown in Table 1.3-3, OC population is projected to rise from 3.1 million to 3.7 million people, and potable water demand is projected to rise at just about the same rate. Potable water supplies that were used in 2005 and are projected for 2025 are summarized by source in Table 1.3-3.

**Table 1.3-3**
**Orange County Potable Water Demands and Supplies, Current/Future**

| | 2005 | 2025 | % Inc | Notes |
|---|---|---|---|---|
| **Population (millions)** | 3.1 | 3.7 | 19% | 2005 actual; projections per CDR, CSUF |
| **ACRE-FEET** | | | | |
| a. Water demand before WUE | 735,000 | 936,000 | 27% | Based on OC-MAIN [(1)], rounded |
| b. Less WUE | 58,000 | 115,000 | 27% | Based on OC-MAIN[(1)], rounded |
| a – b = Consumptive Water demand | 677,000 | 821,000 | 21% | |
| c. Less Recycling.& Non-domestic supply<br><br>**a – b - c = Consumptive Demand for Potable Water** | 50,000<br><br>**627,000** | 75,000<br><br>**746,000** | 50%<br><br>**19%** | Recycled & Non-Domestic Projections per agencies' responses to MWDOC 5-yr. Water Demand survey Spring '05. If the achieved Recycled & Non-Domestic supplies are less than projected, potable water demand will increase. |
| d. OCWD Basin pumping | 350,000 | 450,000 | 29% | Projection per agencies' responses to survey Spring '05, with assumed BPP of 75%. If Santa Ana River capture is limited, future basin pumping would be less than shown. |
| e. Less Import. Replenishment | 60,000 | 60,000 | 0% | OCWD's continued purchase of replenishment water in future assumes continued availability from MET; otherwise pumping volume would decrease. |
| d – e = OCWD Basin pumping, non-imported source water only | 290,000 | 390,000 | 34% | Increase shown results from GWRS production of 72,000 af/yr and increased capture of Santa Ana River water. |
| f. Non-OCWD Basin potable water wells | 2,000 | 9,000 | 350% | Increase is from San Juan (4,800 af/yr), and Capistrano Beach Desalters (1,300 af/yr) and others. |
| g. Cal Domestic supply to Brea & La Habra | 13,000 | 13,000 | 0% | |
| h. Anaheim WTP | 12,500 | 14,500 | 16% | |
| i. Serrano WTP | 2,500 | 3,000 | 20% | |
| j. Trabuco WTP | 3,000 | 4,000 | 33% | |
| k. Ocean Water Desal Plant | | 25,000 | n/a | If ocean desal production is less than shown, demand on Met would increase. |
| a – b – c - d – e – f – g - h – j - k = **Met treated full service water** | 304,000 | 287,500 | -5% | By subtraction. Does not include water for replenishment of OCWD Basin. |

| | | | | |
|---|---|---|---|---|
| **Sum of Potable Supplies** | **627,000** | **746,000** | **19%** | |
| **CFS** | | | | |
| Annual average demand rate | 870 | 1,030 | 18% | Potable water only, rounded |
| Peak mo. demand rate @1.35 | 1,170 | 1,390 | 19% | Potable water only, rounded |

1. MWDOC's OC-MAIN model dated Dec 2000 is an econometric model that used demographics prepared by the Center for Demographic Research CSUF. The OC-MAIN model projected in 5-yr intervals from 2005 through 2020. MWDOC projected 2025 numbers by straight-line extension from the model's 2015 and 2020 numbers.

### 1.3.2 Emergency Supplies

For emergency supply analyses, it is assumed that all local water treatment plants (WTPs) would be run at full capacity. The City of Orange would use any of the Serrano WTP capacity not being used by Serrano.

Reservoir storage provides a source of emergency water, but its rate of supply during a system outage event is limited based upon the type and duration of event. For a planned facility outage, it is assumed that tanks would be topped off prior to the outage, and 70% of tank volume would be "available" during the outage period. But an earthquake could strike with tank storage at various levels, and it is assumed that only 30% of tank volume would be "available". The "available" volume would be drawn down at a steady rate over the duration of the outage (7 days for a planned outage, 10-31 days for an earthquake). Gross storage volumes and "available" volumes for each water utility are shown in Table 1.3-4.

### 1.3.3 Imported Water

MWDOC is Orange County's imported water wholesaler, supplying 29 water retailers. These entities, comprised of cities and water districts, are referred to as MWDOC member utilities and provide water to approximately 2.3 million customers. MWDOC represents the interests of its member utilities and is MET's third largest member utility. The cities of Anaheim, Fullerton, and Santa Ana are direct MET member utilities and are not represented by MWDOC.

Imported water from Northern California and the Colorado River meet approximately half of the County's water needs. This water is provided by MET, which serves the needs of six counties – Ventura, Los Angeles, San Bernardino, Riverside, Orange, and San Diego.

MET "imports" water from the distant Colorado River and Northern California, and treats the raw water to potable quality at its water treatment plants. The MET Diemer Treatment Plant in Yorba Linda can deliver water to all of Orange County via MET feeders and joint-utility pipelines. Additionally, the western portion of Orange County can be served by MET's Jensen Treatment Plant via the Sepulveda Feeder and other feeders. The Brea/La Habra and the OCWD Basin areas obtain some flow from MET's Weymouth Treatment Plant via the relatively small Orange County Feeder. The South Orange County area receives almost all its imported water from MET's Diemer Plant, via the Allen-McColloch Pipeline (AMP) and its extension, the South County Pipeline (SCP), and via the East Orange County Feeder No. 2 (EOCF#2) and its main extensions the Joint Regional Transmission Main (JTM) and Aufdenkamp Transmission Main (ATM). The MET OC-88 South County Pump Station (OC-88 SCPS) is a key facility, boosting water about 300 feet hydraulically from the AMP into the SCP to allow service throughout south Orange County. About 10 cfs of flow from MET can reach Laguna Beach via the south

end of the Orange County Feeder and the Coast Supply Line. There are three large lined-and-covered reservoirs in the County of Orange: the El Toro Water District's R-6 Reservoir, the City of Newport Beach's Big Canyon Reservoir, and the MET's Orange County Reservoir in Brea.

Regarding imported water supplies, there are many assumptions that are noted in Table 1.3-3. The largest unknown is the success rate of planned local projects. If the water supply projects do not get built or produce less than planned or are merely delayed, then more MET water will be needed than shown. With the planned local projects plus the continued availability of MET Replenishment water for the OCWD Basin, Table 1.3-3 shows a 5% decrease in Full-Service MET water demand out to 2025.

For hazard mitigation purposes relative to water supply in Orange County, the continued heavy reliance on imported water points out the need to ensure the high reliability of the import system both inside of Orange County and those portions of the MET system bringing the water to Orange County.

### 1.3.4 Groundwater

Among all local supplies available to retail agencies, groundwater sources supply the most water. The water supply resources in Orange County result from the existence of the following three groundwater basins.

- OCWD Groundwater Basin
- La Habra Groundwater Basin
- San Juan Capistrano Groundwater Basin (San Juan Basin Authority)

#### 1.3.4.1 OCWD Groundwater Basin

The Orange County Basin is by far the largest groundwater basin in Orange County. The underlying formations are dominated by a deep structural depression containing a thick accumulation of fresh water-bearing interbedded marine and continental sand, silt and clay deposits. The proportion of fine material generally increases toward the coast, dividing the Basin into forebay and pressure areas. Figure 1.3.4.1-1 shows an overview of the basin areas. The sediments containing easily recoverable fresh water extend to about 2,000 feet below the ground surface near the center of the Basin. Well yields range from 500 to 4,500 gallons per minute (gpm), but are generally 2,000 to 3,000 gpm.

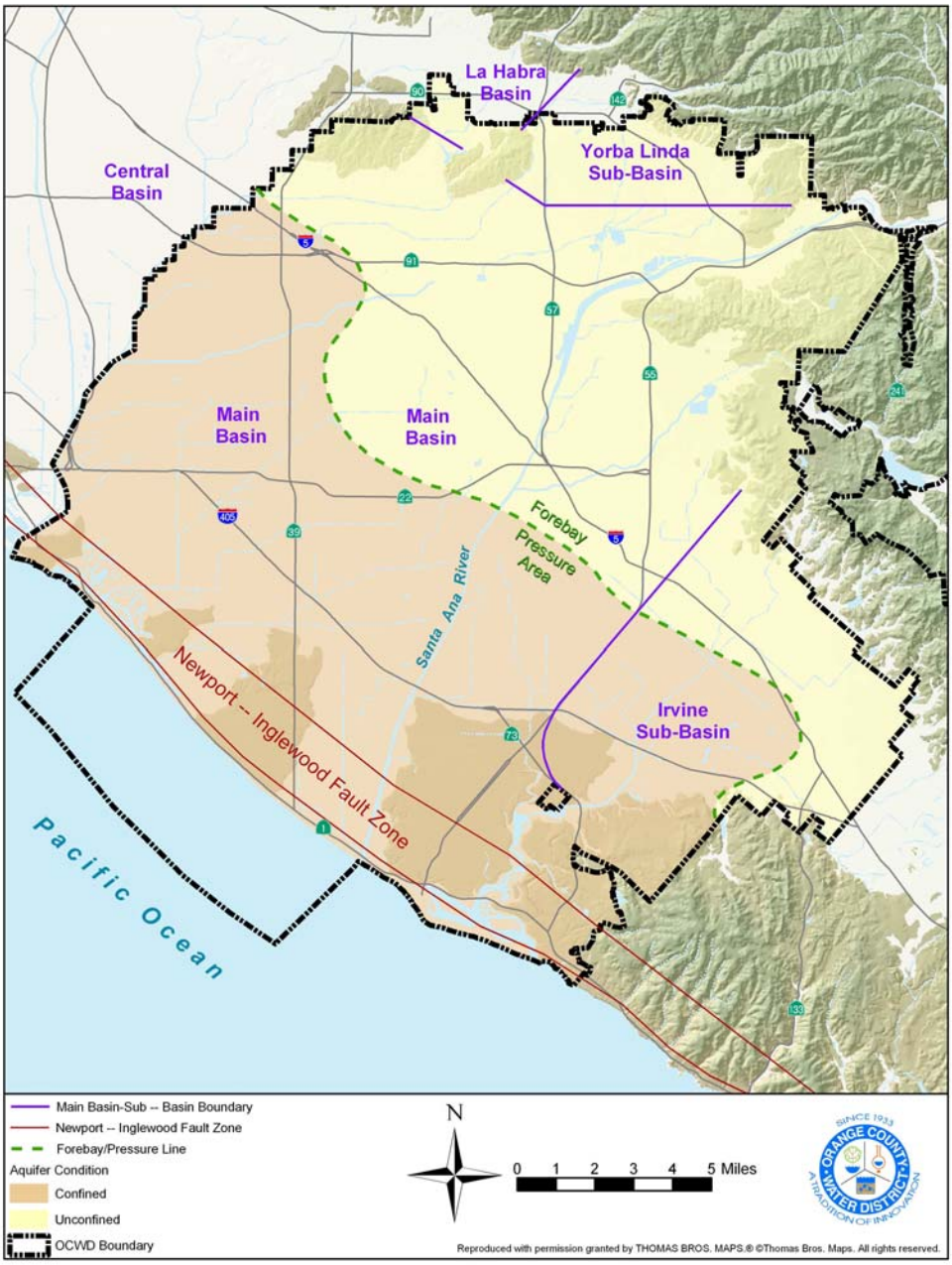
Historically, OCWD managed the Basin based upon seeking to increase supply rather than restricting demand. Nonetheless, a Basin Production Percentage (i.e., pumping limitation) is established each year by OCWD to ensure the long term beneficial use of the Basin. Because the Basin is not operated on an annual safe-yield basis, the net change in storage in any given year may be positive or negative; however, over the long term, the Basin must be maintained in an approximate balance to ensure the long-term viability of Basin supplies.

Currently, groundwater is produced from approximately 500 active wells within the Basin, approximately 300 of which produce less than 25 AF/yr. Groundwater production from approximately 200 large-

capacity or large-system wells operated by the 21 largest water retail utilities accounted for an estimated 97 percent of the total production.

Total potable water pumping capacity of OCWD Basin utilities is about 700 cfs, and an additional 48 cfs is planned "certain". For Year 2025, it is assumed that for OCWD Basin utilities, three fourths of the increase in potable demand (from 2010 to 2025) will be met from increases in well capacity. There is no increase projected for non-OCWD Basin utilities. The projected 2010 and 2025 summer pumping capacities are shown on the right side of Table 1.3-5.

**Figure 1.3.4.1-1 Orange County Water District Basin Areas**




Working closely with OCWD, MWDOC has developed a water balance model that incorporates OCWD's operating policies in managing the Basin. It is used to project the groundwater production for each producer in the Basin based on a range of assumptions provided by OCWD. Most of the assumptions involve the future condition of replenishment supplies to the Basin, which will be discussed in detail in the next subsection. The variables used to project the groundwater production are:

- Amount of Santa Ana River base flow;
- Amount of Santa Ana River storm flow;
- Amount of Basin incidental recharge;
- Relationship of basin storage and subsurface outflow;
- Basin percolation capacity;
- Basin well production capacity;
- Refill/maintain basin level approach;
- Replenishment purchases from imported sources; and
- Future annexation activities

#### 1.3.4.2 OCWD Seawater Intrusion Barrier

OCWD operates several seawater intrusion barriers to prevent the intrusion of seawater into the groundwater basin. OCWD operates the Talbert Seawater Intrusion Barrier in Fountain Valley and Huntington Beach, and co-funds operation of the Alamitos Seawater Intrusion Barrier in Seal Beach. Currently OCWD is developing the Groundwater Replenishment (GWR) System, which will expand the amount of purified wastewater that can be used for seawater intrusion barriers, and for groundwater recharge into the basin.

#### 1.3.4.3 OCWD Recharge Operations

OCWD has developed an extensive system of facilities to divert and store Santa Ana River (SAR) water to recharge water into the basin. OCWD currently encompasses over 229,000 acres of the lower watershed of the SAR below Prado Dam in Orange County. OCWD owns and operates several diversion structures and roughly 1,124 acres of spreading facilities that facilitate the recharge process. Additionally, OCWD implements an extensive water quality monitoring program to assess groundwater quality through the groundwater basin.

The OCWD Groundwater Basin is recharged by multiple sources. These include artificial, i.e., man-made systems, and incidental or natural recharge. One of OCWD's core activities is refilling or replenishing the Basin to balance the removal of groundwater by pumping. Sources of recharge water include SAR baseflow and storm flow, Santiago Creek Flows, imported supplies purchased from MET, supplemental supplies from the upper SAR Watershed, and purified wastewater from recycled plants.

#### 1.3.4.4 OCWD Prado Dam Activities and Prado Dam Conservation Pool

Prado Dam is located in Riverside County on the main stem of the SAR upstream of the Orange County Groundwater Basin. The dam was constructed in 1941 to protect against flooding, such as occurred in 1938. The Army Corps of Engineers (ACOE) operates the dam, and has long cooperated with OCWD to facilitate groundwater recharge efforts below the dam, as long as the primary flood control benefits of the

project are not compromised. Operation of Prado Dam has been adjusted over the years to recognize the secondary goal of conserving water for groundwater recharge.

In 1994, the ACOE adopted the Prado Dam and Reservoir Water Control Manual, which instituted the creation of a conservation pool behind Prado Dam to augment OCWD's groundwater recharge operations. Under the tightly controlled conditions of a 2006 Memorandum of Agreement (MOA) between the ACOE, the US Fish and Wildlife Service (USFWS), and OCWD, the ACOE conserves stormwater on ACOE and OCWD lands behind the dam on behalf of OCWD. Conserved water is subsequently released for percolation downstream at a rate of approximately 500 cubic feet per second (cfs).

### 1.3.5 La Habra Groundwater Basin

Currently, the La Habra Basin is non-adjudicated and serves the City of La Habra. The long-term extraction supply has been estimated at 4,500 AF/yr; however, historically the City's extraction rate is approximately 1,074 AF/yr (averaged over the past 15 years), which is considerably less than the potential yield. Thus, the La Habra Basin has not been identified to be in overdraft. There is some interest by the local agencies to increase production out of the basin. Water quality issues with high TDS and iron and manganese have created problems and likely require treatment for potable service.

### 1.3.6 San Juan Capistrano Groundwater Basin

This groundwater basin underlies the San Juan Valley and several tributary valleys in southern Orange County and is managed by the San Juan Basin Authority. The basin is bounded on the west by the Pacific Ocean and otherwise by tertiary semi-permeable marine deposits. San Juan Creek drains the San Juan Valley, and several other creeks drain valley tributaries to the San Juan. Average annual precipitation ranges from 11 to 15 inches. Thickness of the alluvium average about 65 feet and may reach more than 125 feet. Wells typically yield from 450 to 1,000 gpm. A study by NBS Lowry (1994) investigated and modeled the groundwater basin for 1979 through 1990. They determined a mean pumpage of 5,621 AF/yr and a mean subsurface inflow of 2,246 AF/yr. Average subsurface outflow to the ocean is estimated to be about 800 AF/yr.

Recharge of the basin is from flow in San Juan Creek, Oso Creek, and Arroyo Trabuco and precipitation to the valley floor. Water from springs flows directly from Hot Spring Canyon into San Juan Creek, adding to recharge. Groundwater mineral content is variable in this basin with TDS increasing from below 500 mg/L in the upper reaches of the valley to near 2,000 mg/L near the coast. TDS content of water from three public supply wells averages 760 mg/L and ranges from 430 mg/L to 1,250 mg/L.

Historical production from the basin has ranged from 2,000 to 5,000 AF over the years. In 2000, the California State Water Resources Control Board granted a water rights permit of 9,227 AF/yr to San Juan Basin Authority for diversion and use from the San Juan Basin. Member agencies of the San Juan Basin Authority are: City of San Juan Capistrano, Moulton Niguel Water District, Santa Margarita Water District, and South Coast Water District. San Juan Basin Authority completed Phase I of the San Juan Basin Desalter Project in December 2004 at a capacity of 4,900 acre-feet per year. Depending on the condition of the basin after the implementation of the San Juan Basin Groundwater Management and Facility Plan, future expansion of the production may be possible. Another desalter project is currently

under construction by South Coast Water District. When complete, the project is expected to extract up to 2,000 AF/yr.

## 1.4 PARTICIPATING WASTEWATER JURISDICTIONS

For wastewater collection and treatment in Orange County, there are two regional agencies that are responsible for the trunk line collection, treatment, biosolids management, and ocean outfalls for treated wastewater disposal. These agencies are the Orange County Sanitation District (OCSD), which covers north and central Orange County, and the South Orange County Wastewater Authority (SOCWA), which covers south Orange County. Following are descriptions of these agencies.

### 1.4.1 Orange County Sanitation District Facilities and History

Orange County Sanitation District (OCSD) began operations in 1954, replacing the Orange County Joint Outfall Sewer. Formed under the County Sanitation District Act of 1923, OCDS was comprised of nine revenue areas until 1998, when it consolidated into a single district. Today, OCSD is the third largest wastewater discharger in the western United States, providing sewer service for 23 cities and the unincorporated areas of north and central Orange County. Its capital facilities include 12 regional trunk lines, two treatment plants, two discharge outfalls and two emergency weir outlets. OCSD operates and maintains approximately 400 miles of sewer lines.

OCSD's formation was not only to address the need for sewage collection, treatment and disposal facilities for a growing Orange County. Its formation also facilitated public financing for sewer systems in Orange County, which the previous organization was unable to accomplish. A bond election in 1949 allowed OCSD to buy treatment and disposal facilities serving the cities of Anaheim, Santa Ana, Fullerton, and Orange, as well as the sanitary districts in Placentia, Buena Park, La Habra and Garden Grove. The bond election also financed the beginning of a network of trunk sewer systems throughout Orange County. OCSD formally took control of sewer management in 1954 when Plant No. 2 and Ocean Outfall No. 1 were constructed. Ocean Outfall No. 2 was subsequently constructed in the 1970's.

#### 1.4.1.1 OCSD Capital Facilities

OCSD manages its facilities through the preparation and implementation of wastewater master plans. These plans outline the improvements to collection, treatment and disposal facilities required to manage flows over a selected planning horizon.

In October 1999, the District adopted a new strategic plan. The planning effort defined the District's goals, responsibilities, and requirements over the next twenty years, including projections through the assumed "build-out" of the District's service area to the year 2050. Critical factors such as population growth, new construction, and the volume of wastewater delivered to the treatment plants and viable water conservation and reclamation programs have been evaluated.

In June 2002, the District completed the Interim Strategic Plan Update (ISPU), which further updated these critical factors and developed revised cost estimates and user fee projections for upgrading the

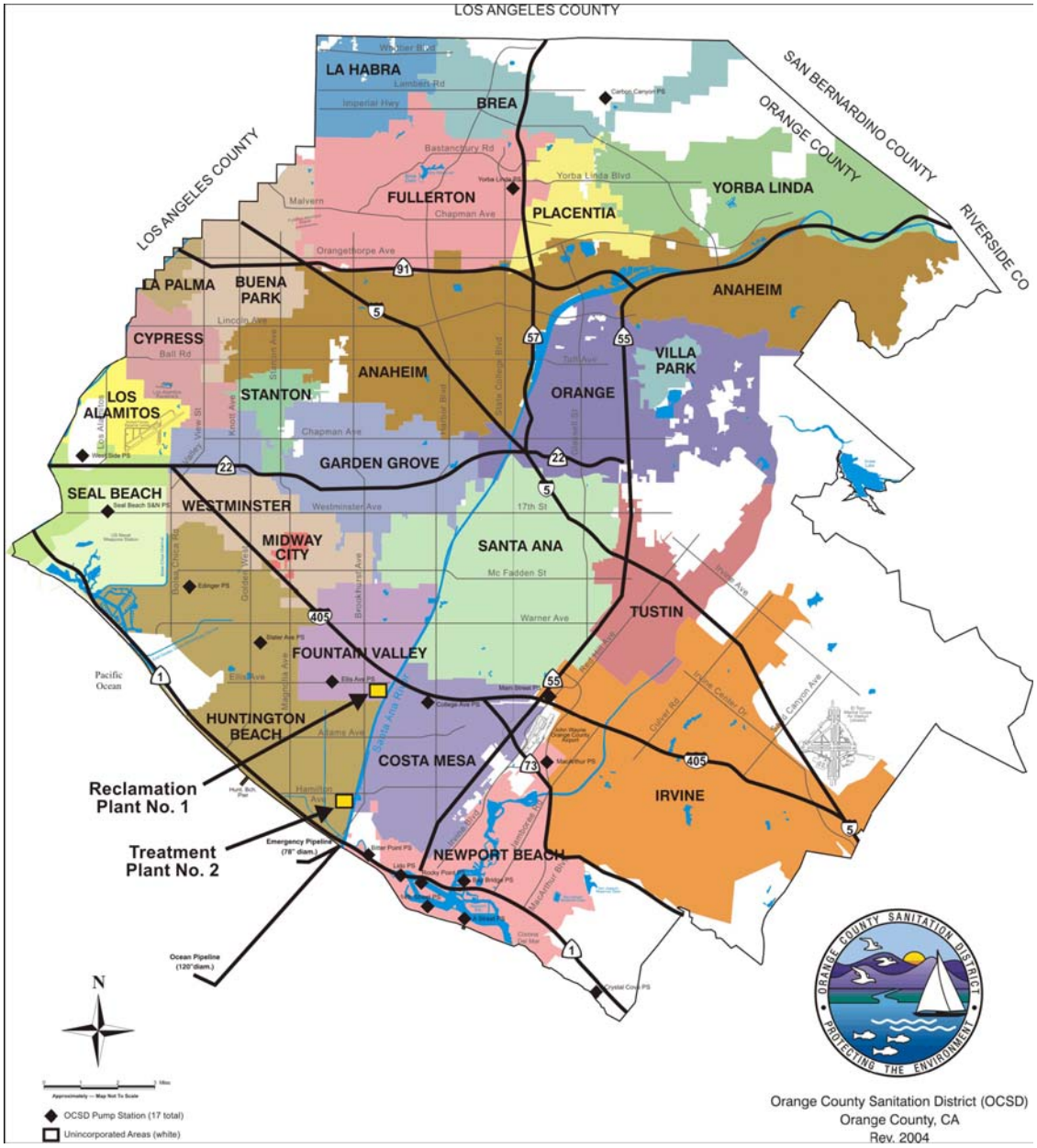
District's level of treatment to secondary standards. On July 17, 2002, after reviewing the Interim Strategic Plan, updated treatment alternatives, ocean monitoring data, public input, regulatory issues, and financial considerations, the Board of Directors made the decision to upgrade treatment to meet secondary treatment standards.

Figure 1.4.1.1-1 shows the OCSD service area. OCSD serves more than 87 percent of the population in Orange County, representing over 2.3 million people. It has been estimated that OCSD will be serving a population of over 2.8 million people in 2020. OCSD provides sewer service for over 210,000 acres within Orange County (approximately 35 percent of the county's land area). Land use in the OCSD service area consists of a mixture of residential, commercial, industrial, institutional and open space categories. The south and west portions of the OCSD area are largely developed, while the north and east portions are less developed.

### 1.4.1.2 Overview of Existing OCSD System

The OCSD sewer system collects wastewater through an extensive system of regional pipelines, pump stations and force mains, with diversions installed between trunk sewer systems. Wastewater is treated at two treatment facilities, and an outfall system is available for ocean disposal of treated wastewater. The treatment plants currently operate under a permit from the Regional Water Quality Control Board as established in National Pollutant Discharge Elimination Systems (NPDES) Permit No. CA0110604 that permits the discharge of treated wastewater through an ocean outfall system to the Pacific Ocean.

**Figure 1.4.1.1-1 Orange County Sanitation District Service Area**




## 1.4.1.3 OCSD Trunk Sewer Systems

OCSD owns, operates, and maintains twelve trunk sewer systems that are located throughout the service area. The trunk systems include approximately 400 miles of sewer pipes and force mains, ranging in size from 12 to 120 inches in diameter (interplant), as well as twenty pump stations. The trunk sewer system also includes nine interconnections (to convey flow between main trunk systems) and 87 diversion

structures (to convey flow between sewer pipes within a main trunk system). The trunk sewer systems are currently conveying approximately 240 million gallons per day (mgd); or with a flow split of approximately 150 mgd to Plant No. 1 and approximately 90 mgd to Plant No. 2. This split reflects that a portion of the raw wastewater tributary to Plant No. 1 is diverted to Plant No. 2 via a 120-inch interplant pipeline.

#### 1.4.1.4 OCSD Treatment Plant System

OCSD has two wastewater treatment plans. Plant No. 1 is located in the City of Fountain Valley, approximately four miles inland of the Pacific Ocean and adjacent to the Santa Ana River. Influent wastewater entering Plant No. 1 passes through the metering structure, mechanical bar screens, grit chambers and the primary clarifiers, before undergoing the activated sludge process. The activated sludge process consists of aeration basins and secondary clarifiers. Activated sludge effluent can be diverted to OCWD for tertiary treatment before reuse. The remainder of the activated sludge effluent flows through the interplant line to Plant No. 2 where it's either used as plant water or it goes to the outfall booster pump and directly to the ocean outfall for final disposal. Plant No. 2 is located in the City of Huntington Beach, adjacent to the Santa Ana River and east of the Pacific Coast Highway. Untreated wastewater entering Plant No. 2 passes through magnetic flow meters, mechanical bar screens and grit removal chambers. Flow then passes through the primary clarifiers before undergoing secondary treatment via an oxygen-activated sludge process. Some of OCSD's primary-treated effluent does not undergo secondary treatment. However, both primary- and secondary-treated effluent from Plant Nos. 1 and 2 are blended together before being release into the ocean outfall system.

Interconnections exist between Plant Nos. 1 and 2. These interconnections include a digester gas pipeline, communications cables, Plant No. 1 effluent lines to the Ocean Outfall Booster Station and a raw wastewater interplant pipeline. Solids treatment at both Plant No. 1 and 2 includes dissolved air floatation thickening of waste activated sludge, anaerobic sludge digestion and belt press dewatering. Both plants also have facilities for odor control, chemical addition and digester gas utilization for electrical generation.

#### 1.4.1.5 OCSD Ocean Outfall System

The ocean outfall system includes three discharge structures. The primary ocean outfall (Outfall No. 2) was put in service in 1971 and is approximately 27,400 feet long including a 6,000-foot diffuser section. The primary outfall is 120 inches in diameter and discharges treated wastewater into the Pacific Ocean, at a depth of approximately 200 feet some four and a half miles offshore. The primary outfall has a capacity of approximately 480 mgd. The emergency outfall (Outfall No.1), originally constructed in 1954 and modified in 1965, is approximately 7,000 feet long, including a 1,000-foot diffuser section. The emergency outfall is 78 inches in diameter and is located at a depth of approximately 65 feet, a mile and a half offshore. The emergency outfall has a capacity of approximately 245 mgd. OCSD's NPDES permit specifies that this outfall can be used for emergencies only. The Santa Ana River emergency overflow weirs discharge directly to the Santa Ana River, and are also limited for emergency use only.

### 1.4.1.6 OCSD Levels of Service

The levels of service provided by OCSD will increase significantly in the future, requiring nearly $3 billion in new capital assets and millions in increased maintenance and operations costs over the next seven years.

One area where OCSD's levels of service will increase significantly is the quality of effluent that is provided to OCWD for reclamation or discharged into the ocean. OCSD is also considering further reduction in the offsite odors from its treatment plants, and reducing its emissions of air toxics. OCSD's levels of service will also improve in the area of biosolids management.

### 1.4.1.7 Communities Included within OCSD's Service Area

Anaheim
Brea
Buena Park
Cypress
Fountain Valley
Fullerton
Garden Grove
Huntington Beach
Irvine
La Habra
La Palma
Los Alamitos
Newport Beach
Orange
Placentia
Santa Ana
Seal Beach
Stanton
Tustin
Villa Park
Yorba Linda
Costa Mesa Sanitary District
Midway City Sanitary District
Irvine Ranch Water District
Unincorporated areas near Anaheim Hills

### 1.4.2 South Orange County Wastewater Authority (SOCWA)

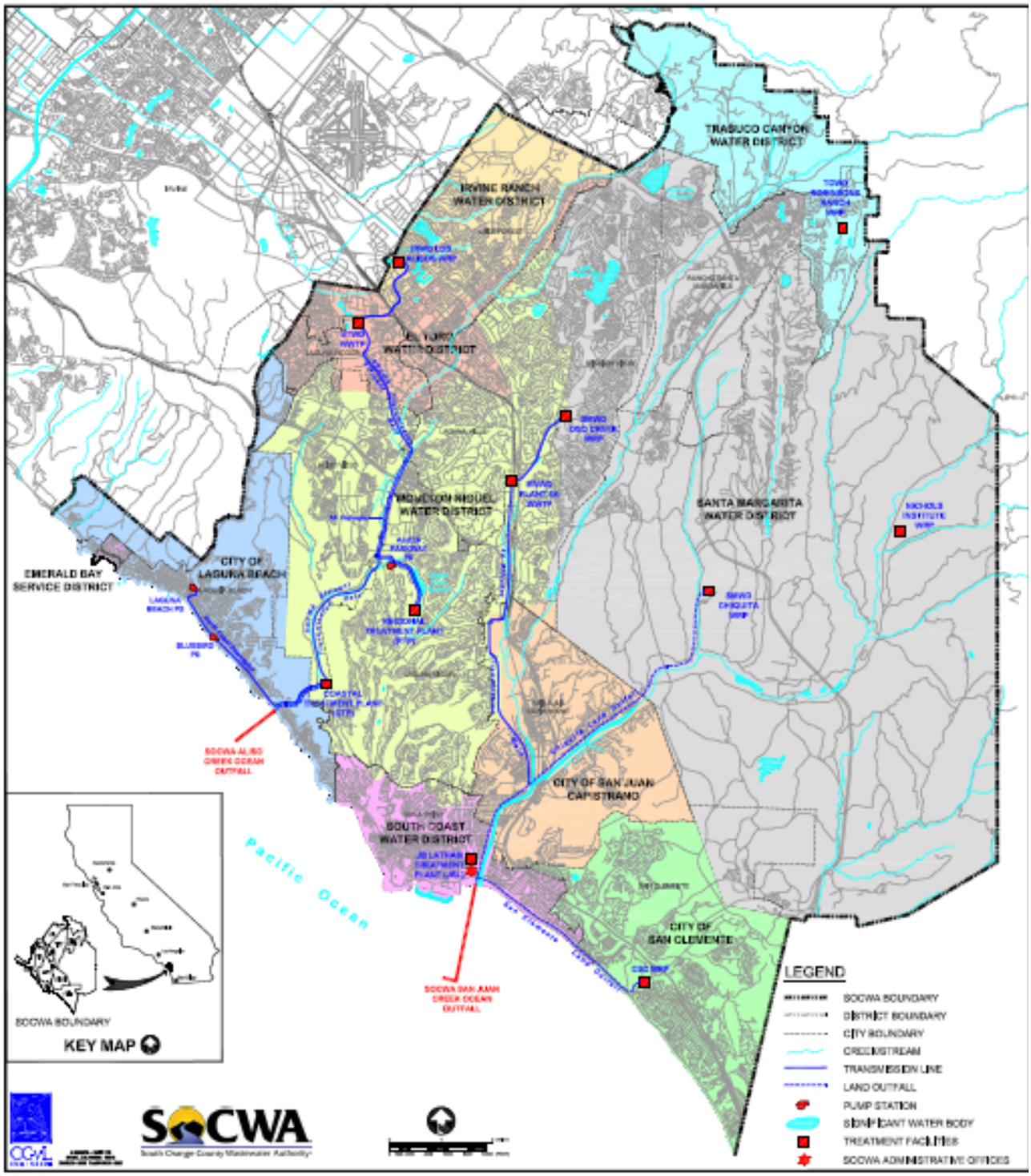
The mission of the South Orange County Wastewater Authority (SOCWA) is to collect, treat, beneficially reuse, and dispose of wastewater and biosolids in an effective and economical manner that respects the environment, maintains the public's health and meets or exceeds all local, state and federal regulations to the mutual benefit of SOCWA's ten member agencies and the general public in South Orange County. SOCWA provides, at a minimum, full secondary treatment at all of its regional wastewater facilities, and also has active water recycling, industrial waste (pretreatment), biosolids management and ocean/shoreline monitoring programs to meet the needs of its members and the requirements of the applicable National Pollutant Discharge Elimination System (NPDES) permits. In order to strike this balance, SOCWA manages a series of ongoing environmental programs, each designed to play an important role in fulfilling the Agency's mission. Programs related to Hazard Mitigation Planning include acquiring, constructing, maintaining, repairing, managing, operating and controlling facilities for the collection, transmission, treatment and disposal of wastewater and biosolids, the reclamation and reuse of wastewater for beneficial purposes, and the production, transmission, storage and distribution of non-domestic water.

SOCWA was created on July 1, 2001 as a Joint Powers Authority with no taxing authority (Joint Powers Authority Signatories listed below). SOCWA is the legal successor to the Aliso Water Management Agency (AWMA) (1972), South East Regional Reclamation Authority (SERRA) (1970) and South Orange County Reclamation Authority (SOCRA) (1991). Figure 1.4.2-1 shows the service area and the major facilities.

#### 1.4.2.1 SOCWA Joint Powers Member Agencies

City of Laguna Beach (CLB)
City of San Clemente (CSC)
City of San Juan Capistrano (CSJC)
El Toro Water District (ETWD)
Emerald Bay Service District (EBSD)
Irvine Ranch Water District (IRWD)
Moulton Niguel Water District (MNWD)
Santa Margarita Water District (SMWD)
South Coast Water District (SCWD)
Trabuco Canyon Water District (TCWD)

**Figure 1.4.2-1**
**SOCWA Regional Wastewater System**



### 1.4.2.2 Communities Included within SOCWA

Aliso Viejo
Coto de Caza
Dana Point
Emerald Bay
Ladera
Laguna Beach
Laguna Hills
Laguna Niguel
Laguna Woods
Lake Forest
Las Flores
Mission Viejo
Rancho Santa Margarita
San Clemente
San Juan Capistrano
Talega
Trabuco Canyon

### 1.4.2.4 SOCWA Treatment Plants Operated

| | |
|---|---|
| Regional Treatment Plant (RTP) | 12.0 mgd |
| Jay B. Latham (JBL) | 13.0 mgd |
| Coastal Treatment Plant (CTP) | 6.7 mgd |
| 3A Plant (3A) | 6.0 mgd |

SOCWA also operates the Effluent Transmission Main (ETM) and the Aliso Creek and San Juan Creek Ocean Outfalls. The City of Laguna Beach operates the North Coast Interceptor (NCI) on a contract basis on behalf of SOCWA. MNWD operates the Alicia Parkway Pump Station on behalf of SOCWA, and the City of San Clemente operates the San Clemente Land Outfall.

### 1.4.2.5 SOCWA Ocean Outfall System

The ocean outfall system includes two discharge structures. The Aliso Creek Outfall was put in service in 1978 and is approximately 7,900 feet offshore in a SW direction from the mouth of Aliso Creek. This outfall has a capacity of approximately 50 mgd, but currently discharges approximately 21 mgd. The outfall suffered damage in 1992 from coastal storms and was repaired in 1993. The second outfall is the San Juan Creek Outfall built in 1978. It is 10,550 feet offshore in a SW direction from Doheny Beach at San Juan Creek. This outfall has a design capacity of 24 mgd gravity flow and an additional 80 mgd pumped flow. Its current Flow rate is 19.1 mgd.

**Table 1.3-3**
**Orange County Potable Water Demands and Supplies, Current/Future**

| | 2005 | 2025 | % Inc | Notes |
|---|---|---|---|---|
| **Population (millions)** | 3.1 | 3.7 | 19% | 2005 actual; projections per CDR, CSUF |
| **ACRE-FEET** | | | | |
| a. Water demand before WUE | 735,000 | 936,000 | 27% | Based on OC-MAIN [1], rounded |
| b. Less WUE | 58,000 | 115,000 | 27% | Based on OC-MAIN[1], rounded |
| a – b = Consumptive Water demand | 677,000 | 821,000 | 21% | |
| c. Less Recycling.& Non-domestic supply<br><br>**a – b - c = Consumptive Demand for Potable Water** | 50,000<br><br>**627,000** | 75,000<br><br>**746,000** | 50%<br><br>**19%** | Recycled & Non-Domestic Projections per agencies' responses to MWDOC 5-yr. Water Demand survey Spring '05. If the achieved Recycled & Non-Domestic supplies are less than projected, potable water demand will increase. |
| d. OCWD Basin pumping | 350,000 | 450,000 | 29% | Projection per agencies' responses to survey Spring '05, with assumed BPP of 75%. If Santa Ana River capture is limited, future basin pumping would be less than shown. |
| e. Less Import. Replenishment | 60,000 | 60,000 | 0% | OCWD's continued purchase of replenishment water in future assumes continued availability from MET; otherwise pumping volume would decrease. |
| d – e = OCWD Basin pumping, non-imported source water only | 290,000 | 390,000 | 34% | Increase shown results from GWRS production of 72,000 af/yr and increased capture of Santa Ana River water. |
| f. Non-OCWD Basin potable water wells | 2,000 | 9,000 | 350% | Increase is from San Juan (4,800 af/yr), and Capistrano Beach Desalters (1,300 af/yr) and others. |
| g. Cal Domestic supply to Brea & La Habra | 13,000 | 13,000 | 0% | |
| h. Anaheim WTP | 12,500 | 14,500 | 16% | |
| i. Serrano WTP | 2,500 | 3,000 | 20% | |
| j. Trabuco WTP | 3,000 | 4,000 | 33% | |
| k. Ocean Water Desal Plant | | 25,000 | n/a | If ocean desal production is less than shown, demand on Met would increase. |
| a – b – c - d – e – f – g - h – j - k = **Met treated full service water** | 304,000 | 287,500 | -5% | By subtraction. Does not include water for replenishment of OCWD Basin. |
| **Sum of Potable Supplies** | **627,000** | **746,000** | **19%** | |
| **CFS** | | | | |
| Annual average demand rate | 870 | 1,030 | 18% | Potable water only, rounded |
| Peak mo. demand rate @1.35 | 1,170 | 1,390 | 19% | Potable water only, rounded |

1. MWDOC's OC-MAIN model dated Dec 2000 is an econometric model that used demographics prepared by the Center for Demographic Research CSUF. The OC-MAIN model projected in 5-yr intervals from 2005 through 2020. MWDOC projected 2025 numbers by straight-line extension from the model's 2015 and 2020 numbers.

**Table 1.3-4**
**Existing Potable Water Storage Volume and Portion Available for Emergency**

| Sub-Region | Retail Water Agency | OC Reservoir | EOCWD Wholesale | ET R-6 Reservoir | Bradt | Schlegel Reservoir | Gross Jt. Reservoir | Avail.for Emer. Use | Avail.Jt. Res. Vol. | Gross Vol. | Avail for Emer. Use | Avail Loc Res. Vol. | Stor.Avail for Emer. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | MG | | | | | | | | | | |
| Brea/ LaHabra | Brea | 19.6 | | | | | 19.6 | 0.97 | 19 | 67 | 30% | 20 | 39 |
| | La Habra | 9.8 | | | | | 9.8 | .97 | 9 | 17 | 30% | 5 | 15 |
| Subtotal Brea/La Habra | | 29.3 | | | | | 29.3 | | 28 | 84 | | 25 | 54 |
| OCWD Basin | Anaheim | | | | | | | | | 29 | 33% | 9 | 9 |
| | Buena Park | | | | | | | | | 20 | 30% | 6 | 6 |
| | East Orange CWD | | (2) | | | | | | | 1.8 | 30% | .5 | .5 |
| | Fountain Valley | | | | | | | | | 10 | 30% | 3 | 3 |
| | Fullerton | 19.6 | | | | | 19.6 | .97 | 19 | 85 | 30% | 26 | 44 |
| | Garden Grove | | | | | | | | | 53 | 30% | 16 | 16 |
| | Golden State–East OC | | (2) | | | | | | | 4 | 30% | 1 | 1 |
| | Golden State Plac./YL | | | | | | | | | 3 | 30% | 1 | 1 |
| | Golden State West OC | | | | | | | | | 5 | 30% | 1 | 1 |
| | Huntington Beach | | | | | | | | | 55 | 30% | 43 | 43 |
| | Irvine Ranch WD | | | | | | | | | 143 | 30% | 43 | 43 |
| | La Palma | | | | | | | | | 4.5 | 30% | 8 | 8 |
| | Mesa Consol. WD | | | | | | | | | 28 | 30% | 8 | 8 |
| | Newport Beach | | | | | | | | | 194 | 70% | 136 | 136 |
| | Orange | | (2) | | | | | | | 43 | 30% | 13 | 13 |
| | O Park Acres | | (2) | | | | | | | 1 | 30% | 0 | 0 |
| | Santa Ana | | | | | | | | | 49 | 30% | 15 | 15 |
| | Seal Beach | | | | | | | | | 7 | 30% | 2 | 2 |
| | Serrano WD | | | | | | | | | 9 | 30% | 3 | 3 |
| | Tustin | | (2) | | | | | | | 12 | 30% | 4 | 4 |
| | Westminster | | | | | | | | | 16 | 30% | 12 | 12 |
| | Yorba Linda WD | | | | | | | | | 41 | 30% | 12 | 12 |
| Subtotal Basin | | 20 | | | | | 20 | | 19 | | | 322 | 341 |
| South OC | El Toro WD | | | 124.5 | | | 124.5 | .97 | 121 | 12 | 30% | 4 | 124 |
| | Laguna Bch CWD | | | | | | | | | 34 | 50% | 17 | 17 |
| | Moulton Niguel | | | 13.0 | 2.4 | | 15.4 | .93 | 14 | 72 | 65% | 47 | 61 |
| | San Clemente | | | | 29 | 7 | 35.9 | .7 | 25 | 22 | 30% | 7 | 32 |
| | San Juan Capo | | | | .51 | | .5 | .7 | 9 | 12 | 30% | 4 | 4.0 |
| | Santa Margarita WD | | | 137.5 | | | 137.5 | .97 | 133 | 84 | 30% | 25 | 159 |
| | South Coast WD | | | | 13 | | 12.6 | .70 | 9 | 22 | 30% | 7 | 15 |
| | SDCWA San.Onofre | | | | 3.7 | 5 | 8.7 | .70 | 6 | | 30% | | 6 |
| | Trabuco CanyonWD | | | | | | | | | 10 | 30% | 3 | 3 |
| Subtotal South County | | | | 275 | 48 | 12 | 335 | | 309 | | | 112 | 421 |

1 Year 2005 storage volumes reported to MWDOC.

2 Share of volume of EOCWD Wholesale system reservoirs (about 18 mg) is not known.

**Table 1.3-5**
**Potable Well Water Production Capacity to Year 2025 by Producer**

| Sub-Region | Retail Water Agency | Historic Peak Month Pumping | Exist. Summer Pumping Capacity(1) | Certain (2) Projects Additional Capacity | 2010 Summer Pumping Capacity | Increase With (3) Demand | 2025 Summer Pumping Capacity |
|---|---|---|---|---|---|---|---|
| | | AF | cfs | | | | |
| Brea/ LaHabra | Brea | | | | | | |
| | La Habra | 130 | 2.2 | | 2.2 | | 2.2 |
| | Subtotal | | 2.2 | | 2.2 | | 2.2 |
| OCWD Basin | Anaheim | 6,481 | 107.4 | 5.0 | 112.4 | 14.4 | 126.9 |
| | Buena Park | 1,415 | 23.5 | 5.0 | 28.5 | 10.4 | 38.8 |
| | East Orange CWD | 164 | 2.7 | | 2.7 | 0.0 | 2.8 |
| | Fountain Valley | 1,255 | 20.8 | | 20.8 | 3.6 | 24.4 |
| | Fullerton | 2,530 | 41.9 | | 41.9 | 3.0 | 44.9 |
| | Garden Grove | 3,766 | 62.4 | 5.0 | 67.4 | 0.8 | 68.2 |
| | Golden State–East | 209 | 3.5 | | 3.5 | 0.3 | 3.7 |
| | Gold. State- Plac./YL | 497 | 8.2 | | 8.2 | 0.6 | 8.9 |
| | Gold. State -West OC | 1,451 | 24.1 | 5.0 | 29.1 | 2.4 | 31.5 |
| | Huntington Beach | 2,445 | 40.5 | | 40.5 | 0.1 | 40.6 |
| | Irvine Ranch WD | 5,213 | 90.8 | 7.7 | 98.5 | 32.3 | 130.8 |
| | La Palma | 284 | 4.7 | | 4.7 | 6.7 | 11.4 |
| | Mesa Consol. WD | 1,857 | 30.8 | | 30.8 | 0.3 | 31.1 |
| | Newport Beach | 1,455 | 24.1 | | 24.1 | 2.3 | 26.4 |
| | Orange | 3,203 | 53.1 | | 53.1 | 0.6 | 53.7 |
| | Orange Park Acres | 106 | 1.8 | | 1.8 | 2.4 | 4.2 |
| | Santa Ana | 5,117 | 84.8 | 10.0 | 94.8 | 0.0 | 94.9 |
| | Seal Beach | 440 | 7.3 | | 7.3 | 0.0 | 7.3 |
| | Serrano WD | 339 | 5.6 | | 5.6 | 0.1 | 5.7 |
| | Tustin | 1,147 | 19.0 | | 19.0 | 1.5 | 20.5 |
| | Westminster | 1,396 | 23.1 | 5.0 | 28.1 | 3.3 | 31.4 |
| | Yorba Linda WD | 1,398 | 23.2 | 5.0 | 28.2 | 1.2 | 29.4 |
| | Subtotal Basin | | 703.4 | 47.7 | 751.1 | 86.3 | 837.4 |
| South OC | El Toro WD | | | | | | |
| | Emerald Bay SD | | | | | | |
| | Laguna Bch CWD | | | | | | |
| | Moulton Niguel | | | | | | |
| | San Clemente | 142 | 0.8 | | 0.8 | | |
| | San Juan Capo | 234 | 3.9 | 8.0 | 8.0 | | 8.0 |
| | Santa Margarita WD | 41 | 0.7 | | 0.7 | | 0.7 |
| | South Coast WD | | | 1.8 | 1.8 | | 1.8 |
| | Trabuco Canyon WD | 174 | 2.0 | | 2.0 | | |
| Subtotal South County | | | 7.4 | 9.8 | 13.3 | 0 | 10.5 |
| TOTAL Orange County | | | 712.9 | 57.4 | 766.5 | 86.3 | 850.0 |

1. Source: MWDOC's records of maximum monthly pumping, however, the numbers have been adjusted down if pumping capacity has decreased since the pumping was recorded. IRWD's number is DRWF "Clear" 80 cfs (conservative) plus DATS 10 cfs plus Harding Canyon 0.8 cfs.
2. Additional "certain" groundwater projects are 8 conjunctive use wells (@ 50 cfs), the IRWD Desalter (7.7 cfs) and the San Juan Desalter (8.0 cfs).
3. Basin agencies assumed to increase well capacity to match 75% of increase in potable water demand.

# SECTION 2 MULTI-JURISDICTIONAL PARTICIPATION

## 2.1 LIST OF PARTICIPATING WATER DISTRICTS AND CITY PUBLIC UTILITIES

Descriptions of each participating Water and Wastewater Utility (PWU) are provided below. This section is organized first by utilities that have management responsibilities that extend to several water districts or city utilities including: Municipal Water District of Orange County, Orange County Water District, Orange County Sanitation District, and South Orange County Wastewater Authority. Participating water and wastewater utilities are then presented in alphabetical order, including: City of Buena Park, El Toro Water District, City of Garden Grove , City of La Habra, Laguna Beach County Water District, Mesa Consolidated Water District, Moulton Niguel Water District, City of Newport Beach, City of Orange, Santa Margarita Water District, Serrano Water District, South Coast Water District, Trabuco Canyon Water District, City of Tustin, City of Westminster and Yorba Linda Water District.

### 2.1.1 Municipal Water District of Orange County (Service Population: 2.3 Million)

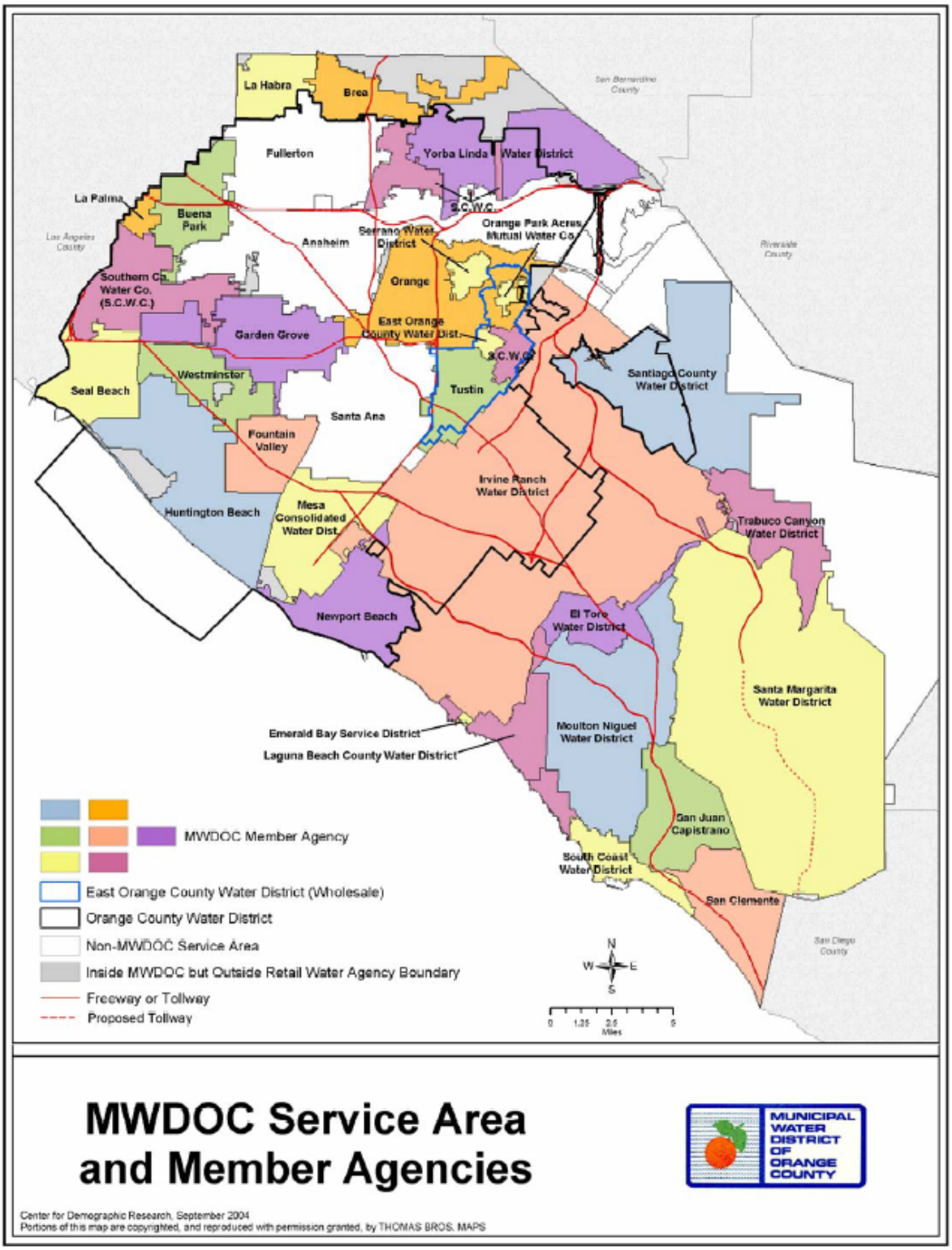
MWDOC's Mission Statement is to provide reliable, high-quality water supplies from MET and other sources to meet present and future needs, at an equitable and economical cost for all Orange County, and to promote water use efficiency.

MWDOC is a regional water wholesaler and resource planning utility, managing all of Orange County's imported water supply with the exception of water imported to the cities of Anaheim, Fullerton, and Santa Ana. MWDOC serves more than 2.3 million residents in a 600-square-mile service area (see Figure 2-2). Its commitment is to ensure water reliability for the communities it serves. To that end, MWDOC focuses on sound planning and appropriate investments in water supply, regional delivery infrastructure and emergency preparedness.

As a regional wholesaler, MWDOC's most significant roles are broadly applicable to all of its member utilities. A key goal of MWDOC is to provide services and programs that are broad-reaching that the retail utilities cannot reasonably provide as single entities.

MWDOC is governed by an elected seven-member Board of Directors, each board member representing a specific area of the County. Each director is elected to a four-year term by voters who reside within one of the seven divisions within the MWDOC service area.

**Figure 2-2:**
**MWDOC's Service Area and Member Agencies**



### 2.1.2 Orange County Water District (Service Population: 2.3 million)

The Orange County Water District (OCWD) manages the large groundwater basin that provides reliable, high-quality groundwater to 20 cities and water utilities and their 2.3 million customers. OCWD was formed in 1933 by a special act of the California Legislature [Water Code App §40-1 *et seq*.], which authorized OCWD to represent water users and landowners in litigation (with upstream users) and empowered OCWD to protect the water supply and protect the groundwater basin. The mission of OCWD is to provide local water retailers with a reliable, adequate, high-quality water supply at the lowest reasonable cost in an environmentally responsible manner. With years of proper planning and investment, OCWD has more than doubled the output of the groundwater basin.

The groundwater basin, which underlies north and central Orange County, provides between 2/3rds and 3/4ths of the water needed in that area; imported water meets the balance of the water demand. Groundwater is pumped by water utilities before being delivered to customers. Groundwater is a great value at approximately one-half the cost of imported water. OCWD purchases through MWDOC some imported water supplies for recharge operations and for operating and maintaining the seawater intrusion barrier.

Today, OCWD is managed by a ten-member Board of Directors, with three appointed from the cities of Anaheim, Fullerton and Santa Ana, and the remainder of the Board publicly elected from geographic divisions within the OCWD service area.

OCWD is known internationally for its "tradition of innovation." OCWD built the first advanced wastewater purification plant to provide water to prevent seawater intrusion into Orange County's groundwater basin. Today, OCWD and OCSD are partners in the world's largest advanced wastewater purification project, called the Groundwater Replenishment System that will provide water to 144,000 families each year beginning in 2007.

### 2.1.3 Orange County Sanitation District (Service Population: 2.3 million)

The Orange County Sanitation District (OCSD) is responsible for safely collecting, treating, and disposing wastewater (sewage) and industrial waste in central and northwest Orange County. Owning 400 miles of wastewater pipeline, OCSD serves 2.3 million residents in 21 cities, three special districts and the unincorporated areas within north and central Orange County.

The District is governed by a board of 25 individuals; 24 board members are elected officials appointed by the cities and special districts served, and one is a representative from the Orange County Board of Supervisors.

OCSD treats approximately 250 million gallons of wastewater each day and releases it into the ocean five miles from shore and approximately 200 feet below the surface. The one-mile-long diffuser section on the five-mile ocean outfall contains 503 portholes through which treated wastewater are slowly released. Up to seven million gallons of treated wastewater is reclaimed each day for use by the Orange County Water District in landscape irrigation and injection into the seawater intrusion barrier along the coast.

In addition to its primary role of managing wastewater for north and central Orange County, OCSD is also concerned about ocean water quality and protecting the coastline from urban runoff contamination. This is why plans have been made to take diverted sewer water (and its various urban contaminants) from storm drains and treat it before releasing it to the ocean. Currently, OCSD recycles all biosolids produced for beneficial use by the agricultural industry and runs an award-winning ocean monitoring program that evaluates water quality, sediment quality and sea life.

### 2.1.4 South Orange County Wastewater Authority (Service Population: 500,000)

The South Orange County Wastewater Authority (SOCWA) was created July 1, 2001 as a Joint Powers Authority. SOCWA was formed under and pursuant to Government Code Section 6500 and is the legal successor to the Aliso Water Management Utility, the South East Regional Reclamation Authority and the South Orange County Reclamation Authority. SOCWA is comprised of 10 member utilities including the City of Laguna Beach, City of San Clemente, City of San Juan Capistrano, El Toro Water District, Emerald Bay Service District, Irvine Ranch Water District, Moulton Niguel Water District, Santa Margarita Water District, South Coast Water District and Trabuco Canyon Water District. SOCWA provides wastewater treatment, effluent and biosolids disposal, and water recycling at regional facilities in the southern part of Orange County.

SOCWA is governed by a Board of Directors. As members of SOCWA's Board of Directors (one Director from each Member Agency) they each balance the interests of their own respective District or City while continuing the purpose and mission of SOCWA's Project Committees.

### 2.1.5 City of Buena Park (Service Population: 84,300)

The City of Buena Park (Buena Park) was incorporated in 1953; Buena Park is situated in central Orange County, with a land area of 10.3 square miles serviced by the City's water utility. Buena Park is a public municipality and is governed by an elected City Council consisting of a mayor and four councilpersons. The cities of La Mirada, Fullerton, Anaheim, La Palma, and Cypress bound Buena Park.

Buena Park has a water system with three pressure zones. The water system consists of seven active wells with one new well under construction in 2006, one 20 million gallon reservoir, one booster pump station and numerous pressure reducing stations. In addition, there are four imported water supply connections with MET. Water supply is transported to approximately 84,300 consumers through 216 miles of pipeline and approximately 19,550 service connections.

Groundwater is the primary source of water for Buena Park, and historically has accounted for about 58 percent of total water supply. Groundwater is drawn from seven municipal wells that are drilled down to about 1000 feet into the Orange County Groundwater Basin. The second source of water is imported water from MET through MWDOC.

### 2.1.6 El Toro Water District (Service Population: 51,000)

The El Toro Water District (ETWD) was formed in September 1960 under provisions of the California Water District Law (Division 13, Section 34000 et seq. of the Water Code of the State on California). The District is governed by a publicly elected Board of Directors consisting of five Board Members. The Board of Directors establishes District policies and Rules and Regulations. The District's service area, which is nearly completely developed, includes 5,350 acres in South Orange County. ETWD is bordered by the Irvine Ranch Water District (IRWD) to the north, the Laguna Beach County Water District (LBCWD) to the west, the Moulton Niguel Water District (MNWD) to the west and south, and the Santa Margarita Water District (SMWD) to the south and east. The District also shares a small border with Trabuco Canyon Water District (TCWD) in the northern part of the District. The District provides water and sewer service to over 51,000 customers in the cities of Laguna Woods, Laguna Hills, Lake Forest, Mission Viejo and Aliso Viejo.

ETWD's responsibilities as authorized by the California Water District Law are:

- Treatment and distribution of potable water for domestic consumption, irrigation and fire protection.
- Collection, treatment and disposal of wastewater.
- Treatment and distribution of recycled water.

All of the District's domestic water demands are met from the supply imported from MET through MWDOC. ETWD receives imported (potable) water from MET via the Allen-McColloch Pipeline (AMP) and the East Orange County Feeder #2 (EOCF#2).

### 2.1.7 City of Garden Grove (Service Population: 171,042)

The City of Garden Grove (Garden Grove), recognizing the importance of the groundwater basin underlying the City, established a Municipal Water Department in 1958. The Department is the principle water retailer within the boundaries of Garden Grove. Imported water is purchased by Garden Grove from MET through MWDOC to alleviate over depletion of the groundwater basin. The percentage of import to well water changes periodically and is dependent upon OCWD groundwater projections.

Garden Grove has 12 wells strategically located throughout the City, with a pumping capacity of over 41,000 gallons per minute. In 1993, the sale of water bonds allowed the City to take on many capital improvement projects to provide a safe and abundant water supply for the citizens of Garden Grove. The improvements included building a new water supply well, two new reservoirs, and upgrades to the City's import water connections and water distribution system. Careful planning and management of utility services ensures that a reliable source of potable water is readily available to the City's water users, now at a population of 171,042.

The Water Services Division consists of a professional staff responsible for ongoing operation, maintenance, repair and improvements to the City's water system. Garden Grove is governed by a

five member council. Each position is an elected position, including the position of mayor. Revenue is collected through bi-monthly water rates. Since the LAFCO Reorganization No.141, City staff has also been responsible for the operation and maintenance of 380 miles of sewer lines, and three lift stations located throughout the City.

### 2.1.8 City of La Habra (Service Population: 58,974)

The City of La Habra (La Habra) was incorporated under general law on January 20, 1925, with a population of 3,000. Today, La Habra is a bedroom community located in northern Orange County with a population of nearly 62,000 residents in 7.3 square miles. La Habra operates under a five member Council/Manager form of government who also act as the board of the Water/Sewer Division.

La Habra possesses 125 miles of all gravity sewer pipelines with a replacement cost of $145,000,000 and 143 miles of water pipeline with a replacement cost of $110,000,000. There are three water storage tanks, one water well, six booster stations, 57 pressure reducing valves and 21 pressure zones. La Habra receives water from MET through MWDOC and from California Domestic Water Company prepared from the San Gabriel Groundwater Basin.

### 2.1.9 Laguna Beach County Water District (25,000)

Laguna Beach County Water District (Laguna Beach) is well known as a unique beach community and artist's colony. The District provides water services to 25,000 people within an 8.5 square mile area, including portions of the City of Laguna Beach, a portion of Crystal Cove State Park and the community of Emerald Bay. Laguna Beach serves approximately 4,500 acre feet of water annually to its 8,450 customers. There are 22 water storage reservoirs with a total storage capacity of 33.5 million gallons. Laguna Beach staff operate and maintain 36 pumps in 14 pumping stations and 135 miles of distribution pipelines ranging in diameter from 4 to 16 inches.

The area's sewer and storm drain services are managed by the Water Quality Department of the City of Laguna Beach. The department is organized into two divisions: Wastewater and Water Quality. Wastewater is responsible for maintaining 95 miles of sewer lines, 26 pump stations and the four-mile North Coast Interceptor that transmits sewage to the regional treatment plant operated by SOCWA. Water Quality is a new division formed to implement the water quality permit approved by the San Diego Regional Water Quality Control Board in 2002. The new permit identifies multiple tasks cities and counties must complete to comply with the permit and reduce water pollution.

### 2.1.10 Mesa Consolidated Water District (Service Population: Over 100,000)

Mesa Consolidated Water District (Mesa) is a public utility serving more than 100,000 users within an 18 square-mile area, which includes Costa Mesa, part of Newport Beach and the John Wayne Airport. Mesa commenced operations on January 1, 1960 by acquiring the assets and obligations and assuming the responsibility of consolidating the City of Costa Mesa's Water Department, Fairview County Water District, Newport Heights Irrigation District and Newport Mesa County Water District. Mesa set a precedent with this merger as the first California water utility to consolidate two or more water utilities and assume both their assets and debts. Mesa is

governed by a publicly elected Board of Directors comprised of five directors. The Board of Directors establishes the water rates. Mesa strives to provide its customers with 100 percent groundwater, which is pumped from Orange County's natural groundwater basin via nine wells. Since its formation in 1960, Mesa's goal has been to produce the highest quality drinking water for all of our customers.

### 2.1.11 Moulton Niguel Water District (Service Population: over 160,000)

Moulton Niguel Water District (MNWD) was formed in November 1960 under provisions of the California Water District Law, Division 13 of the Water Code of the State of California. The District is governed by a publicly elected Board of Directors comprised of seven directors. The Board of Directors establishes the water and sewer rates. MNWD is located in the southern portion of the County of Orange and provides water and sewer service to over 160,000 customers. The District is almost entirely developed and encompasses almost all of the cities of Aliso Viejo, Laguna Niguel, Laguna Hills, about half of the city of Mission Viejo, and a portion of Dana Point. All of the potable water is imported water from MET through MWDOC and approximately 20% of the District's demand is supplied by recycled water serving landscape irrigation services.

### 2.1.12 City of Newport Beach (Service Population: 83,120)

The City of Newport Beach (Newport Beach) was established in 1906 and is governed by a Council/Manager form of government. The City's present population is 83,120 for permanent residents and peaks at approximately 100,000 seasonally. The City's Utilities Department is responsible for providing water service, wastewater collection, oil and gas production, electrical services, and street lights to the citizens of Newport Beach. All city rates for services are set by Municipal Ordinance.

Newport Beach has two sources of water: groundwater pumped from four wells in Fountain Valley and imported water from MET via MWDOC. At this time, Newport Beach pumps 69 percent of its water from wells and imports the remaining 31percent. In the next five years Newport Beach expects those percentages to adjust to 75/25 percent pumped and imported water, respectively.

### 2.1.13 City of Orange (Service Population: 138,000)

The City of Orange is located in northern Orange County, serving an area of 23.6 square miles. The City of Orange's water system was established in October 1904 serving a population of 1,216 people. Since then, the water system has grown tremendously to support a current population of over 138,000 people. The City's water system is comprised of 16 groundwater wells, 8 connections to the imported water supply, 18 water storage tanks with a total storage capacity of over 42 million gallons, 18 pumping stations, 437 miles of pipelines, and over 34,000 service connections. Orange's water comes from two sources: the primary source is groundwater from OCWD, which makes up 64% to 75% of the supply; the second source is imported water purchased from MET through MWDOC. The city also utilizes local supply through an agreement with Serrano Water District who provides treated local runoff captured in Irvine Lake.

The governing body of the City of Orange is a five-member Council. Under a council-manager form of government, a mayor is elected every two years and four council members are elected to four-year terms alternating on a two-year basis. The City Manager, who is the administrative official of the City, is appointed by the City Council. The water rate structure and all other regulations must be approved by City Council before becoming effective.

### 2.1.14 Santa Margarita Water District (Service Population: 150,000)

Santa Margarita Water District (SMWD) established in December 1964 under provisions of the California Water District Law (Section 34000 et seq. of the California Water Code), includes 62,674 acres in the southeastern corner of Orange County. SMWD is bounded on the north by El Toro Road in the City of Lake Forest, on the east by the Cleveland National Forest, on the south by United States Marine Corp Camp Pendleton and Orange County and on the west by the City of San Juan Capistrano and Moulton Niguel Water District. SMWD is responsible for inter-utility coordination and long range planning to meet future water supply and wastewater treatment needs for its service area.

The Cities of Mission Viejo, Rancho Santa Margarita, a portion of San Clemente and the incorporated communities of Coto de Caza, Las Flores and Ladera Ranch, as well as the remaining undeveloped portion of the Rancho Mission Viejo are within the service boundary of SMWD.

The governing body of SMWD (and all improvement districts therein) is a five-member Board of Directors, publicly elected at large for staggered four-year terms. SMWD's responsibilities as authorized by the California Water District Law are:

- Distribution of domestic water for consumption and fire protection.
- Collection and treatment of wastewater.
- Distribution of recycled water along with the collection and distribution of urban return flows for irrigation purposes.

Nearly 100% of the District's annual domestic water demands are imported from MET through MWDOC. SMWD receives imported (potable) water from MET via the regional distribution system located in Orange County (Allen-McColloch Pipeline and the East Orange County Feeder No. 2).

### 2.1.15 Serrano Water District (Service Population: 6,500)

Serrano Water District (Serrano) was formed in 1927 under the California Water Code and serves a population of 6,500 in the City of Villa Park and a small portion of the City of Orange. Serrano is an independent governmental body with an elected Board of Directors. It is separate and distinct from the City of Villa Park's Municipal Government. Serrano receives its water supply mostly from local surface water which is stored in Irvine Lake and groundwater from three wells located within the City of Villa Park. Annually, Serrano provides about 3,500 acre-feet of water serving primarily large lot single family homes and one shopping center. About once every 10

years, Serrano supplements its local water supply with raw imported water from MET through MWDOC

Serrano owns 50 percent capacity of Irvine Lake and the dam forming the lake; Irvine Ranch Water District (IRWD) owns the other 50 percent. Serrano is the managing district for the Irvine Lake facility and its recreational aspects. The annual operation of Irvine Lake varies depending on the amount of local runoff.

The water Serrano receives out of Irvine Lake can be either locally generated runoff, imported water or some combination thereof. Water is supplied from Irvine Lake to the Serrano treatment plant, located about 1.5 miles away, through a 24" gravity flow supply line that has a capacity of about 17 cubic feet per second (cfs). Serrano's existing water treatment plant can produce about 3,000 gallons per minute (gpm) and its wells can produce about 2500 gpm for a peak supply of about 5,500 gpm. In recent years, Serrano has been using their treatment plant to supply 1,000 to 1,500 acre-feet of water to the City of Orange through interconnections.

### 2.1.16 South Coast Water District (Service Population: 40,000)

South Coast Water District (SCWD) is a public utility, formed by popular vote and owned by the people it serves. SCWD is a special district operating under state law, completely independent of county government. A Board of Directors, elected by the voters of the District, has the power to establish policies, fix rates, construct and maintain facilities and perform any other act necessary to provide water and sanitation service for present and future consumers. Day-to-day operations are administered by a general manager who is appointed by the Board of Directors.

SCWD has gone through several consolidations and reorganizations to accommodate the needs of the community, as well as to provide the most efficient water and sanitary services possible. At this time the District serves approximately 12,300 water and 17,800 sewer accounts. The area serviced by SCWD has an estimated population of 40,000 residents and two million visitors a year. The District purchases imported water from MET through MWDOC.

Due to the District's hilly terrain, much of the water must be pumped and stored in reservoirs to maintain constant pressure. The District's total water storage capacity of approximately 22 million gallons is maintained in 15 reservoirs. Water is moved to upper elevations through approximately 147 miles of local mains using a system of nine pump stations. As an additional safeguard to assure the water supply, the District maintains a series of "inter-ties" with neighboring water districts which can be activated in an emergency. Additionally, recycled water is used for landscape irrigation on parks, golf courses, playgrounds and greenbelt areas. Using recycled water for landscaping irrigation frees up imported drinking water for other uses.

In April of 2000, SCWD accepted the responsibility for operations and maintenance of what is now identified as the joint Regional Water Supply System (JRWSS). The JRWSS provides water transmission over a 26 mile service area to approximately 200,000 residents. JRWSS operates two storage/regulating reservoirs located in San Clemente: Bradt Reservoir with a capacity of 48 mg, and the Schlegel Reservoir with a capacity of 12 mg.

### 2.1.17 Trabuco Canyon District (Service Population: 14,000)

The Trabuco Canyon Water District (TCWD) is a county water district organized and operating pursuant to Section 34,000 and following, of the Water Code of the State of California. The District was organized on February 26, 1962 under Division XII of the California Water Code. The District is governed by a five-member Board of Directors elected to alternating four-year terms at elections held every two years.

Trabuco Canyon Water District is located in the southeastern portion of Orange County at the foothills of the Santa Ana Mountains and encompasses approximately 9,100 acres. The terrain within the District is generally steep hills and canyons throughout the central area of the District. The east and west sides consist of more gentle terrain made up primarily of rolling hills. Elevations within the District range from approximately 900 feet above mean sea level in the lower Aliso Creek area and the southern area of Dove Canyon, to nearly 2,400 feet in the northeasterly portion of the District adjacent to the Cleveland National Forest.

Prior to 2000, the District was entirely within the unincorporated area of Orange County. In 2000, the City of Rancho Santa Margarita was incorporated and now covers the eastern portion of the District. TCWD serves an estimated population of 13,665 in the City of Rancho Santa Margarita, City of Lake Forest, and an unincorporated area of Orange County.

The District provides water, wastewater and recycled water service to major communities within the District's service area. The District's sources of water supply are imported treated water, imported surface water treated at the District's water treatment plant, and treated local groundwater. To provide reliability and redundancy, the District's system is interconnected with adjacent utilities including Santa Margarita Water District, Irvine Ranch Water District, and El Toro Water District.

### 2.1.18 City of Tustin (Service Population: 65,000)

The City of Tustin is a General Law city, governed by a 5-member non partisan generally elected city council under the council-manager form of government. The City is staffed with approximately 290 full-time employees with approximately 22 full-time employees within the Water Services Division.

The City of Tustin (Tustin) bought the privately held Tustin Water Works in 1980. Tustin serves a population of approximately 65,000 people, with 14,500 service connections. The service area totals 8.4 square miles which includes most of the incorporated area of the City of Tustin and unincorporated areas north of the City. Currently, supply deliveries are 84 percent from groundwater and 16 percent from imported water. There are seven untreated or "clear" groundwater wells that pump directly into the distribution system. Two treatment plants treat groundwater from five additional wells to potable standards for delivery into the system. At several sites, water is blended with other well water or imported water to reduce nitrate concentrations below the State Maximum Contaminant level (MCL). The water system is divided into three pressure zones. The average ground elevations for Zones 1, 2, and 3 are 210 feet, 280 feet, and 400 feet above mean sea level, respectively.

Currently, Tustin has approximately 13.83 mg of storage capacity in its six existing reservoirs and three booster stations. Water is delivered through 170 miles of 1.5-inch to 20-inch water mains.

### 2.1.19 City of Westminster (Service Population: 93,000)

Westminster is located on eleven square miles of broad, flat coastal plain in western Orange County, five miles from the Pacific Ocean and 25 miles southeast of Los Angeles. Westminster is a general law city that operates under the Council–Manager Form of government, which is responsible for establishing water rates.

The Westminster Water Division currently provides potable water to 93,000 residents and the business community using 20,000 service connections. At present, Westminster has 12 active wells and three import water connections. Two of the three imported water interties are from regionally operated pipelines shared with other agencies. On annual average, 66 percent of drinking water is produced by wells and 34 percent is imported. The Water Division does not manage wastewater disposal or recycled water for the City. Wastewater is handled by the Midway City Sanitation District.

### 2.1.20 Yorba Linda Water District (Service Population: 75,000)

Yorba Linda Water District (YLWD) is an independent special district that provides water and sewer service to residents and businesses within its service area. The District's history dates back to 1909, when local farmers and ranchers formed the Yorba Linda Water Company. In 1959, the voters elected to create a public utility with the assets of the Water Company, and the YLWD was formed under the California Water District Law, Division 13 of the Water Code of the State of California.

The District is governed by a publicly elected Board of Directors comprised of five Directors who serve four year terms. The Directors set District policies and programs, provide general oversight of District activities, set water and sewer rates, and employ the general manager to direct the activities of the District.

YLWD provides water and sewer services to most of Yorba Linda, and to portions of Placentia, Anaheim, Brea, and unincorporated Orange County. From 1959 through the mid-1970s, the District experienced a gradual transition from a rural, agriculturally orientated area to a suburban community. In 1978, YLWD Board of Directors agreed to annex lands to the east of then current boundaries that more than doubled the District's size. YLWD purchases imported water from MET through MWDOC to provide up to 50% of its demand for its more than 23,000 service connections. The remaining water comes from the District's local production wells which are pumped from the OCWD groundwater basin.

# SECTION 3 PLANNING PROCESS DOCUMENTATION

## 3.1 DESCRIPTION OF EACH JURISDICTION'S PARTICIPATION IN THE PLANNING PROCESS

Representatives from all participating water and wastewater utilities provided input into the preparation of the Plan. Because the operations of water and wastewater facilities is confidential for security reasons only approved MWDOC/PWU and URS staff participated in portions of the planning process that included discussions concerning the locations and operations of critical facilities. The public was informed of the planning process through public notices, the MWDOC website, and was invited to participate in discussions on hazards identified in the County as well as the MWDOC/PWU mitigation goals and objectives. Confidential data was excluded from these public meetings.

The planning process for the Orange County Regional Water and Wastewater Multi-Hazard Mitigation Plan involved ten water districts, two regional wastewater agencies, and the public utilities departments for eight cities; a total of 20 jurisdictions participated in the planning process. MWDOC served as the lead for the plan preparation, monitored planning progress, and met with participating jurisdictions as needed to assist with preparing capabilities assessments and assets worksheets. The MWDOC/PWU participated in the planning process by exchanging information, discussing planning strategies, sharing goals, resolving issues, and monitoring progress. The periodic MWDOC and PWU meetings included discussions of the planning process with neighboring jurisdictions, but all Hazard Mitigation Working Group (HMWG) meetings were private due to the confidential nature of the data discussed. The participating jurisdictions benefited from working closely together because many of the hazard mitigation issues identified are shared by neighboring jurisdictions.

All meeting attendees were provided an overview of hazard mitigation planning at the meetings. This training was designed after the FEMA State and Local Mitigation Planning How-to Guide worksheets, which led the attendees through the process of defining the jurisdiction's assets, vulnerabilities, capabilities, goals and objectives, and action items. In addition, several HMWG members met with URS staff specifically to discuss hazard-related goals, objectives and actions. Preliminary goals, objectives and actions developed by jurisdiction staff were reviewed with their respective management and/or representatives for approval.

The HMWG were given maps of the profiled hazards to compare with their detailed jurisdiction-level maps that illustrated the critical facilities. Data received from the HMWG were added to the hazard database and used in the modeling process described in the Risk Assessment portion of the Plan (Section 4). Jurisdictions that provided URS with updated hazard-related data are:

- MWDOC - provided local liquefaction/soil stability data
- Center for Demographic Research (CDR) - provided earthquake shake, epicenter and fault data

All PWU provided URS with edits to critical facility maps within their jurisdictions.

## 3.2 DESCRIPTION OF PLANNING COMMITTEE FORMATION

MWDOC hired URS Corporation (URS) to assist with the development of the Plan. Kelly Hubbard, the project coordinator for MWDOC, requested input from all water and wastewater utilities in Orange County. Ms. Hubbard received positive responses from ten water districts, two wastewater districts, and eight city utilities and representatives from these jurisdictions attended a kickoff meeting to develop an approach to the planning process and to help form the HMWG. MWDOC also provided an opportunity for neighboring communities, local and regional utilities involved in hazard mitigation activities, and utilities that have the authority to regulate development, as well as business, academia and other private and non-profit interests to be involved in non-confidential portions of the planning process. Some of those parties are listed in Section 3.2 below. The committee was formed as an advisory body to undertake the planning process and meeting dates were set for all members of the committee to attend. Jurisdictional representatives included but were not limited to utility engineers, planners and emergency management officers.

## 3.3 NAME OF PLANNING COMMITTEE AND ITS MEMBERS

The HMWG is comprised of representatives from the 12 participating water and wastewater utilities and eight participating cities, as listed above in Section 2.1. The HMWG met regularly, and served as a forum for other utilities and the public to voice their opinions and concerns about non-confidential portions of the mitigation plan. Although several jurisdictions sent several representatives to the HMWG meetings, each jurisdiction selected a lead representative who acted as the liaison between their jurisdictional Local Mitigation Planning Team and the HMWG. Each local team, made up of other jurisdictional staff/officials met separately and provided additional local-level input to the leads for inclusion into the Plan. Participants in the planning process are listed below in Table 3.3-1. The lead representatives for each district are highlighted.

**Table 3.3-1**
**Planning Representatives for Participating Jurisdictions**

| Name | Utility | Title |
|---|---|---|
| Chuck Fowler | City of Buena Park | Water Quality Inspector |
| Zack Barret | City of Garden Grove | Water Quality Supervisor |
| Robert Bermudez | City of Garden Grove | Production Supervisor |
| Brent Hayes | City of Garden Grove | Sanitation Supervisor |
| Les Ruitenchild | City of Garden Grove | Distribution Supervisor |
| Don Tunison | City of Garden Grove | Senior Production Operator |
| Jeff Henderson | City of La Habra | Administrative Analyst for the City Yard |
| Jerry Vilander | City of La Habra | Water/Sewer Manager |
| Tim Deutsch | City of Newport Beach | Utilities Administrative Manager |
| Terresa Moritz | City of Newport Beach | Administrative Analyst |

| | | |
|---|---|---|
| George Murdoch | City of Newport Beach | Utilities Operations Manager |
| Joe DeFrancesco | City of Orange | Water Manager |
| Son T. Tran | City of Orange | Senior Civil Engineer |
| Kathy Barr | City of Tustin | Office Support Specialist |
| Joe Meyers | City of Tustin | Administrative Services Manager |
| Vivian Filippelli | City of Westminster | Public Works Analyst |
| Todd Miller | City of Westminster | Cross Connection Inspector, Water Conservation, and Lead Worker |
| Renzo Marin | El Toro Water District | Emergency Response |
| Brian Miller | El Toro Water District | Engineering Assistant Coordinator |
| Jim Smith | Laguna Beach County Water District | Senior Engineer |
| Gordon Davis | Mesa Consolidated Water District | Risk Management Coordinator |
| Victoria L. Beatley | Mesa Consolidated Water District | Financial Services Manager |
| Frani Bailey | Moulton Niguel Water District | Administrative Assistant for Operations |
| Larry Ballew | Moulton Niguel Water District | Station Maintenance Crew Chief |
| Phil Lawler | Moulton Niguel Water District | Facilities Operations Supervisor |
| Ray McDowell | Moulton Niguel Water District | Inspection Supervisor |
| Tom Stephenson | Moulton Niguel Water District | Director of Engineering |
| Heather Fong | Municipal Water District of Orange County | WEROC Intern |
| Kelly Hubbard | Municipal Water District of Orange County | Emergency Services Manager |
| Lee Jacobi | Municipal Water District of Orange County | Senior Engineer |
| Karl Seckel | Municipal Water District of Orange County | Assistant General Manager |
| Keith Lyon | Municipal Water District of Orange County | Principal Analyst |
| Jim Matte | Orange County Sanitation District | Safety and Health Supervisor |
| George Rivera | Orange County Sanitation District | Security and Emergency Planning Specialist |
| Chuck Steinbergs | Orange County Water District | Principal Engineer |
| Lo Tan | Orange County Water District | Senior Engineer |
| Boyd Lypka | Orange County Water District | Risk and Safety Manager |
| Steve Francis | Santa Margarita Water District | Operations Field Superintendent |

| | | |
|---|---|---|
| Ron Meyer | Santa Margarita Water District | Engineering Associate |
| Jaime Aguilar | Santa Margarita Water District | Senior Project Engineer |
| David H. Noyes | Serrano Water District | General Manager/Secretary |
| Tim de Turk | Serrano Water District | Superintendent of Operations |
| Ann Michel | Serrano Water District | Director of Finance & Administration/Assistant Secretary |
| Mark Cole | South Coast Water District | Safety and Compliance Coordinator |
| Steve Sanchez | South Coast Water District | Manager of Support Services |
| Dan Wheeler | South Orange County Wastewater Authority | Chief Operator |
| Hector Ruiz | Trabuco Canyon Water District | District Engineer |
| Hank Samaripa | Yorba Linda Water District | Project Engineer |

## 3.4 HAZARD MITIGATION WORKING GROUP MEETINGS

The HMWG had regular monthly meetings; the following is a list of HMWG meeting dates and content of meetings (see Appendix A1 to A7 for sign-in sheets, meeting agendas, and meeting minutes). In addition, Kelly Hubbard met with and coordinated with the participating jurisdictions on various additional dates in person, via telephone or via email.

**HMWG Meeting Dates/Results of Meeting**

- HMWG Meeting 1: 10-18-05/Kickoff and Formation of HMWG
- HMWG Meeting 2: 11-15-05/ Identifying Risks/Identifying Assets
- HMWG Meeting 3: 12-13-05/ Inventory of Assets/Verifying Facility Locations
- HMWG Meeting 4: 2-14-06/ Goals, Objectives, and Actions/Capabilities Assessment
- HMWG Meeting 5: 4-18-06/ Development of Mitigation Plan/Hazard Maps/Loss Estimation
- HMWG Meeting 6: 06-20-06/ Review Risk Assessment/Jurisdiction Descriptions
- HMWG Meeting 7: 08-15-06/Distribution of Draft Plan

Other meetings included individual meetings with jurisdictions, presentations to community and government planning groups, and by individual jurisdictions' governing boards for adoption of the Plan.

## 3.5 PLANNING PROCESS MILESTONES

The approach taken by MWDOC relied on sound planning concepts and a methodical process to identify water and wastewater vulnerabilities and to propose the mitigation actions necessary to avoid or reduce those vulnerabilities. Each step in the planning process was built upon the

previous, providing a high level of assurance that the mitigation actions proposed by the participants and the priorities of implementation are valid. Specific milestones in the process included:

- *Risk Assessment (October, 2005 – June 2006)* - The HMWG used the FEMA list of hazards from the State and Local Mitigation Planning How-to Guide (How-to Guide) to identify natural hazards that potentially threaten all or portions of the County. In addition to natural hazards, the HMWG also identified manmade hazards that may threaten all or portions of the County and individual PWU. Specific geographic areas subject to the impacts of the identified hazards were mapped using a Geographic Information System (GIS). The HMWG had access to information and resources regarding hazard identification and risk estimation. This included hazard specific maps, such as floodplain delineation maps, earthquake shake potential maps, and wildfire threat maps; GIS-based analyses of hazard areas; the locations of infrastructure, critical facilities, and other properties located within each jurisdiction; and an estimate of potential losses or exposure to losses from each hazard.

  Many of the participating utilities had recently completed a vulnerability assessment of their critical facilities in compliance with the Bioterrorism Act of 2002. These documents and data were utilized in the HMP planning process. GIS data and modeling results were used to identify specific vulnerabilities that could be addressed by specific mitigation actions. The HMWG also reviewed the history of disasters in the County and assessed the need for specific mitigation actions based on the type and location of damage caused by past events.

  Finally, the assessment of community vulnerabilities included a review of existing codes, plans, policies, programs, and regulations used by the PWU to determine whether existing provisions and requirements adequately address the hazards that pose the greatest risk to the community.

- *Goals, Objectives and Alternative Mitigation Actions (June, 2006- February, 2006)* – Based on this understanding of the hazards faced by the County, a series of goals and objectives were identified by HMWG members to guide subsequent planning activities. In addition, a series of alternative mitigation actions were identified to address these goals and objectives. This was done in the HMWG meeting series described above, starting in October, 2005 and continuing through July, 2006.

- *Mitigation Plan and Implementation Strategy (March--July, 2006)* – The HMWG determined the priorities for action from among all the alternatives identified. Each agency will utilize current approved planning documents that identify specific implementation strategies for capital improvement, risk reduction, system upgrades, and operations, which include details regarding who is responsible for project management, estimated costs, possible funding sources, and timelines for implementation. These plans complement the Plan and include but are not limited to:

  - Strategic Plans
  - Capital Improvement Plans

- General Plans
- EPA Vulnerability Assessments and ERP
- Asset Management Plan

- *Work Group Meetings (October, 2005 – August, 2006)* – As listed in Section 3.4 a series of meetings were held in which the HMWG considered the probability of a hazard occurring in an area and its impact on public health and safety, property, the economy, and the environment, and the mitigation actions that would be necessary to minimize impacts from the identified hazards. With the exception of two re-scheduled meetings, these meetings were held every month starting October 18, 2005 and continued through August 15, 2006. The meetings evolved as the planning process progressed, and were designed to aid the jurisdictions in completing worksheets that helped define hazards within their jurisdictions, their existing capabilities and mitigation goals and action items for the Mitigation

## 3.6 PUBLIC INVOLVEMENT

Water and wastewater facility location and operational information is confidential for security reasons due to the need to ensure public safety. As a result, public participation was restricted to two information meetings wherein the participating jurisdictions shared the mitigation planning process and their goals and objectives to increase the safety and security of their facilities and therefore enhance the safety of the community. Throughout the planning process, MWDOC published news releases on the planning process and progress, and developed a website with this information. The PWU also met with non-participating utilities and districts that they have co-operative agreements with to inform them of plan progress and invite input. Meetings with the HMWG, internal meetings within each PWU, meetings with co-operating utilities, three public meetings, and a webpage with a "contact us" link on the MWDOC website served as methods to obtain input and identify priorities in developing goals for reducing risk and preventing loss from natural hazards in Orange County. Public involvement included:

- Public Information Meeting to educate citizens, public officials, and business leaders about the hazard mitigation planning process. Topics included hazard mitigation planning and its benefits, steps in the hazard mitigation planning process, and the importance of community input and participation, especially to suggest mitigation goals to be incorporated into the Plan.

  **Public Meeting Dates:**

  – ETWD Community Advisory Group: September 7, 2006

  – Public Meeting and Presentation: September 12, 2006

  – Public Meeting and Presentation: September 14, 2006

- Public Response and Comments to develop lists of potential mitigation actions by soliciting community input regarding vulnerabilities and potential solutions. Citizens participated by reviewing the hazards maps, reviewing the draft plan, and discussing the hazard mitigation purpose. They were then able to ask questions and provide comments for the HMWG to consider. Comment cards were distributed at the public workshops. See Appendix B for a summary of the workshops.
- Press Releases were prepared and released to solicit public review and comment. See Appendix C for copies of press releases and public notices.

  **Press Release Dates:**

  – October 17, 2005: Announcing Initiation of the Planning Process
  – July 5, 2006: Announcing Public Workshops via website & bill inserts
  – August 25, 2006: Announcing the Public Workshops via regional and local print media
- A Hazard Mitigation Plan Web Site was developed to provide the public with information. Items posted on the web site included public meeting announcements, PowerPoint presentations, a Hazard Mitigation Fact Sheet, hazard maps, the draft plan, and links to FEMA guidance documents. Anyone viewing the site could choose a "contact us" link to provide comment via email.

Public involvement was valuable in the development of the Plan. Feedback given during the public meetings led to the re-prioritization of mitigation actions, and acted as a reality check in determining the impacts of the Plan on the general public.

## 3.7 EXISTING PLANS OR STUDIES REVIEWED

HMWG team members and their corresponding Local Mitigation Planning Teams reviewed several plans, studies, and guides both prior to and during the planning process. These plans included FEMA documents, emergency services documents as well as water district and local general plans and community plans. These included:

- County of Orange Hazard Mitigation Plan
- City of Irvine Hazard Mitigation Plan
- Various Vulnerability Assessments and Emergency Response Plans
- Various Local Codes and Ordinances
- State and Local Mitigation Planning How-to guide, FEMA 386-2, August 2001
- Interim Hazard Mitigation Planning Guidance for California Local Governments
- FEMA CRS-DMA2K Mitigation Planning Requirements
- South Orange County Water Reliability Study (MWDOC)

- Executive Summary of the Value of a Reliable Water Supply Study (Appendix D)
- Crosswalk Reference Document for Review and Submission of Local Mitigation Plans to the State Hazard Mitigation Officer and FEMA Regional Office

# SECTION 4 RISK ASSESSMENT

## 4.1 OVERVIEW OF THE RISK ASSESSMENT PROCESS

Risk Assessment requires the collection and analysis of hazard-related data to enable local jurisdictions to identify and prioritize appropriate mitigation actions that will reduce losses from potential hazards. The *FEMA State and Local Mitigation Planning How-to Guide* (How-to Guide) identifies five Risk Assessment steps as part of the hazard mitigation planning process, including: 1) identifying hazards, which involves determining those hazards posing a threat to a study area, 2) profiling hazards, which involves mapping identified hazards and their geographic extent, 3) identifying assets, which assigns value to structures and landmarks in the identified hazard areas, 4) assessing vulnerability, which involves predicting the extent of damage to assets, and 5) analyzing development trends, which assesses future development and population growth to determine potential future threat from hazards. These steps are described in detail in the following sections, first with an overall summary of hazard identification and data collection in Section 4.2, then with a jurisdictional summary of hazards, assets and vulnerability in Section 4.3.

### 4.1.1 Identifying Hazards

Hazard identification is the process of identifying hazards that threaten an area including both natural and man-made events. A natural event causes a hazard when it harms people or property. Such events would include floods, earthquakes, tornadoes, tsunami, coastal storms, landslides, and wildfires that strike populated areas. Man-made hazard events are caused by human activity and include technological hazards and terrorism. Technological hazards are generally accidental and/or have unintended consequences (for example, an accidental hazardous materials release). Terrorism is defined by the *Code of Federal Regulations* as "…unlawful use of force and violence against persons or property to intimidate or coerce a government, the civilian population, or any segment thereof, in furtherance of political or social objectives." Natural hazards that have harmed the County in the past are likely to happen in the future; consequently, the process of identifying hazards includes determining whether or not the hazard has occurred previously. To identify the potential hazards, extensive research was conducted. In addition to reviewing hazards identified in the Orange County HMP, URS collected historical hazard data including researching newspapers and other records, conducting a planning document and report literature review in all relevant hazards subject areas, gathering hazard-related GIS data, and engaging in conversation with relevant experts from the community. In addition, a variety of sources were used to determine the full range of potential hazards within Orange County. Even though a particular hazard may not have occurred in recent history in Orange County, it is important during the hazard identification stage to consider all hazards that may potentially affect the study area.

### 4.1.2 Profiling Hazards

Hazard profiling entails describing the physical characteristics of past hazards such as their magnitude, duration, frequency, and probability. This stage of the hazard mitigation planning process involves creating base maps of the study area and then collecting and mapping hazard event profile information obtained from various Federal, State, and local government utilities. URS obtained data and maps available online from sources such as the United States Geological Survey (USGS), National Oceanographic and Atmospheric Administration (NOAA), FEMA, and ESRI (a Geographic Information System [GIS] software development

firm). Local utilities were contacted to provide more detailed and accurate data for Orange County. Where possible, the hazard data were mapped to determine the geographic extent of the hazards in each PWU in the County. Data that could not be mapped were evaluated qualitatively by the HMWG based on their knowledge of their facilities and the probable extent/occurrence of these hazards. The level of risk associated with each hazard in each jurisdiction was also estimated and assigned a risk level depending on several factors unique to that particular hazard.

### 4.1.3 Identifying Assets (Process Related Discussion)

The third step of the risk assessment process entails identifying which assets in each jurisdiction will be affected by each hazard type. Assets include any type of structure or facility associated with the operation of water and wastewater infrastructure. An inventory of existing and proposed assets within each PWU was generated. The assets were then mapped to show their locations and to determine their vulnerability to each hazard type.

### 4.1.4 Assessing Vulnerability (Process Related Discussion)

Vulnerability describes the degree to which an asset is susceptible to damage from a hazard. Vulnerability depends on an asset's construction, contents and the economic value of its functions. Like indirect damages, the vulnerability of one facility is often related to the vulnerability of another. Often, indirect effects can be much more widespread and damaging than direct effects; especially when considering that outages at water facilities can result in significant economic consequences and losses in product output and impact to residents and businesses. A vulnerability analysis predicts the extent of injury and damage that may result from a hazard event of a given intensity in a given area. The vulnerability assessment identifies the effects of natural and man-made hazard events by estimating the relative exposure of existing and future population, land development, and infrastructure to hazardous conditions. The assessment helps set mitigation priorities by allowing local jurisdictions to focus attention on areas most likely to be damaged or most likely to require early emergency response during a hazard event. Pursuant to the Bioterrorism Act of 2002 some of the PWU have completed security vulnerability assessments of their water facilities. These assessments were utilized by each PWU to identify hazards that could not be modeled in GIS that may affect their facilities. Further, this information was key in developing objectives and action items to enhance the security of water and wastewater facilities.

## 4.2 HAZARD IDENTIFICATION AND SCREENING

### 4.2.1 List of Hazards Prevalent in the Jurisdiction

The HMWG reviewed hazards listed in the How-to Guide and determined the prevalence of each hazard in Orange County and whether each hazard should be included in the Plan. All hazards identified by FEMA in the How-To-Guides were reviewed. They include: avalanche, coastal storm, coastal erosion, dam failure, drought/water supply, earthquake, expansive soils, extreme heat, flooding, hailstorm, house/building fire, land subsidence, landslide, liquefaction, severe winter storm, tornado, tsunami, wildfire, windstorm, and volcano. Although not required by the FEMA *Disaster Mitigation Act of 2000*, manmade hazards such as hazardous materials release, nuclear materials release, and terrorism were also reviewed by the HMWG.

### 4.2.2 Hazard Identification Process

As summarized above, hazard identification is the process of identifying all hazards that threaten an area, including both natural and man-made events. In the hazard identification stage, URS worked with the HMWG to determine hazards that potentially threaten Orange County. The hazard screening process involved narrowing the FEMA all-inclusive list of hazards to those most threatening to the Orange County region. Most of the hazards identified in the Orange County HMP were selected by the HMWG to be reviewed in the Plan as hazards that might affect water and wastewater facilities and structures. In addition to these hazards the HMWG determined that there are some other hazards that could adversely affect their resources.

URS used information from FEMA and other nationally and locally available databases to map the County's hazards, infrastructure and critical facilities. This initial mapping effort was utilized in the hazard screening process to determine which hazards would present the greatest risk to MWDOC and the PWU.

The HMWG indicated that based on the fact that the majority of the development in Orange County is relatively recent (within the last 60 years), an urban type of fire that destroys multiple city blocks is not likely to occur alone, without a wildfire in the urban/wildland interface occurring first. Therefore, it was determined that house/building fire and wildfire should be addressed as one hazard category in the plan.

The final list of hazards to be profiled for Orange County was determined as:

- Tsunamis,
- Contamination,
- Dam Failure,
- Drought/Extreme Heat,
- Earthquake,
- Liquefaction,
- Expansive soils,
- Floods/Coastal Storms,
- High winds/Santa Ana Winds (resulting in power outages),
- Landslide/mudslide,
- Land Subsidence,
- Tornado,

- Wildfire/Urban Fire, and
- Human caused hazards.

Table 4.2.2-1 shows a summary of the hazard identification results for Orange County.

**Table 4.2.2-1**
**Summary of Hazard Identification Results**

| Hazard | Data Collected for Hazard Identification | Justification for Inclusion |
|---|---|---|
| Coastal Storms, Erosion | • Historical Coastlines (NOAA)<br>• FEMA FIRM Maps<br>• FEMA Hazards website<br>• Coastal Zone Boundary (California Coastal Commission)<br>• Orange County – Planning and Development Services | • Coastal storms prompted 8 Proclaimed States of Emergency from 1950-1997<br>• Coastline stabilization measures have been implemented at various times in the past (erosion)<br>• Extensive development along the coast |
| Ground Water Contamination/ Salt Water Intrusion | • OCWD Historical Records | • In 1956, the water table was 15-ft below sea level and salt water had encroached several miles inland. |
| Dam Failure | • FEMA-HAZUS MH<br>• FEMA Hazards website<br>• Topography (USGS) | • Dam failure<br>• Several dams exist throughout Orange County<br>• Many dams over 30 years old<br>• Increased downstream development |
| Drought/Extreme Heat | Long periods without substantial rainfall.<br>• Temperatures that hover 10 degrees or more above the average high temperature for the region and last for several weeks | The Orange County region relies extensively on imported water. Long periods without substantial rainfall in Northern California and in the Colorado River watershed would affect Orange County water supply more than a local rainfall deficit. Additionally there are regional water conservation and water management programs already in place. |
| Earthquake/ Liquefaction/ Tsunami | • USGS<br>• CGS<br>• URS<br>• Maximum Tsunami Run up Projections (USCA OES)<br>• Historical Tsunami Run ups and Events<br>• CISN<br>• FEMA-HAZUS MH<br>• FEMA Hazards website<br>• Faults, Liquefaction (Orange County)<br>• Earthquake (Center for Demographic Research (CDR), Cal State Fullerton, Earth Consultants) | • Several active fault zones pass through Orange County;<br>• Steep slopes or alluvial deposit soils in low-lying areas are susceptible to liquefaction during earthquakes or heavy rains. Orange County terrain has both of these characteristics and lies within several active earthquake zones<br>• Tsunami linked to seismic occurrences in Southern California. |

**Table 4.2.2-1**
**Summary of Hazard Identification Results**

| Hazard | Data Collected for Hazard Identification | Justification for Inclusion |
|---|---|---|
| Expansive soils | Expansive soils shrink when dry and swell when wet. This movement can exert enough pressure to crack sidewalks, driveways, basement floors, pipelines and even foundations<br>• State Soils Geographic Data Base (United States Department of Agriculture) | Presents a minor threat to limited portions of the County |
| Floods | • FEMA FIRM Maps<br>• Topography<br>• Base flood elevations (FEMA)<br>• Historical flood records<br>• FEMA Hazards website<br>• FEMA-HAZUS MH<br>• FEMA Hazards website | • Much of Orange County is located within the 500-year floodplain<br>• Flash floods and other flood events occur regularly during rainstorms due to terrain and hydrology of Orange County<br>• There were 10 Proclaimed States of Emergency between 1950-1997 for floods in Orange County |
| High winds/ Santa Ana Winds | • County of Orange Historical Data | • Wind gusts damage power transmission lines, resulting in loss of power at critical facilities. |
| Landslide | • USGS<br>• CGS<br>• FEMA-HAZUS MH<br>• FEMA Hazards website<br>• NEH | • Steep slopes within earthquake zones exist in Orange County, which creates landslide risk.<br>• Blue Bird Canyon Landslide in 2005. |
| Land subsidence | Occurs when large amounts of groundwater have been withdrawn from certain types of soils, such as fine-grained sediments. The soil compacts because the water is partly responsible for holding the ground up. | Soils in Orange County area susceptible to subsidence. |
| Tornado | A tornado is a violent windstorm characterized by a twisting, funnel-shaped cloud. It is spawned by a thunderstorm (or sometimes as a result of a hurricane) and produced when cool air overrides a layer of warm air, forcing the warm air to rise rapidly. The damage from a tornado is a result of the high wind velocity and wind-blown debris. | Southern California experiences 30 percent of tornadoes that occur in California. |

**Table 4.2.2-1**
**Summary of Hazard Identification Results**

| Hazard | Data Collected for Hazard Identification | Justification for Inclusion |
|---|---|---|
| Wildfire/ Structure Fire | • CDF-FRAP<br>• Orange County Fire Authority<br>• CDFG<br>• Topography<br>• Local Fire Utilities<br>• Historical fire records<br>• FEMA Hazards website | • Orange County experiences wildfires on a regular basis<br>• 7 States of Emergency were declared for wildfires between 1950-2003<br>• Terrain and climate of Orange<br>• Santa Ana Winds |
| Human Caused Hazards | • County of Orange Environmental Health Department Hazardous Materials Division<br>• San Onofre Nuclear Generating Station (SONGS) and Department of Defense | • The federal and state governments have advised every jurisdiction to consider the terrorism hazard<br>• The potential exists for an accidental release to occur at SONGS<br>• Heightened security concerns since September 2001<br>• The storage and used of chemicals at facilities. |

Data in GIS format was projected into the State Plane, NAD 1983, California Zone VI Coordinate System (US Survey Units Feet), and clipped to the Orange County and Jurisdictional boundaries. Data that was not available in GIS format was either digitized into GIS or kept in its original format and used as a reference. A matrix of all data collected, including source, original projection, scale, and data limitations is included in Appendix E. Data and methods that were ultimately used to determine risk levels and probability of occurrence for each hazard are described in detail in the hazard profiling sections.

### 4.2.3 Hazard Identification Sources

Once the hazards of concern for Orange County were determined, URS collected the available data, using sources including the Internet, direct communication with various utilities, discussions with in-house URS experts, and historical records. Specific sources included the United States Geological Survey (USGS), California Geological Survey (CGS), Federal Emergency Management Agency (FEMA) HAZUS, FEMA Flood Insurance Rate Maps (FIRM), United States Forest Service (USFS), California Department of Forestry – Fire and Resource Assessment Program (CDF-FRAP), National Oceanographic and Atmospheric Administration (NOAA), Southern California Earthquake Data Center (SCEDC), California Seismic Safety Commission (CSSC), California Integrated Seismic Network (CISN), Orange County Bureau of Emergency Services, United States Department of Agriculture, Drought Outlook websites, and input gathered from local jurisdictions, districts and utilities. Table 4.2.2-1 also depicts data sources researched and utilized by hazard, as well as brief justifications for inclusion of each hazard of concern in the Orange County region.

Non-Profiled Hazards

During the initial evaluation, the HMWG determined that a number of hazards would not be included in the profiling step because they were not prevalent hazards within the County. The following table gives a brief description of those hazards and the reason for their exclusion from the list.

**Table 4.2.4-1**
**Summary of Hazards Excluded from Hazard Profiling**

| Hazard | Description | Reason for Exclusion |
|---|---|---|
| Avalanche | A mass of snow moving down a slope. There are two basic elements to a slide; a steep, snow-covered slope and a trigger | Snowfall in the County mountains not significant; poses very minor threat compared to other hazards; no historical record of this hazard in the region. |
| Hailstorm | Can occur during thunderstorms that bring heavy rains, strong winds, hail, lightning and tornadoes | Occurs during severe thunderstorms; most likely to occur in the central and southern states; no historical record of this hazard in the region. |
| Severe winter storm | Large amounts of falling or blowing snow and sustained winds of at least 35 miles per hour occurring for several hours | Minor threat in mountains of the County. No historical record of this hazard in the region. |
| Volcano | A volcano is a mountain that is built up by an accumulation of lava, ash flows, and airborne ash and dust. When pressure from gases and the molten rock within the volcano becomes strong enough to cause an explosion, eruptions occur | No active volcanoes in Orange County. No historical record of this hazard in the region. |

## 4.3 HAZARD PROFILES

A hazard profile is a description of the physical characteristics of a hazard and a determination of various hazard descriptors, including magnitude, duration, frequency, probability, and extent. The hazard data that was collected in the hazard identification process was mapped to determine the geographic extent of the hazards in each jurisdiction in the County and the level of risk associated with each hazard. Most hazards were given a risk level of high, medium or low depending on several factors unique to the hazard. The hazards identified and profiled for Orange County, as well as the data used to profile each hazard, are presented in this section. The hazards are presented in alphabetical order; and this does not signify level of importance to the HMWG. Table 4.2.4-2 provides a summary of the Hazard Valuation Loss for each mapped hazard.

**Table 4.2.4-2**

**Hazard Valuation Loss Summary by Hazard**

| Hazard | Event | Replacement Value $M |
|---|---|---|
| Earthquake | | |
| | Moderate | $3,251 |
| | High | $3,986 |
| | Extreme | $662 |
| Flood | | |
| | 100 Year | $1,415 |
| | 500 Year | $1,459 |
| Landslide | | |
| | | $1,372 |
| Liquefaction | | |
| | Moderate | $1,200 |
| | High | $1,931 |
| | Very High | $56 |
| Fire | | |
| | Low | $1,111 |
| | High | $329 |
| | Extreme | $41 |

## 4.3.1 Tsunami

### *4.3.1.1 Nature of Hazard*

The phenomenon we call "tsunami" is a series of traveling ocean waves of extremely long length generated primarily by earthquakes occurring below or near the ocean floor. In the deep ocean, the tsunami waves move across the deep ocean with a speed exceeding 500 miles per hour, and a wave height of only a few inches. Tsunami waves are distinguished from ordinary ocean waves by their great length between wave crests, often exceeding 60 miles or more in the deep ocean, and by the time between these crests, ranging from 10 minutes to an hour.

As they reach the shallow waters of the coast, the waves slow down and the water can pile up into a wall of destruction up to 30 feet or more in height. The effect can be amplified where a bay, harbor or lagoon funnels the wave as it moves inland. Large tsunamis have been known to rise over 100 feet. Even a tsunami 1-3 feet high can be very destructive and cause many deaths and injuries.

There are many causes of tsunamis, but the most prevalent is earthquakes. In addition, landslides, volcanic eruptions, explosions, and even the impact of meteorites can generate tsunamis http://www.prh.noaa.gov/itic/library/about_tsu/faqs.html

Not all earthquakes generate tsunamis. To generate a tsunami, the fault where the earthquake occurs must be underneath or near the ocean, and cause vertical movement of the sea floor over a large area, hundreds or thousands of square miles. By far the most destructive tsunamis are generated from large, shallow earthquakes with an epicenter or fault line near or on the ocean floor. The amount of vertical and horizontal motion of the sea floor, the area over which it occurs, the simultaneous occurrence of slumping of underwater sediments due to the shaking, and the efficiency with which energy is transferred from the earth's crust to the ocean water are all part of the tsunami generation mechanism. The sudden vertical displacements over such large areas disturb the ocean's surface, displace water, and generate destructive tsunami waves. Although all oceanic regions of the world can experience tsunamis, the most destructive and repeated occurrences of tsunamis are in the Pacific Rim region.

Tsunami waves can travel at the speed of a commercial jet plane, over 500 miles per hour, moving from one side of the Pacific Ocean to the other in less than a day. This great speed makes it important to be aware of the tsunami as soon as it is generated. Scientists can predict when a tsunami will arrive at various locations by knowing the source characteristics of the earthquake that generated the tsunami and the characteristics of the sea floor along the path to the shore from the point of origin.

Offshore and coastal features can determine the size and impact of tsunami waves. Reefs, bays, entrances to rivers, undersea features and the slope of the beach all modify the tsunami as it converges on the coastline. People living near areas where large earthquakes occur may find that the tsunami waves can reach their shores within minutes of the earthquake. For these reasons, the tsunami threat to many areas such as Alaska, the Philippines, Japan and the United States West Coast can be immediate (for tsunamis from nearby earthquakes which take only a few minutes to reach coastal areas) or less urgent (for tsunamis from distant earthquakes which take from three to 22 hours to reach coastal areas). When a tsunami reaches the coastline and moves inland, the water level can rise several feet, flooding homes, businesses and infrastructure from several thousand feet to miles inland, depending on the topography.

Scientists cannot accurately predict when earthquakes will occur, and as a result they cannot determine exactly when a tsunami will be generated or how destructive it will be. However, past tsunami height measurements are useful in predicting future tsunami impact and flooding limits at specific coastal locations and communities.

#### *4.3.1.2 Disaster History*

Tsunamis can be categorized as Pacific-wide or "local." Typically, a Pacific-wide tsunami is generated by a major vertical shift in the ocean floor creating a wave that includes the entire column of water that has the potential to travel long distances. A "local" tsunami can be a component of a Pacific-wide tsunami in the immediate area of the earthquake, or a wave that is confined to the area of generation; such as a landslide within a bay or harbor. Worldwide, tsunamis have resulted in loss of thousands of lives, billions of dollars in damages, and the closure of many local economies.

All of the coastal areas in Orange County are susceptible to tsunamis. Although the majority of tsunamis have occurred in Northern California, Southern California has been impacted as well. Since 1812, the California coast has had 14 tsunamis with wave heights higher than three feet; six of these were destructive. The Channel Islands were hit by a big tsunami in the early 1800s. In the 1930's, four tsunamis struck the Los Angeles, Orange County, and San Diego coastal areas. In Orange County the tsunami wave reached heights of approximately 20 feet above sea level. In 1964, following the Alaska 8.2 earthquake, tidal surges of approximately 4 feet to 5 feet battered the Huntington Harbor causing moderate damages.

#### *4.3.1.3 Location and Extent/ Probability of Occurrence and Magnitude*

The historic record indicates that there is a low probability of occurrence of a major tsunami in Orange County. However, smaller scale tsunamis can have severe impacts on coastal communities. As shown on the following series of tsunami run-up maps the entire 43 miles of the County of Orange coastline could be impacted (Figure 4.3-1a through 4.3-1f). The Tsunami maps used for the Plan were created by County of Orange RDMD. The county mapping staff started with the State Office of Emergency Services' Tsunami Inundation Maps, and expanded upon them to show local knowledge of the topography and water ways. Approximately 89,000 residents would have to be evacuated. The impact could cause loss of life, destroy thousands of high priced homes, greatly affect coastal businesses, and impact tourism. Infrastructure including highways, secondary roads, bridges, and water and wastewater facilities are also at risk. Damage to water and wastewater facilities would further exacerbate the disaster by exposing people to disease and dehydration.

The Tsunami maps provided in this document are provided by the County of Orange Resource and Development Management Department. The maps are based on currently available Tsunami inundation maps from the State office of Emergency Services and then enhanced to project additional inundation based on local knowledge of water ways and land development.

### 4.3.2 Contamination/Salt Water Intrusion

#### *4.3.2.1 Nature of Hazard*

When fresh water is withdrawn from aquifers at a faster rate than it can be replenished, a draw down of the water table occurs with a resulting decrease in the overall hydrostatic pressure. When this happens near an ocean coastal area, salt water from the ocean can intrude into the fresh water aquifer. The result is that fresh water supplies become contaminated with salt water.

#### *4.3.2.2 Disaster History*

In Orange County, by 1956, years of heavy pumping to sustain the region's agricultural economy had lowered the water table by 15-feet below sea level and saltwater from the Pacific Ocean had encroached as far as five miles inland. The area of intrusion is primarily across a four-mile front between the cities of Newport Beach and Huntington Beach known as the Talbert Gap. The mouth of an alluvial fan formed millions of years ago by the Santa Ana River; the Talbert Gap has since been buried along the coast by several hundred feet of clay. Since 1976 the Water Factory 21 Direct Injection Project, operated by OCWD, has been injecting highly treated recycled water into the aquifer to prevent salt water intrusion, while augmenting the potable

groundwater supply. In 2006, construction of the Groundwater Replenishment System will replace Water Factory 21 to expand the seawater barrier program.

#### *4.3.2.3 Location of Extent/ Probability of Occurrence and Magnitude*

Massive seawater intrusion has been prevented in Orange County by the OCWD basin management programs. However, the threat of saltwater intrusion along the coast is still present. To prevent further intrusion and to provide basin management flexibility, OCWD operates a hydraulic barrier system. A series of 23 multi-point injection wells four miles inland delivers fresh water into the underground aquifers to form a water mound, blocking further passage of seawater. Continued injection of recycled water into the aquifer is essential to keep saltwater from intruding into the groundwater table and contaminating a major source of the county's potable water.

### 4.3.3 Dam/Reservoir Failure

#### *4.3.3.1 Nature of Hazard*

Dam failures can result from a number of natural or human caused threats such as earthquakes, erosion of the face or foundation, improper silting, rapidly rising flood waters, malicious events, and structural/design flaws. Seismic activity can also compromise dam regulating structures, resulting in catastrophic flooding. A dam failure can cause loss of life, damage to property, the displacement of persons, and other ensuing hazards residing in the inundation path. Damage to electric generating facilities and transmission lines could also impact life support systems in communities outside the immediate hazard areas. Mutual Aid from all levels of government would be required for an extended period of time. Recovery efforts would include the removal of debris, clearing roadways, demolishing unsafe structures, assistance in reestablishing public services, and providing continued care and welfare for the affected population including.

There are 33 dams in Orange County with ownership ranging from the Federal government to Home Owners Associations. These dams hold billions of gallons of water in reservoirs. The major reservoirs are designed to protect Southern California from flood waters and to store domestic and recycled water. The reservoirs range in capacity from 18 acre feet to 196,235 acre feet of water storage. The following is a list of the larger reservoirs and dams in Orange County and their Owners/Operators:

| Name of Facility | Owner/Operator |
|---|---|
| Santiago Reservoir (Irvine Lake) | Serrano Water District/Irvine Ranch Water District |
| Villa Park Dam | County of Orange |
| Sulphur Creek Dam | County of Orange |
| Peters Canyon Dam | County of Orange |
| Walnut Canyon Reservoir | City of Anaheim |
| San Joaquin Reservoir | Irvine Ranch Water District |
| Sand Canyon Reservoir | Irvine Ranch Water District |
| Rattlesnake Canyon Reservoir | Irvine Ranch Water District |
| Big Canyon Reservoir | City of Newport Beach |
| Lake Mission Viejo | Lake Mission Viejo Association |

| | |
|---|---|
| El Toro Reservoir | El Toro Water District |
| Rossmoor #2 | El Toro Water District |
| Orange County Reservoir | Metropolitan Water District |
| Palisades Bradt Reservoir | South Coast Water District |
| Portola Reservoir | Santa Margarita Water District |
| Syphon Canyon Reservoir | The Irvine Company |
| Trabuco Dam & Reservoir | Trabuco Canyon Water District |
| Dove Canyon Dam | Trabuco Canyon Water District |
| Upper Oso Dam | Santa Margarita Water District |
| Brea Dam | U. S. Army Corps of Engineers |
| Fullerton Dam | U. S. Army Corps of Engineers |
| Carbon Canyon Dam | U. S. Army Corps of Engineers |
| Prado Dam | U.S. Army Corps of Engineers |

In addition to reservoirs with dams in Orange County, there are many water storage tanks that are potentially susceptible to failure or damage by natural or manmade events. These water tanks contain millions of gallons of water each and provide an important source of water storage. Their capacity is large enough to effect substantial damage down slope from a tank should one fail. Correspondingly, the history of failure of water storage tanks is considered.

#### *4.3.3.2 Disaster History*

**St. Francis Dam, Disaster of 1928**

In Los Angeles the failure of the St. Francis Dam, and the resulting loss of over 500 lives was a scandal that resulted in the almost complete destruction of the reputation of its builder, William Mulholland. It was he who proposed, designed, and supervised the construction of the Los Angeles Aqueduct, which brought water from the Owens Valley to the city. The St. Francis Dam, built in 1926, was 180 feet high and 600 feet long. It was located near the City of Saugus in San Francisquito Canyon.

The dam failed on March 12, 1928 three minutes before midnight. Its waters swept through the Santa Clara Valley toward the Pacific Ocean about 54 miles away. The valley was devastated before the water finally made its way into the ocean between Oxnard and Ventura. At its peak the wall of water was said to be 78 feet high. At the time the water flowed through Santa Paula, 42 miles south of the dam, the water was estimated to be 25 feet deep. Almost everything in its path was destroyed: livestock, structures, railways, bridges, and orchards. In the end Ventura County lay below 70 feet of mud and damage estimates topped $20 million.

**Baldwin Hills Dam, Disaster of 1963**

The Baldwin Hills Dam collapse sent a 50-foot wall of water down Cloverdale Avenue on Dec. 14, 1963. Five people were killed. Sixty-five hillside houses were ripped apart, and 210 homes and apartments were damaged. The flood swept northward in a V-shaped path roughly bounded by La Brea Avenue, Jefferson Boulevard, and La Cienega Boulevard.

The earthen dam that created a 19-acre reservoir to supply drinking water to West Los Angeles residents ruptured at 3:38 p.m. A pencil thin crack widened to a 75 foot gash allowing 292 million gallons to surge out in 77 minutes. The cascade caused an unexpected ripple effect that is still being felt in Los Angeles and beyond. It prompted the end of urban-area earthen dams as a major element of water storage systems, and a tightening of the Division of Safety of Dams control over reservoirs throughout the state.

**Westminster Water Tank Failure, Disaster of 1998**

In September of 1998, a 5 million gallon municipal water storage unit in the City of Westminster failed almost 30 years after its construction due to corrosion and construction defects. There was no loss of life, but damage was extensive. The flow of water from the tank destroyed most of the facility as well as several private residences. Additionally, there were approximately 30 more homes inundated with water and silt. Through the Public Works Mutual Aid Agreement the County of Orange Public Works Department assisted the City of Westminster in the clean up and temporary repair of the streets.

City employees, the Orange County Fire Authority, neighboring fire services, and the Red Cross were on-site for days assessing the damage and assisting residents. Water storage for the City was non-existent following this event while a twin storage tank was emptied until the cause of the tank failure was determined.

Two new eight million gallon water storage tanks, a 17 million gallon per day booster station, and a new groundwater well were constructed. All new construction has passed rigorous State Department of Health Services inspection and permitting.

### *4.3.3.3 Location of Extent/ Probability of Occurrence and Magnitude*

Loss of life and damage to structures, roads, and utilities may result from a dam failure. Economic losses can also result. These effects would certainly accompany the failure of any one of the major reservoirs with a dam or storage tanks in the County of Orange. Because dam failure can have severe consequences, FEMA and the California Office of Emergency Services require all dam owners develop Emergency Action Plans (EAP) for warning, evacuation, and post-flood actions. Although there has been extensive coordination with County officials in the development of a County Response Plan, the responsibility for developing potential flood inundation maps and facilitation of emergency response is the responsibility of the dam owner. For more detailed information regarding dam failure flooding, and potential flood inundation zones for a particular dam in the County, refer to the County of Orange, Operational Area Emergency Action Plan Dam/Reservoir Failure Annex.

**Reservoirs with Dams Impacting the PWU**

Big Canyon Reservoir is a 600 acre foot potable water storage facility constructed in 1959 and owned by the City of Newport Beach. It is located in the San Joaquin Hills overlooking Newport Bay. Big Canyon Reservoir is retained on three sides by a homogenous earth filled embankment dam, while the east side was formed by a slope cut. At its maximum section the dam embankment is 65 feet high. The spillway is an ungated concrete lined overflow structure located on the west side of the reservoir. The bottom of the reservoir and the cut

slopes are lined with minimum 5 foot thick clay blanket, and the entire inside surface, including the embankments and cut slopes, is overlain with a three inch thick porous asphalt pavement.

El Toro Reservoir is an earth-filled dam owned by the ETWD. The impounded reservoir has a storage capacity of about 850 acre-feet with a surface area of approximately 20.6 acres. The reservoir is presently being used for operational and emergency storage for the ETWD, Santa Margarita Water District and Moulton Niguel Water District.

ETWD also owns and operates Rossmoor #2, a dam/reservoir also known as the Water Recycling Effluent Holding Pond. If problems occur at either location, operations personnel at the El Toro Water District who will notify the Sheriff's Department Control One of dam failure or possible dam failure.

Palisades Bradt Reservoir provides up to 48 million gallons of potable water storage with a 146 foot high, zoned, earthen embankment dam constructed in 1963. The bottom and internal slopes of the reservoir are lined and the reservoir surface has a floating cover. The dam has a low-level outlet, an emergency outlet, and an emergency spillway. The upstream watershed that contributes inflow to the reservoir has an area of 19 acres.

Peters Canyon Dam is an earth-filled structure owned by the County of Orange and has a capacity of 626 acre feet at the spillway pipe elevation of 537 feet MSL. Water storage varies from 200 acre feet to 600 acre feet depending on seasonal rain amounts. Alerting would come primarily from the Park Ranger at Peters Canyon Regional Park who would notify the Sheriff Department, Control One of dam failure or possible dam failure.

Prado Dam is owned and operated by the Army Corps of Engineers, and was constructed for the primary purpose of providing protection from floods for Orange County, California. Installation of the Seven Oaks Dam in San Bernardino County has lessened the potential likelihood of a Prado Dam failure due to upper Santa Ana River flooding.

Portola Dam is located near the northern end of Canada Gobernadora in southern Orange County; within the Coto de Caza gated community. Canada Gobernadora flows north to south and confluences with San Juan Creek approximately 7.5 miles upstream of the Pacific Ocean. Portola Dam is an earth-filled structure situated about 8 miles north of San Juan Creek with a maximum recycled water (or domestic water blend) storage capacity of 586 AF and a high water elevation of 936 feet. An inundation study and compliance report for Portola Dam was done in 1980 to allow construction permitting by the State of California. This study indicated that if the dam was breached, a potential maximum flow rate of 22,645 CFS may be expected after about three hours once the reservoir level drops to half-full, or when the water surface elevation is at elevation 920 feet. Should such an event occur, Portola Dam would potentially empty in just over six hours.

The Canada Gobernadora valley channel area between the dam and San Juan Creek has been developed with a golf course and lined on each side by thousands of homes positioned just at or above the 100 year flood plain. If a dam break occurred, the flow would likely destroy streets crossing the flood plain, damage the water, sewer and recycled water pipeline infrastructure in them and may also affect some or many home locations near the stream channel. Streets in Coto de Caza certain to be affected are: Trigo Trail, Via Pajaro, Via Conejo, Vista Del Verde, San Miguel, Cantamar and South Bend Road. Along with the golf course and the equestrian center, additional District facilities that are anticipated to be damaged or destroyed by a dam break in Coto de Caza and farther down stream are:

- Coto Lift Station and force main
- South Ranch lift station and force main
- South County pipeline
- Ortega Lift Station (Talega) force mains
- Talega recycled water transmission main
- Chiquita Land Outfall pipeline

Per the compliance report, after entering San Juan Creek, the dam break inundation flood area would be about the same as the 100-year flood plain all the way down to the Pacific Ocean.

Santiago Dam is an earth fill dam with a 25,000 acre-feet capacity reservoir (Irvine Lake). The dam is jointly owned by the Irvine Ranch Water District and the Serrano Water District. Villa Park Dam is a flood control dam located downstream from Santiago Dam. It is an earth-fill structure with a capacity of 15,600 acre-feet and is owned by the Orange County Flood Control District. Initial alerting is expected from Dam keepers who are on duty at both Santiago Dam and Villa Park Dam.

Upper Oso Reservoir (UOR) and Dam are located within the Cities of Mission Viejo and Rancho Santa Margarita near the northern end of the Oso Creek watershed in southern Orange County. Upper Oso Dam is an earth-filled structure situated between El Toro Road and Los Alisos Boulevard nearly 10 miles north of the Trabuco Creek confluence point. UOR has a high water elevation of 953 feet and stores up to 4000 acre feet of recycled water for landscape irrigation that is mainly used within Santa Margarita and Moulton Niguel Water Districts. A compliance analysis and inundation study report was prepared for Upper Oso Dam in 1979 to allow for construction permitting by the State of California. This study indicated that if the dam was breached, a potential maximum flow rate exceeding 250,000 cubic feet per second may be expected when the water surface elevation drops to about elevation 935 feet. Should such an event occur, UOR could potentially empty in about a half hour.

Immediately downstream of the UOR dam, a long bridge for State Route 241 crosses the flood channel and may not experience problems during a major flood event. Just upstream of Los Alisos Boulevard, some commercial property lies adjacent to the Oso Creek channel and may be affected. About three miles down stream on Oso Creek and upstream of Olympiad Road, a large basin area was created (now a sports park) to capture and attenuate major discharges from UOR before they entered Lake Mission Viejo (LMV). LMV is created by a dam lying under Alicia Parkway. A UOR dam breach may also overflow Lake Mission Viejo and damage the dam to point where it could release stored water and create a catastrophic flood hazard all the way to the Pacific Ocean.

Downstream of LMV, two golf courses have been developed within the Oso Creek channel area and numerous commercial properties are on adjacent sides. Housing tracts have been built above the 100 year flood plain but if a dam break occurred, the flow from UOR and LMV would likely destroy streets crossing the flood plain and damage the water, sewer and recycled water pipeline infrastructure in them. In addition to the many pipelines crossing the flood plain, District facilities that are anticipated to be damaged or destroyed by a UOR dam break are:

- Eastbrook RW Pump Station
- Lakeside Pump Station
- South County Pipeline
- Oso Creek Water Reclamation Plant
- Oso Creek Trunk Sewer
- Oso Barrier RW Pump Station and Pipelines

Due to proximity and elevation, a significant number of the residential and commercial properties in many areas close to the banks of Oso Creek and farther downstream would likely be flooded for short period of time and damaged. Streets in Mission Viejo and farther south likely to be affected by a dam failure are: Los Alisos Boulevard, Santa Margarita Parkway, Olympiad Road, Alicia Parkway, Jeronimo Road, Marguerite Parkway, Casta del Sol, La Paz Road, Oso Parkway, Interstate 5, Camino Capistrano, Del Obispo Street, Stonehill Drive and Pacific Coast Highway.

### 4.3.4 Drought/Extreme Heat

#### *4.3.4.1 Nature of Hazard*

Many governmental utilities, the National Oceanic and Atmospheric Administration (NOAA) and the California Department of Water Resources, as well as academic institutions, such as the University of Nebraska-Lincoln's National Drought Mitigation Center and the National Drought Mitigation Center, generally agree that there is no clear definition of drought. Drought is highly variable depending in what part of a state, the country or globe one is situated.

Drought in its simplest definition is an extremely dry climatic period where the available water falls below a statistical average for a particular region. Drought is also defined by factors other than rainfall, including: vegetation conditions, agricultural productivity, soil moisture, water levels in reservoirs and stream flow. In effect, there are essentially three forms of drought: meteorological drought, agricultural drought, and hydrologic drought. A meteorological drought is typically defined when there is a prolonged period of less than average precipitation. An agricultural drought occurs when there is insufficient moisture for an average crop yield. Agricultural drought can be caused by the overuse of groundwater, poor management of cultivated fields, as well as lack of precipitation. Hydrologic drought occurs when the water level in aquifers, lakes or above ground storage reservoirs fall below sustainable levels. A significant percentage of water in Southern California is imported from other regions (Colorado River and Northern California) via aqueducts. Correspondingly drought in California can be made worse by water availability conditions in the regions at which the water originates.

#### *4.3.4.2 Disaster History*

A significant drought, reported by many of the ranchers in southern California, occurred in 1860.

The great drought of the 1930s, coined the "Dust Bowl," was geographically centered in the Great Plains yet ultimately affected water shortages in California. The drought conditions in the plains resulted in a large influx of people to the west coast. Approximately 350,000 people from Arkansas and Oklahoma immigrated mainly to the Great Valley of California. As more people moved into California, including Orange County increases in intensive agriculture led to overuse of Santa Ana River watershed and groundwater resulting in regional water shortages.

Several bills have been introduced into Congress in an effort to mitigate the effects of drought. In 1998, President Clinton signed into law the National Drought Policy Act, which called for the development of a national drought policy or framework that integrates actions and responsibilities among all levels of government. In addition it established the National Drought Policy Commission to provide advice and recommendations on the creation of an integrated federal policy. The most recent bill introduced into Congress was the National Drought Preparedness Act of 2003, which established a comprehensive national drought policy and statutorily authorized a lead federal utility for drought assistance. Currently there exists only an ad-hoc response approach to drought unlike other disasters (e.g., hurricanes, floods, and tornadoes) which are under the purview of FEMA.

### *4.3.4.3 Location of Extent/ Probability of Occurrence and Magnitude*

Of the many varied indexes used to measure drought, the "Palmer Drought Severity Index" (PDSI) is the most commonly used drought index in the United States. Developed by meteorologist Wayne Palmer, the PDSI is used to measure dryness based on recent temperature compared to the amount of precipitation. It utilizes a number range, 0 as normal, drought shown in terms of minus numbers, and wetness shown in positive numbers (Table 4.3.4.3-1). The PDSI is most effective at analyzing long-range drought forecasts or predications. Thus, the PDSI is very effective at evaluation trends in the severity and frequency of prolonged periods of drought, and conversely wet weather. The National Oceanic and Atmospheric Administration (NOAA) publish weekly Palmer maps, which are also used by other scientists to analyze the long-term trends associated with global warming and how this has affected drought conditions.

**Table 4.3.4.3-1**
**Palmer Drought Severity Index**

| | |
|---|---|
| -4.0 or less (Extreme Drought) | +2.0 or +2.9 (Unusual Moist Spell) |
| -3.0 or -3.9 (Severe Drought) | +3.0 or +3.9 (Very Moist Spell) |
| -2.0 or -2.9 (Moderate Drought) | +4.0 or above (Extremely Moist) |
| -1.9 to +1.9 (Near Normal) | |

The University of Nebraska-Lincoln has published many of these Palmer Drought Index maps analyzing trends over the past one hundred years (National Drought Mitigation Center 2005; Figure 1). In coastal southern California, from 1895 to 1995, severe droughts occurred 10 to 15 percent of the time. From 1990 to 1995, severe droughts occurred 10 to 20 percent of the time and as recently as 1989, a severe drought was documented that lasted for six years. More recently, between 1999 and 2004, a six-year drought on the

Colorado River basin has resulted in a draw down of Colorado River water storage by more than 50%. Based on these trends, severe droughts can readily occur in southern California. According to the California Natural Resources Conservation Service (NRCS), the current drought in southern California has caused extensive devastation to forests in the mountains of San Bernardino, San Jacinto and Palomar Mountains. Drought weakens trees which make them susceptible to infestation by bark-beetles. In turn dry vegetation and beetle infested trees are more susceptible to fire than healthy forests.

### 4.3.5 Earthquake/Liquefaction

#### *4.3.5.1 Nature of Hazard - Earthquakes*

Earthquakes are considered a major threat to the County, especially when focusing on water and wastewater facilities and pipelines that run throughout the County. A significant earthquake along one of the major faults could cause substantial casualties, extensive damage to infrastructure, fires, and other threats to life and property. Significant damages and outages of water and wastewater facilities could also occur. The effects could be aggravated by aftershocks and by secondary effects such as fire, landslides and dam failure. A major earthquake could be catastrophic in its effects on the population, and could exceed the response capability of the local communities and even the State.

Following major earthquakes, extensive search and rescue operations may be required to assist trapped or injured persons. Emergency medical care, food/water and temporary shelter would be required for injured or displaced persons. In the event of a truly catastrophic earthquake identification and burial of the dead would pose difficult problems. Mass evacuation may be essential to save lives. Emergency operations could be seriously hampered by the loss of communications, damage to transportation routes within, to, and out of the disaster area, and by the disruption of public utilities and services. With damage to critical water and wastewater infrastructure there will be significant public health concerns, such as dehydration or exposure to contaminated water, and the potential for reduced fire protection due to water flow. Facilities at greatest risk from severe earthquakes are dams and pipelines. Additionally, damage to water and sewer lines that service commercial and industrial areas could have a significant impact on the economy of the region.

Extensive mutual aid for an extended period of time may be required to bring water and wastewater services back online. Large faults that could affect Orange County include the Elsinore Fault, the Newport-Inglewood Fault, the Peralta Fault, the Puente Hills Fault, the San Andreas Fault, the San Jacinto Fault, and the Whittier Fault. Smaller faults include the Norwalk Fault and the El Modena Faults (Figure 4.3-2). In addition, newly studied thrust faults, such as the San Joaquin Hills Fault and the Puente Hills Fault could also have a significant impact on the County. Each of the major fault systems are described briefly below and are presented in alphabetical order. This order does not place more danger on one fault over another; it is simply for organizational purposes.

**Elsinore Fault Zone:** Located in the northeast part of the county, this fault follows a general line easterly of the Santa Ana Mountains into Mexico. The main trace of the Elsinore Fault zone is about 112 miles long. The last major earthquake on this fault occurred in 1910 (M 6.0), and the interval between major ruptures is estimated to be about 250 years. SCEC reports probable earthquake magnitudes for the main trace of the Elsinore fault to be in the range of 6.5 to 7.5. At the northern end of the Elsinore Fault zone, the fault splits into two segments: the 25 mile long Whittier Fault (probable magnitudes between 6.0 and 7.2), and the 25 mile

long Chino Fault (probable magnitudes between 6.0 and 7.0). **The location of the Whittier Fault makes it especially critical to the Diemer Filtration Plant in Yorba Linda and pipelines bringing water into Orange County which is located very near to the fault.**

**Newport-Inglewood Fault Zone:** Extends from the Santa Monica Mountains in a South East direction through the western part of Orange County through the City of Newport Beach and slightly offshore the city's boundaries 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 after shocks ranging from magnitude 3.0 to 5+ have been recorded. SCEC reports probable earthquake magnitudes for the Newport-Inglewood fault to be in the range of 6.0 to 7.4.

**Peralta Hills Fault**: Only limited information is available to paleoseismically characterize the fault. No studies have been undertaken to determine the timing of earthquakes. There is a strong geomorphic expression along Lincoln Blvd west of Tustin Ave in the City of Orange. Some believe the fault is not active while others believe it is active. On-going research has linked the fault as a back thrust with the Elsinore fault, with a potential magnitude of (M6.8).

**Puente Hills Thrust Fault:** This is another recently discovered blind thrust fault that runs from northern Orange County to downtown Los Angeles. This fault is now known to be the source of the 1987 Whittier Narrows earthquake. Recent studies indicate that this fault has experienced four major earthquakes ranging in Magnitude from 7.2 to 7.5 in the past 11,000 years, but that the recurrence interval for these large events is on the order of several thousand years.

**San Andreas Fault Zone**: As the dominant active fault in California it is the main element of the boundary between the Pacific and North American tectonic plates. The longest and most publicized fault in California, it extends approximately 650 miles from Cape Mendocino in northern California to east of San Bernardino in southern California, and is approximately 35 miles northeast of Orange County. This fault was the source of the 1906 San Francisco earthquake, which resulted in some 700 deaths and millions of dollars in damage. It is the southern section of this fault that is currently of greatest concern to the scientific community. Geologists can demonstrate that at least eight major earthquakes (Richter Magnitude 7.0 and larger) have occurred along the Southern San Andreas Fault in the past 1200 years with an average spacing in time of 140 years, plus or minus 30 years. The last such event occurred in 1857 (Fort Tejon earthquake). Based on that evidence and other geophysical observations, the Working Group on California Earthquake Probabilities (SCEC, 1995) has estimated the probability of a similar rupture (M 7.8) in the next 30 years (1994 through 2024) to be about 50%. The range of probable magnitudes on the San Andreas Fault Zone is reported to be 6.8 - 8.0.

**San Jacinto Fault Zone:** Located approximately 30 miles north and east of the county. The interval between ruptures on this 130 mile long fault zone has been estimated by SCEC to be between 100 and 300 years, per segment. The most recent event (1968 M6.5) occurred on the southern half of the Coyote Creek segment. SCEC reports probable earthquake magnitudes for the San Jacinto fault zone to be in the range of 6.5 to 7.5.

**San Joaquin Hills Fault:** A recently discovered southwest-dipping blind thrust fault originating near the southern end of the Newport-Inglewood Fault close to Huntington Beach, at the western margins of the San Joaquin Hills. Rupture of the entire area of this blind thrust fault could generate an earthquake as large as M

7.3. In addition, a minimum average recurrence interval of between about 1650 and 3100 years has been estimated for moderate-sized earthquakes on this fault (Grant and others, 1999).

In addition to the major faults described above the rupture of a number of smaller faults could potentially impact Orange County, including the Norwalk Fault (located in the north of the county in the Fullerton area) and the El Modena Fault (located in the City of Orange area).

As indicated, there are a large variety of earthquake events that could affect Orange County. (The earliest recorded earthquake in California occurred in Orange County in 1769.) Predicted ground shaking patterns throughout Southern California for hypothetical scenario earthquakes are available from the United States Geological Survey as part of their on-going "ShakeMap" program. These maps are provided in terms of Instrumental Intensity, which is essentially Modified Mercalli Intensity estimated from instrumental ground motion recordings. ShakeMaps in graphical and GIS formats are available on the USGS website at: http://earthquake.usgs.gov/shakemap/sc/shake/archive/scenario.html. In addition, MWDOC hired Earth Consultants International to prepare specific ground acceleration and shaking maps for five fault earthquake scenarios in Orange County. The maps are included in Section 4.4.2.1 in the discussion of earthquake impacts to water agencies.

Table 4.3.5-1 summarizes the characteristics of the important geologic faults in Orange County.

**Table 4.3.5.1.1-1**
**Characteristics of Imported Geologic Faults in Orange County, CA**

| | Newport-Inglewood (onshore) | Peralta Hills | Puente Hills | San Joaquin Hills | Whittier |
|---|---|---|---|---|---|
| **Fault Type** | Strike-slip | Thrust | Blind thrust | Blind thrust | Strike-slip |
| **Slip Rate (mm/yr)** | 1 +/-0.5 | Unknown, Prob. <1 | 0.7 +/-0.4 | 0.5 +/-0.2 | 2.5 +/-1.0 |
| **Magnitude(1)** | **6.9** | **6.8** | **7.5** | **6.6** | **6.8** |
| **Recurrence Interval (years)** | 2,200-3,900 | Unknown | 2,750 | 1,600-3,100 | 1,100 |
| **Last Activity (years ago)** | M6.3 in 1933 | Unknown | <3,000 | 200-300 | 1,600-2,000 |

(1) The magnitude shown represents the fault's average behavior. Reference: "Five Earthquake Scenarios Ground Motion Maps for Northern Orange County" prepared for Municipal Water District of Orange County by Earth Consultants International, July 22, 2005.

### *Earthquake as a Threat to the County of Orange*

The most recent significant earthquake event affecting southern California was the 1994 Northridge Earthquake. At 4:31 A.M. on Monday, January 17, a moderate, but very damaging earthquake with a magnitude of 6.7 struck the San Fernando Valley. In the following days and weeks, thousands of aftershocks occurred, causing additional damage to affected structures. In this earthquake, 57 people were killed and more than 1,500 people seriously injured. For days afterward, thousands of homes and businesses were without electricity, tens of thousands had no gas, and nearly 50,000 had little or no water. Out of the approximately 66,000 structures inspected approximately 15,000 structures were moderately to severely damaged, which left thousands of people temporarily homeless. Several collapsed bridges and overpasses created commuter havoc on the freeway system. Extensive damage was caused by ground shaking, but earthquake triggered liquefaction and dozens of fires also caused additional severe damage. The extremely strong ground motion felt in large portions of Los Angeles County resulted in record economic losses. The fact that the earthquake occurred early in the morning on a holiday considerably reduced the potential effects. Many collapsed buildings were unoccupied, and most businesses were not yet open. The direct and indirect economic losses ran into the tens of billions of dollars.

For decades, partnerships have flourished between the USGS, Cal Tech, the California Geological Survey and California universities to share research and educational efforts with Californians. Tremendous earthquake mapping and mitigation efforts have been made in California in the past two decades, and public awareness has risen remarkably during this time. Major federal, state, and local government utilities and private organizations support earthquake risk reduction. These partners have made significant contributions in reducing the adverse impacts of earthquakes.

### *4.3.5.2 Earthquake History*

Southern California and Orange County have experienced several powerful earthquakes. To better understand the potential for damaging earthquakes in southern California, the scientific community has reviewed historical records and conducted extensive research on faults that are the sources of the earthquakes occurring in southern California. Historical earthquake records can generally be divided into records of the pre-instrumental period and the instrumental period. In the absence of instrumentation, historic records of past earthquakes are based on observations and the level of information is often dependent upon population density in the area of the earthquake. Since California was sparsely populated in the 1800s, detailed information on pre-instrumental earthquakes is relatively sparse. However, two very large earthquakes, the Fort Tejon in 1857 (7.9) and the Owens Valley in 1872 (7.6) are evidence of the tremendously damaging potential of earthquakes in southern California. Other notable earthquakes that have impacted southern California include the 1910 Glen Ivy Hot Springs earthquake (Elsinore Fault Zone, M 6.0), the 1933 Long Beach earthquake (Newport-Inglewood Fault Zone, M 6.4), the 1952 Kern County and Lander earthquakes (M 7.3), the 1971 San Fernando earthquake (San Fernando Fault Zone, M 6.6), the 1987 Whittier earthquake (Whittier Fault Zone, M 5.9), and the 1994 Northridge earthquake (Pico Thrust, M 6.7). The 1987 Whittier Quake caused damage to the Puente Hills Reservoir in La Habra and after inspection the reservoir was found to have cracks in the concrete lining.

Damage from some of these earthquakes was limited because they occurred in areas which were sparsely populated at the time they occurred. However, developed areas were much more severely affected. The economic losses from the 1933 Long Beach earthquake were estimated at $40 million in damage, and 115 lives were lost. The seismic risk is much more severe today than in the past because the population at risk is in the millions, rather than a few hundred or a few thousand persons. Earthquakes of great magnitudes have caused lasting effects in developed regions.

Clearly, no community in southern California is beyond the reach of a damaging earthquake. The historical earthquake events that have affected southern California are listed below in Table 4.3.5.3-1 (County of Orange 2004:99-115; URS 2004:4-15).

**Table 4.3.5.3-1**
**Partial List of Earthquake Events in the Southern California Region**

| Southern California Region Earthquakes with a Magnitude 5.0 or Greater | |
|---|---|
| 1769 Los Angeles Basin (M 6.0) | 1916 Tejon Pass Region (M 5.3) |
| 1800 San Diego Region (M 6.5) | 1918 San Jacinto (M 6.9) |
| 1812 Wrightwood (M 7.0) | 1923 San Bernardino Region (M 6.0) |
| 1812 Santa Barbara Channel (M 7.0) | 1925 Santa Barbara (M 6.3) |
| 1827 Los Angeles Region (M 5.5) | 1933 Long Beach (M 6.3) |
| 1855 Los Angeles Region (M 6.0) | 1941 Carpentaria (M 5.9) |
| 1857 Great Fort Tejon Earthquake (M 8.3) | 1952 Kern County (M 7.7) |
| 1858 San Bernardino Region (M 6.0) | 1954 West of Wheeler Ridge (M 5.9) |
| 1862 San Diego Region (M 6.0) | 1971 San Fernando (M 6.5) |
| 1892 San Jacinto or Elsinore Fault (M 6.5) | 1973 Point Mugu (M 5.2) |
| 1893 Pico Canyon (M 5.8) | 1986 North Palm Springs (M 6.0) |
| 1894 Lytle Creek Region (M 6.0) | 1987 Whittier Narrows (M 5.8) |
| 1894 E. of San Diego (M 5.8) | 1992 Landers (M 7.3) |
| 1899 Lytle Creek Region (M 5.8) | 1992 Big Bear (M 6.2) |
| 1899 San Jacinto and Hemet (M 6.4) | 1994 Northridge (M 6.7) |
| 1907 San Bernardino Region (M 5.3) | 1999 Hector Mine (M 7.1) |
| 1910 Glen Ivy Hot Springs (M 5.5) | 2004 San Luis Obispo (M unknown) |

### *4.3.5.3 Location of Extent/ Probability of Occurrence and Magnitude*

A Southern California Earthquake Center report (SCEC, 1995) indicated that the probability of an earthquake of Magnitude 7 or larger in southern California before the year 2024 is 80 to 90 percent. The SCEC and the Working Group on California Earthquake Probabilities also determined the prospect of a significant earthquake along the region's major faults:

- **Elsinore Fault Zone:** SCEC reports probable earthquake Magnitudes for the main trace of the Elsinore fault to be in the range of 6.5 to 7.5. The two northern segments, the Whittier Fault and the Chino Fault, have probable Magnitudes of 6.0 - 7.2 and 6.0 - 7.0, respectively. The Whittier Fault location is extremely critical because it crosses the two main sources of untreated water being brought into the County (Yorba Linda Feeder and the Lower Feeder) and it passes very close to the Diemer Filtration Plant which serves as the treatment facility for the bulk of Orange County. MET does not have a back up system to supply treated water to many parts of central and southern Orange County in the event of an outage of the Diemer Plant.
- **Newport-Inglewood Fault Zone:** SCEC reports probable earthquake Magnitudes for the Newport-Inglewood fault to be in the range of 6.0 to 7.4.
- **Puente Hills Thrust Fault:** Recent studies indicate that this fault has experienced four major earthquakes ranging in Magnitude from 7.2 to 7.5 in the past 11,000 years, but that the recurrence interval for these large events is on the order of several thousand years.
- **Peralta Hills Fault:** The Earth Consultants International study for MWDOC indicates that this may be a back thrust fault to the Elsinore fault and may be capable of a M6.8.
- **San Andreas Fault Zone:** Based on that evidence and other geophysical observations, the fault has estimated the probability of a rupture with an M 7.8 in the next 30 years (1994 through 2024) to be about 50%. (SCEC, 1995) The range of probable Magnitudes on the San Andreas Fault Zone during this period is reported to be 6.8 - 8.0.
- **San Joaquin Hills Fault:** Recent reports have determined that the blind thrust fault can generate an earthquake as large as M 7.3. In addition, a minimum average recurrence interval of 1650 to 3100 years has been estimated for moderate-sized earthquakes on this fault.
- **San Jacinto Fault Zone:** SCEC reports probable earthquake Magnitudes for the San Jacinto fault zone to be in the range of 6.5 to 7.5.

Although the San Andreas Fault Zone is capable of producing an earthquake with a magnitude of 8+ on the Richter scale, some of the smaller faults have the potential to inflict greater damage on the urban core of the Los Angeles Basin. Seismologists believe that a 6.0 earthquake on the Newport-Inglewood Fault Zone would result in far more death and destruction than a larger earthquake on the San Andreas Fault Zone, due to the San Andreas' relatively remote location from the urban centers of southern California. From a water system perspective, either the Whittier Fault, if it affects the supply coming into the County from MET, or the Puente Hills Fault has the potential to interrupt the largest number of pipelines and well supplies in the County.

The areas of Orange County most susceptible to damage from earthquakes based on the URS prepared shaking intensity hazard map includes Aliso Viejo, Dana Point, Irvine, Laguna Beach, Laguna Hills, Laguna Niguel, Mission Viejo, Rancho Santa Margarita, San Clemente and San Juan Capistrano. These communities can be severely impacted by landslides, liquefaction, extensive infrastructure damage, fire, dam failure, and other secondary earthquake affects. A major earthquake could be catastrophic in its effect on the population, and could exceed the response capability of the local communities and even the State.

## *Liquefaction*

**Nature of Hazard**

Liquefaction is the phenomenon that occurs when ground shaking causes loose soils to lose strength and act like viscous fluid. Liquefaction causes two types of ground failure: lateral spread and loss of bearing strength. Lateral spreads develop on gentle slopes and entails the sidelong movement of large masses of soil as an underlying layer liquefies. Loss of bearing strength results when the soil supporting structures liquefies and causes structures to collapse.

**Liquefaction Disaster History**

The California Department of Conservation (CDC) performed a study of areas susceptible to liquefaction in Orange County. The study was based on historic occurrences of liquefaction, such as damage to the King Harbor area of Redondo Beach during the Northridge earthquake of 1994, as well as shake models of the numerous faults in the County in conjunction with an evaluation of soils that are susceptible to liquefaction. Historic accounts of damage to structures from liquefaction are not readily available. However, the study conducted by the CDC found several areas in the County to be at risk to liquefaction.

**Liquefaction - Location and Extent/Probability of Occurrence and Magnitude**

Recognizing active faults in the region, and the presence of geologically young, unconsolidated sediments and hydraulic fills, the potential for liquefaction to occur has been long recognized in the Orange County area. The CDC study determined that the most extensive liquefaction zones occur along the Santa Ana River; including along the Santa Ana River at Feathery Regional Park, the Green River Golf Course in East Anaheim, Weir Canyon Road south of the Riverside Freeway, Santiago Creek, Santiago Reservoir (Irvine Lake), and in Irvine Park and Fremont Canyon. In the El Toro area liquefaction zones exist along Aliso, Serrano, Oso, Santiago and San Diego creeks, as well as in Borrego Canyon and in some areas north and east of the Marine Corps Air Station.

Areas in Tustin susceptible to liquefaction include all areas north of the Irvine boundary to approximately Chestnut Avenue, and from Irvine Boulevard at Browning Avenue west to the Santa Ana boundary. Santa Ana is affected from Flower Street east to the Tustin city boundary, from First Street south to the San Diego Freeway. The potential exists in areas of loose soils and/or shallow groundwater in earthquake fault zones throughout the County. Figure 4.3.6 displays the location and extent of areas with a risk of liquefaction.

Data used to profile liquefaction hazard included probabilistic Peak Ground Acceleration (PGA) data from the United States Geological Survey (USGS) and a Scenario Earthquake Shake map for faults in Orange County along with existing liquefaction hazard areas from local maps. Liquefaction hazards were modeled as collateral damages of earthquakes using HAZUS-MH, which uses base information and NEHRP soils data to derive probabilistic peak ground accelerations much like the PGA map from USGS. Soils were considered because liquefaction risk may be amplified depending on the type of soil found in a given area. The National Earthquake Hazards Reduction Program (NEHRP) rates soils from hard to soft utilizing ratings from Type A through Type E. The hardest soils being Type A and the softest soils rated at Type E. Liquefaction risk was considered high if there were soft soils (Types D or E) present within an active fault zone. Liquefaction risk

was considered low if the PGA risk value was less than 0.3, and hard soils were present (Types A-C). For example, an area may lie in a PGA zone of 0.2, which would be a low liquefaction risk in hard soils identified by the NEHRP. However, if that same PGA value is found within a soft soil such as Type D or E, a PGA of 0.2, when multiplied by 1.4 or 1.7 (amplification values for type D and E soil, shown below), would become a PGA value of at least 0.28 to 0.3. This would increase the liquefaction risk to high. Areas where soil types D or E are located are illustrated in Figure 4.3.6.

**Soil Amplification Factors**

| | Soil Type | | | | |
|---|---|---|---|---|---|
| PGA | A | B | C | D | E |
| 0.1 | 0.80 | 1.00 | 1.20 | 1.60 | 2.50 |
| 0.2 | 0.80 | 1.00 | 1.20 | 1.40 | 1.70 |
| 0.3 | 0.80 | 1.00 | 1.10 | 1.20 | 1.20 |
| 0.4 | 0.80 | 1.00 | 1.00 | 1.10 | 0.90 |
| 0.5 | 0.80 | 1.00 | 1.00 | 1.00 | 0.80 |

## 4.3.6 Expansive Soils

### *4.3.6.1 Nature of Hazard*

According to a scientific paper published in the Journal of Geotechnical Engineering (Day 1994), "expansive soil is a worldwide problem that causes extensive damage to civil engineering structures." Expansive soils are particularly problematic in the southwestern United States and especially in southern California, where there exists large clay deposits compounded by "alternating periods of rainfall and drought." In essence, the problem with constructing on expansive soils is that the clay, often times referred to as adobe, expands rapidly during the rainy season and contracts gradually during the dry season causing "shrink-swell." Shrink-swell is particularly problematic for "slab-on-grade" foundations which can be placed directly on expansive soil which are constantly in a state of movement as the soil expands and contracts causing the foundation to fatigue and crack. Buildings with balloon frame construction are also susceptible to bowing and cracking when built on expansive soils. Shrink and swell can affect water/wastewater facilities particularly buildings or structures built using slab on grade or balloon frame construction techniques.

Expansive soil is also known to "creep" on unstable slopes eventually leading to landslides. Typically, this is found when expansive soil underlies compact topsoil. As the expansive soil expands-contracts, the compact topsoil slides or creeps downhill. Facilities built on unstable slopes with underlying expansive soils are prone to movement and can be damaged or completely destroyed in extreme circumstances.

### *4.3.6.2 Disaster History*

In 1980, Krohn and Slosson (1980) made an assessment and cost estimate of the damage caused by expansive soils throughout the United States. They estimated that approximately $7 billion in property damage was reportedly attributed to construction on expansive soils. While no recent figures have been identified, the increase in construction activity in areas of expansive soil, especially in southern California, will undoubtedly

cause this number to increase. J. David Rogers of the University of Missouri found that "expansive soils are the second leading cause of property damage in the United States.

#### *4.3.6.3 Location of Extent/ Probability of Occurrence and Magnitude*

Expansive soils in southern California are problematic. The California Building Code specifically addresses expansive soils in Sections 1804.4, 1806.5 and 1815. The California Health and Safety Code Section 17954 states that "If the preliminary soil report indicates the presence of critically expansive soils or other soil problems which, if not corrected, would lead to structural defects, such ordinance shall require a soil investigation of each lot in the subdivision" and "The soil investigation shall be prepared by a civil engineer who is registered in this state."

Several cities in southern California have established guidelines for construction in areas of expansive soils. MWDOC and the PWU generally conduct soil surveys prior to construction of water and wastewater facilities and take the specific circumstances into consideration during design and construction.

### 4.3.7 Flood/Coastal Storm

#### *4.3.7.1 Nature of Hazard*

Orange County covers 789 square miles and its landscape varies from mountainous terrain (on the northeast and southeast) to floodplains (in the central and western section). The County's rapid growth and transformation from an agricultural community to an urban community has changed flood control practices in the region. Water from rivers and creeks that originate in the mountains are controlled through reservoirs, dams, diversion structures and developed plains. Although there is a countywide system of flood control facilities, the majority of these are not designed for or capable of conveying runoff from major storms, such as the Standard Project Flood (a major flood that can be expected to occur from a severe combination of meteorological and hydrological conditions) or the 100-year flood.

To provide quantitative information for flood warning and detection, Orange County began installing its ALERT (Automated Local Evaluation in Real Time) system in 1983. Operated by the County's Environmental Resources Section of the Resource Development and Management Department (RDMD) in cooperation with the National Weather Service, ALERT uses remote sensors located in rivers, channels and creeks to transmit environmental data to a central computer in real time. Sensors are installed along the Santa Ana River, San Juan Creek, Arroyo Trabuco Creek, Oso Creek, Aliso Creek, as well as flood control channels and basins. The field sensors transmit hydrologic and other data (e.g., precipitation data, water levels, temperature, wind speed, etc.) to base station computers for display and analysis. In addition, seven pump stations (Huntington Beach, Cypress, Seal Beach, Los Alamitos, Rossmoor, Harbor-Edinger, and South Park) which regulate storm water discharge to flood control channels are utilized.

#### *4.3.7.2 Disaster History*

Residents reported damaging floods caused by the Santa Ana River, known as "Great Floods," as early as 1770 (notes of Father John Crespi). Major floods in Orange County along the Santa Ana River occurred in 1810, 1815, 1825, 1862, 1884, 1891, 1916, 1927, 1938, 1969, 1983, and 1993. The greatest flood in terms of

water flow occurred in 1862 with an estimated flow rate of 317,000 cubic feet per second (cfs). This flood was three times greater than the Great Flood of 1938 which had an estimated flow of 110,000 cfs.

Great Flood of 1862 - The flood of January 1862, called the NOACHIAN deluge of California, was unusual in two ways: 1) the storm causing the flood occurred during a very severe drought spanning 1856 to 1864; and 2) the flood lasted 20 days, which is considered an extremely long duration. Under normal circumstances, major floods last only a few days. The only structure left standing along this portion of the Santa Ana River was the Aqua Mansa chapel and residents gathered on the small point of high-land to take refuge from the storm. Miraculously, there were no recorded deaths.

Great Flood of 1916 – The flood on January 27, 1916 inundated a large area along the Santa Ana River, including Main Street in downtown Santa Ana where the water was three feet deep. Adjacent farm lands, which later became the City of Westminster, were also flooded. Three vehicular bridges and three railroad bridges were washed away by the flood and four people drowned.

Great Flood of 1938 – The flood of 1938 is considered the most devastating flood to occur in Orange County during the 20$^{th}$ Century, and affected all of southern California. The storm began on February 27 and lasted until March 3. In the Santa Ana Basin, 34 people died and 182,300 acres were flooded. All buildings in Anaheim were damaged or destroyed. Two major railroad bridges, seven vehicular bridges, and the little town of Atwood were completely destroyed. The Santa Ana River inundated the northwestern portion of Orange County and train service to and from Santa Ana was cancelled. Damage exceeded $50 million.

Great Flood of 1969 – The floods of January and February were the most destructive on record in Orange County. Previous floods had greater potential for destruction, but the County was relatively undeveloped when they occurred. During the flood of 1969 rain fell almost continuously from January 18 to January 25, resulting in widespread flooding. Orange County was declared a national disaster area on February 5. A second storm hit on February 21 and lasted until February 25 bringing rain to the already saturated ground. This second storm culminated in a disastrous flood on February 25th. The storm resulted in the largest peak outflow from Santiago Reservoir since its inception in 1933. The reservoir at Villa Park Dam reached its capacity for the first time since its construction in 1963; the dam had a maximum inflow of 11,000 cfs. The outlet conduit was releasing up to 4,000 cfs yet the spillway overflowed at 1:30 p.m. and continued for 36 hours. The maximum peak outflow from the dam reached 6,000 cfs. Although the safety of the dam was never threatened the outflow caused serious erosion downstream in the cities of Orange and Santa Ana and in some parks and golf courses. A Southern Pacific Railroad bridge, water and sewer lines, a pedestrian over crossing, and three roads washed out. Approximately 2,000 Orange and Santa Ana residents were evacuated from houses bordering Santiago Creek.

Great Flood of 1983 – El Nino rains caused the flood of 1983. The intense downpour and high tides often associated with El Nino (due to the presence of a low pressure system) affected intense shoreline flooding. Meanwhile the Santa Ana River crested its sides near the mouth of the ocean; creating a disaster for the low-lying areas of Huntington Beach; floodwaters were three to five feet deep.

Great Floods of 1993 – In 1993, El Nino caused more flooding. An intense storm was concentrated in the Laguna Canyon Channel area extending from Lake Forest to downtown Laguna Beach. In spite of a valiant effort to save downtown merchants by sandbagging, the stores were flooded. Laguna Canyon Road was

damaged extensively, as well as homes and small businesses in the Laguna Canyon Channel. There were no fatalities reported.

Great Flood of 1995 -- In 1995 a disaster was declared in Orange County after extremely heavy and intense rains exceeded the storm runoff capacity of local drainage systems in many Orange County cities and regional Flood Control District systems. As a result widespread flooding of homes and businesses occurred throughout these cities. There were approximately 1000 people evacuated and extensive damage sustained to both private and public property.

Great Floods of 1997/1998 -- El Niño Storms that occurred during this period created extensive storm damage to private property and public infrastructure, with damages reaching approximately $50 million. Storm conditions caused numerous countywide mudslides, road closures, and channel erosion. Hillside erosion and mudslides forced the continual clearing of roads of fallen trees and debris. Protective measures, such as stabilizing hillside road slopes with rock or K-rail at the toe of slopes, were taken to keep the normal flow of transportation. Harbors, beaches, parks, and trails also sustained substantial storm damage.

In 1992 server coastal storms affected many coastal utilities storm drain and sewage treatment processes. SOCWA reported significant cracks and damage to its Aliso Creek Ocean outfall.

#### *4.3.7.3 Location of Extent/ Probability of Occurrence and Magnitude*

The Santa Ana River, flowing through the heart of Orange County to the Pacific Ocean is the county's greatest flood threat (Figure 4.3-4 floodplain map). Critical wastewater lines are located within the Santa Ana River channel carrying human waste as well as hazardous chemicals. Should the river flood, sediment overlying this line may be eroded away and expose portions of the lines. Exposure of the line during a flood episode would make it vulnerable to direct impact from debris as well as the force of the water, potentially resulting in a line break. A rupture along this critical line would result in the exposure of the downstream population and environment to the human waste and hazardous waste it carries.

The flood of 1938 wiped out roads, bridges, and railroads near the river and took 34 lives when an eight-foot wall of water swept out of the Santa Ana Canyon. The communities of Anaheim, Santa Ana, and Garden Grove were the hardest hit. This flood was a catalyst for construction of Prado Dam, which was developed as part of the Army Corps of Engineers flood control protection plan. Government officials' estimate that today without the protection of Prado Dam, a flood of this magnitude would cause as many as 3,000 deaths and exceed $25 billion in damages. More than 110 acres would be flooded with three feet of water and 255,000 structures would be damaged (S. Gold, in the Los Angeles Times, in 1999).

The Army Corp of Engineers, tasked with the project of increasing the level of protection at Prado Dam from the current 70-year level to a 190-year level of protection, has slated completion for January 2008 (http://www.spl.usace.army.mil/Pradodam/prododam.htm). Further, portions of the County not inundated by river overflow during a 100-year event could be subject to flooding from overflow of water drainage facilities currently inadequate for carrying the 100-year discharge. Other areas subject to flooding during severe storms include areas adjacent to Atwood Channel, Brea Creek Channel, Fullerton Creek Channel, Carbon Creek Channel, San Juan Creek Channel, and East Garden Grove-Wintersburg Channel. Areas adjacent to Santiago Creek and Collins Channel in the central portion of the County and large portions of the San Diego Creek

watershed in the City of Irvine and unincorporated areas of the County are also subject to inundation. In the southern portion of the county canyon areas are subject to flooding. The continued development in these areas has made the flood hazard even greater.

In 1992, the City of Buena Park was affected by a flooding episode in which their city hall flooded and the water system had minor main breaks needing repair. In 1998, the Moulton Niguel Water District was affected by flooding when a major failure in two separate locations was identified along the Oso-Trabuco Trunk sewer system. The water district's 18-inch gravity sewer pipeline along Aliso Creek has also historically been affected by flooding over the past 25 years. The Santa Margarita Water District was affected by flooding in 1980 when Oso Creek flooding and bank failures cost nearly $300,000 in damages to trunk sewer lines and an access road. The South Orange County Wastewater Authority has also experienced damage to its facilities resulting from flooding. In the 1980s the JB Latham Facility flooded resulting in an additional facility having had to be built. The Coastal Treatment Plant was flooded several times between 1992 and 1998. A three-mile stretch of the AWMA access road was also flooded each year with major flooding episodes in 1998 and 2005. SOCWA's 3A Plant has also been subject to flooding from the Oso Creek. In 2005 severe storms caused flooding, mudslides and heavy surface flows in the San Juan Creek which broke a 16" and 10" sewer force main and eroded a protective cover over a 48" domestic pipeline at a repair cost of nearly 3 million dollars.

### 4.3.8 *High Winds/Santa Ana Winds*

#### *4.3.8.1 Nature of Hazard*

Santa Ana winds are generally defined as warm, dry winds that blow from the east or northeast (offshore). The complex topography of southern California combined with various atmospheric conditions creates numerous scenarios that may cause widespread or isolated Santa Ana events. Commonly, Santa Ana winds develop when a region of high pressure builds over the Great Basin (the high plateau east of the Sierra Mountains and west of the Rocky Mountains including most of Nevada and Utah). Clockwise circulation around the center of this high pressure area forces air down slope from the high plateau. The air warms as it descends toward the California coast at the rate of 5 degrees Fahrenheit per 1,000 feet due to compression of the air mass. The air is dry since it originated in the desert, and it dries out even more as it is compressed.

Santa Ana winds often blow with exceptional speed in the Santa Ana Canyon and forecasters at the National Weather Service in Oxnard and San Diego usually place speed minimums on these winds and reserve the use of "Santa Ana" for winds greater than 25 knots (http://nimbo.wrh.noaa.gov/Sandiego/snawind.html).

#### *4.3.8.2 Disaster History*

Santa Ana wind conditions can result in two general disaster conditions. The most common is fire fanned by the high winds. This was the situation in 1993 in Laguna Beach when a massive fire destroyed a number of homes in the hills around Laguna Beach. Fires are a concern to the water utilities both due to the potential affect to its infrastructure, but also in terms of the utilities' obligation to provide water pressure for the fire fighting effort. The second concern with Santa Ana wind conditions is the potential for direct damage to buildings and infrastructure as a result of the high winds. The falling of trees can break pipelines, as well as negative affects on buildings. Of a higher concern is that Santa Ana winds can adversely affect power utilities

that have transformers and power lines, in turn affecting the ability of some water and wastewater utilities to operate when back up generation is unavailable.

#### *4.3.8.3 Location of Extent/ Probability of Occurrence and Magnitude*

Santa Ana winds commonly occur between October and February, with December having the highest frequency of events. Summer events are rare. Wind speeds are typically 35 knots through and below passes and canyons with gusts to 50 knots. Stronger Santa Ana winds can have gusts greater than 60 knots over widespread areas with gusts greater than 100 knots in some areas. Frequently, the strongest winds in the basin occur during the night and morning hours due to the absence of a sea breeze. The sea breeze which typically blows onshore daily, can moderate the Santa Ana winds during the late morning and afternoon hours. Santa Ana winds are an important forecast challenge because of the high fire danger associated with them.

### 4.3.9 Landslide/Mudslide > 25 Percent

#### *4.3.9.1 Nature of Hazard*

Landslide is a general term for a falling mass of soil or rocks. A mudslide (debris flow) is a flow of very wet rock and soil. The primary effects of landslides/ mudslides can include:

- Abrupt depression and lateral displacement of hillside surfaces over distances of up to several hundreds of feet.
- Disruption of surface drainage.
- Blockage of flood control channels and roadways.
- Displacement or destruction of improvements such as roadways, buildings, and water wells.

Landslides are a type of ‘mass wasting’ which denotes any down slope movement of soil and rock under the direct influence of gravity. The term ‘landslide’ encompasses events such as rock falls, topples, slides, spreads, and flows. Landslides can be initiated by rainfall, earthquakes, volcanic activity, changes in groundwater, disturbance and change of a slope by man-made construction activities, or any combination of these factors. Landslides can occur underwater, causing tidal waves and damage to coastal areas. These landslides are called submarine landslides (USGS Fact Sheet 0071-40, Version 1.0).

Failure of a slope occurs when the force that is pulling the slope downward (gravity) exceeds the strength of the earth materials that compose the slope. They can move slowly, (millimeters per year) or can move quickly and disastrously, as is the case with debris-flows. Debris-flows can travel down a hillside of speeds up to 200 miles per hour (more commonly, 30 – 50 miles per hour), depending on the slope angle, water content, and type of earth and debris in the flow. These flows are initiated by heavy, usually sustained, periods of rainfall, but sometimes can happen as a result of short bursts of concentrated rainfall in susceptible areas. Burned areas charred by wildfires are particularly susceptible to debris flows, given certain soil characteristics and slope conditions (www.consrv.ca.gov).

A debris or mud flow is a river of rock, earth and other materials, including vegetation that is saturated with water. This high percentage of water gives the debris flow a very rapid rate of movement down a slope. This high rate of speed makes debris flows extremely dangerous to people and property in its path. Earthquakes often trigger flows.[1] Debris flows normally occur when a landslide moves down-slope as a semi-fluid mass scouring, or partially scouring soils from the slope along its path. Flows are typically rapid moving and also tend to increase in volume as they scour out the channel. Flows often occur during heavy rainfall, can occur on gentle slopes, and can move rapidly for large distances.

Wildland fires on hills covered with chaparral are often a precursor to debris flows in burned out canyons. The extreme heat of a wildfire can create a soil condition in which the earth becomes impervious to water by creating a waxy-like layer just below the ground surface. Since the water cannot be absorbed into the soil, it rapidly accumulates on slopes, often gathering loose particles of soil into a sheet of mud and debris. Debris flows can often originate miles away from unsuspecting persons, and approach them at a high rate of speed with little warning.

Natural processes can cause landslides or re-activate historical landslide sites. The removal or undercutting of shoreline-supporting material along bodies of water by currents and waves produces countless small slides each year. Seismic tremors can trigger landslides on slopes historically known to have landslide movement. Earthquakes can also cause additional failure (lateral spreading) that can occur on gentle slopes above steep streams and riverbanks.

#### *4.3.9.2 Disaster History*

The following landslide accounts comprise only a fraction of the southern California landslide history:

- **1978 Bluebird Canyon, Orange County**

  The cost of recovery was $52.7 million (2000 dollars) with 60 houses destroyed or damaged. Unusually heavy rains in March of 1978 may have contributed to initiation of the landslide. Although the 1978 slide area was approximately 3.5 acres, it is suspected to be a portion of a larger, ancient landslide.

- **1980 Southern California Slides**

  The damage was estimated at $1.1 billion in 2000 dollars. Heavy winter rainfall in 1979-80 caused damage in six southern California counties. In 1980, the rainstorm started on February 8 with 5 days of continuous rain and 7 inches of precipitation. Slope failures were beginning to develop by February 15 and then very high-intensity rainfall occurred on February 16. As much as 8 inches of rain fell in a 6 hour period in many locations. Records and personal observations in the field on February 16 and 17 showed that the mountains and slopes literally fell apart on those two days.

- **1983 San Clemente, Orange County**

  The damage to California Highway 1 was estimated at $65 million in 2000 dollars. Litigation at that time involved approximately $43.7 million (2000 dollars).

[1] Robert Olsen Associates, Metro Regional Hazard Mitigation and Planning Guide, (June 1999) Metro

- **1994 Northridge, California earthquake landslides**

  As a result of the magnitude 6.7 Northridge, California, earthquake, more than 11,000 landslides occurred over an area of 10,000 km2. Most were in the Santa Susana Mountains and in mountains north of the Santa Clara River Valley. They destroyed dozens of homes, blocked roads, and damaged oil-field infrastructure. It caused deaths from Coccidioidomycosis (valley fever) the spore of which was released from the soil by the landslide activity and blown toward the coastal populated areas. **March 1995 Los Angeles and Ventura Counties, Southern California**

  Above normal rainfall triggered damaging debris flows, deep-seated landslides, and flooding. Several deep-seated landslides were triggered by the storms, the most notable was the La Conchita landslide, which in combination with a local debris flow, destroyed or badly damaged 11 to 12 homes in the small town of La Conchita, about 20 km west of Ventura. There also was widespread debris-flow and flood damage to homes, commercial buildings, and roads and highways in areas along the Malibu coast that had been devastated by wildfire 2 years before.

- **1998 Laguna Niguel, Orange County, Landslide**

  During the 1997/1998 El Nino Season, heavy rainfall increased movement on the site of an ancient landslide in Laguna Niguel. The storms in December 1997 had accelerated its movement and in early 1998, a crumbling hillside forced the evacuation of 10 hilltop homes and more than 10 condominium units resting below. Ultimately four of the hilltop homes collapsed, falling down hillside into the void created by the slide area. The condominium complex has since been demolished and the site remains open space.

- **2005 Blue Bird Canyon, Laguna Beach, Orange County; Landslide**

  On June 1, 2005, Bluebird Canyon in Laguna Beach experienced a landslide. It would appear that exceptionally heavy rainfall during the winter period was the underlying cause of the instability in an ancient landslide. A 30-acre piece of hillside between 50 to 60 feet deep broke free and fell on the homes below; 15 homes were destroyed and 32 others had varying levels of damage. The approximate cost of damage was about $35 million.

- **2005 SCWD JRWSS Slope Failure**

  During the 2005 winter storms a landslide event occurred in April, causing cracks in the pipeline where it travels through an easement between Camino Del Avion and Philemon Drive in the City of Dana Point. A temporary 24 inch HDPE bypass line was installed above grade within the slide the slide zone and a geotechnical engineer was engaged to report on the likelihood of further landslides and to recommend options for permanent repairs to the damaged pipeline. The project will examine the potential alignments for the permanent replacement of pipeline sections threatened by the slide area.

- **2005 SCWD landslide impact to the Joint Regional Transmission Line**

  Following a year of heavy rainfall, a slope failure occurred in Laguna Niguel in an area that included a section of the Joint Regional Transmission Pipeline. The pipeline had to be shutdown and a temporary pipeline was routed around the slide area while evaluations of the stability of the area were made.

Ultimately, the pipeline will be rerouted around the unstable area or located back in the slope after it has stabilized. Because the problem occurred in the winter/spring period and there are other pipelines into South Orange County, no water shortages were experienced.

#### *4.3.9.3 Location of Extent/ Probability of Occurrence and Magnitude*

Vulnerability assessments for landslides assist in predicting how different types of property and population groups may be affected by a slide. Data that includes specific landslide-prone and debris flow locations in the county can be used to assess the population and total value of property at risk from future landslide occurrences.

Factors included in assessing landslide risk include population and property distribution in the hazard area, the frequency of landslide or debris flow occurrences, slope steepness, soil characteristics, and precipitation intensity. This type of analysis could generate estimates of the damages to the county due to a specific landslide or debris flow event. At the time of publication of this plan, data was insufficient to conduct a GIS risk analysis based on soils and vegetation. However, slopes of greater than 25 percent were identified and mapped as areas of greatest possible risk for a landslide in the county (Figure 4.3-5).

Rain induced landslides were reported in Santa Margarita in 1980, 1993, 1995 and 2005. IN 1980 rains washed out an access road in Coto De Caza uncovering an 8" water line. The same series of storms also exposed a 21" trunk sewer line along the Oso Creek in Mission Viejo resulting in damages of $300,000. In 1993 bank failures caused many pipelines to break which had to be replaced, relocated, or re-protected at a cost of nearly 2.1 million dollars. A slope failure in 1995 caused pipeline failures costing nearly $30,000 and in 2005 a reservoir slope failure in Talega Valley cost $350,000. Landslides also affected the South Orange County Water Authority's Aliso Creek Effluent Transmission Main, when landslides have continually caused an erosion problem along Aliso Creek and affecting a 36-inch pipeline carrying treated wastewater. By the shear nature of water running downhill, several critical pipelines, water storage tanks, reservoirs are located in areas that can be affected by landslides.

### 4.3.10 Land Subsidence

#### *4.3.10.1 Nature of Hazard*

The United States Geological Survey (USGS) defines land subsidence as a gradual settling or sudden sinking of the ground surface as a result of subsurface movement of underlying geologic units (Galloway et al. 2005). Scientists at the USGS have determined that nearly 17,000 square miles in 45 states have been directly affected by land subsidence, caused by aquifer-system compaction, drainage of organic soils, underground mining, hydro-compaction, natural compaction, sinkholes, and thawing permafrost. More than 80 percent of land subsidence is caused by over-use of groundwater and the increasing development of land and water resources threatens to worsen existing land-subsidence problems [while initiating] new ones" (Galloway et al. 2005).

Land subsidence in California is mainly caused by groundwater pumping in areas where aquifer recharge is exceeded. Known as "over-drafting," the inability to replenish aquifers has led to lower water tables, resulting

in damage to infrastructure, water quality and in coastal areas has resulted in the intrusion of seawater. As the Galloway et al. (2005) notes "the compaction of unconsolidated aquifer systems that can accompany excessive groundwater pumping is by far the single largest cause of subsidence" and "the overdraft of such aquifer systems has resulted in permanent subsidence and related ground failures," thus "the extraction of this resource for economic gain constitutes 'groundwater mining' in the truest sense of the term." Over-drafting is further exacerbated in hot geographic regions with a large population; this includes much of the southern California.

#### *4.3.10.2 Disaster History*

The relationship between subsidence and groundwater pumping was not fully recognized until 1928 when O.E. Meinzer, scientist with the USFS, realized that aquifers were compressible (Galloway, et al. 2005). By the 1950s, the USGS made a concerted effort to measure the amount of ground subsidence. In 1952, Joseph Poland studied large discrepancies between the U.S. Coast and Geodetic Survey for the Santa Clara and San Joaquin valleys. Poland noted that the increased use of groundwater correlated with the amount of ground subsidence. Poland's work led to the verification of "consolidation theory" or compressible aquifers, as well as leading to the development of "definitions, methods of quantification, and confirmation of the interrelationship among hydraulic-head declines, aquitard (clay) compaction, and land subsidence" (Galloway, et al. 2005)

##### 4.3.10.2.1 Location of Extent/ Probability of Occurrence and Magnitude

Currently, land subsidence severely affects much of the west Coast. The major land-subsidence affected area of Orange County exists between Newport Beach and Huntington Beach and five miles inland from this point (OCWD 2001). This area is referred to as the Talbert Gap, which formed millennia ago from alluvial deposition from the Santa Ana River. With nearly a century of underground water aquifer pumping to sustain the intensive grazing and agriculture practices, by 1956 the water table had lowered to below sea level allowing saltwater from the Pacific Ocean to intrude through the Talbert Gap. Allowed to continue unchecked, the continued intensive groundwater pumping regime and intruding seawater would have drastically altered the environmental landscape of Orange County, ultimately lending to substantial land subsidence. As a result of studies identifying subsidence and saltwater intrusion in Orange County, OCWD began a massive management program to minimize the loss of aquifer-stored water and reduce saltwater intrusion. However, this does not negate the fact that millions of dollars have been spent throughout the county and the State in an effort to mitigate adverse effects from intensive groundwater pumping leading to ground subsidence.

### 4.3.11 Tornado/Water Spout

#### *4.3.11.1 Nature of Hazard*

A tornado is defined as a violently rotating column of air extending from the base of a thunderstorm to the ground. Air moves very rapidly upward around a tornado center. The most violent tornadoes have wind speeds of 300 mph or more and are capable of tremendous destruction.

Tornados are produced during severe thunderstorms, which are created near the junction between warm moist air and cold dry air. Tornados derive their energy from the heat contained in warm, moist air masses. Tornados do not form during every thunderstorm. They occur when the moist, warm air is trapped beneath a stable layer of cold dry air by an intervening layer of warm dry air. This is called an inversion. If this is disturbed, the moist air will push through the stable air that is holding it down. This warm air will then condense as the latent heat it holds is released. This air will then spiral upwards. With the help of different types of winds, this spiral gains speed, producing a tornado (County of Orange 2004:155; FEMA 2004). Tornados can accompany tropical storms and hurricanes as they move onto land; a tornado that forms over water is known as a waterspout.

A tornado path is generally less than 6/10 of a mile wide. The length of the path ranges from a few hundred meters to dozens of kilometers and a tornado will rarely last longer then 30 minutes. Tornados have been recorded as lifting and moving objects weighing more then 300 tons up to 30 feet. They can also lift homes off of their foundations and move them up to 300 feet. They collect an incredible amount of debris, which whirls out of their winds at high velocities.

Some tornados are clearly visible, while rains or low clouds may obscure others. Before a tornado hits, the wind may diminish and the air may became still. A cloud of debris often marks the location of a tornado, even if no funnel is evident.

In an average year, 800 tornadoes are reported across the United States, which cause 80 deaths and over 1,500 injuries. While many people associate tornados with the Midwest, tornados have occurred in every state. In California, one third of the state's tornados occur in Orange, Los Angeles, San Bernardino, or San Diego counties (FEMA 2004).

The severity of a tornado is measured through the Fujita Scale, which categorizes tornados based on damage discovered (not recorded wind speeds). Named after creator Tetsuya Theodore Fujita of the University of Chicago in 1971, the scale includes the following categories:

- **F-0:** 40-72 mph, chimney damage, tree branches broken
- **F-1:** 73-112 mph, mobile homes pushed off foundation or overturned
- **F-2:** 113-157 mph, considerable damage, mobile homes demolished, trees uprooted
- **F-3:** 158-205 mph, roofs and walls torn down, trains overturned, cars thrown
- **F-4:** 206-260 mph, well-constructed walls leveled
- **F-5:** 261-318 mph, homes lifted off foundation and carried considerable distances, autos thrown as far as 100 meters

To mitigate the damage associated with tornados, several steps and measures can be taken. Orange County has implemented numerous measures, which are designed to protect the County's residents, infrastructure, and assets. These actions are based on preparedness and include:

- Maintaining telephone contact with the National Weather Service (NWS).

- Monitoring the NWS "tornado watches" and "tornado warnings" issued to the public and government utilities.
- Continuing public education regarding watches and warnings.
- Gaining access to and creating considerable cooperation with local media.
- Encouraging power and utility companies to have restoration plans and mitigation efforts in place.
- Establish debris clearance requests with outside utilities.
- Shelter agreements with the Red Cross are established or updated to provide shelter operations.
- Broadcasts using all emergency radio frequencies to all emergency services utilities are issued for all watches and warnings

### *4.3.11.2 Disaster History*

California, and specifically Orange County, have experienced numerous tornadoes and their affects. Between 1958 and 2005, there have been at least 29 confirmed tornadoes in Orange County. Table 4.3-4 surmises these disasters:

**Table 4.3.11.2-1**
**Historic Tornado Events in Orange County (1958-2005)**

| Date | Type | Magnitude | Death | Injury | Property Damage |
|---|---|---|---|---|---|
| 4/1/1958 | Tornado | F | 0 | 0 | 0K |
| 2/19/1962 | Tornado | F0 | 0 | 0 | 0K |
| 4/8/1965 | Tornado | F | 0 | 0 | 0K |
| 11/7/1966 | Tornado | F | 0 | 0 | 3K |
| 11/7/1966 | Tornado | F2 | 0 | 0 | 3K |
| 3/16/1977 | Tornado | F1 | 0 | 4 | 2.5M |
| 2/9/1978 | Tornado | F3 | 0 | 6 | 2.5M |
| 1/31/1979 | Tornado | F1 | 0 | 0 | 0K |
| 11/9/1982 | Tornado | F0 | 0 | 0 | 3K |
| 11/9/1982 | Tornado | F1 | 0 | 0 | 3K |
| 1/13/1984 | Tornado | F0 | 0 | 0 | 3K |
| 3/16/1986 | Tornado | F1 | 0 | 0 | 2.5M |
| 1/18/1988 | Tornado | F0 | 0 | 0 | 25K |
| 1/18/1988 | Tornado | F0 | 0 | 0 | 0K |
| 2/28/1991 | Tornado | F0 | 0 | 0 | 0K |
| 3/27/1991 | Tornado | F1 | 0 | 0 | 0K |
| 12/7/1992 | Tornado | F1 | 0 | 0 | 250K |

**Table 4.3.11.2-1 (continued)**
**Historic Tornado Events in Orange County (1958-2005)**

| Date | Type | Magnitude | Death | Injury | Property Damage |
|---|---|---|---|---|---|
| 12/7/1992 | Tornado | F1 | 0 | 0 | 3K |
| 12/29/1992 | Tornado | F0 | 0 | 0 | 3K |
| 1/17/1993 | Tornado | F0 | 0 | 1 | 5.0M |
| 1/18/1993 | Tornado | F0 | 0 | 0 | 50K |
| 2/8/1993 | Tornado | F0 | 0 | 0 | 50K |
| 11/11/1993 | Tornado | F0 | 0 | 2 | 1K |
| 2/7/1994 | Tornado | F0 | 0 | 0 | 500K |
| 11/11/1997 | Tornado | F1 | 0 | 0 | 0 |
| 12/21/1997 | Tornado | F1 | 0 | 0 | 15K |
| 2/24/1998 | Tornado | F0 | 0 | 0 | 20K |
| 2/24/2001 | Tornado | F0 | 0 | 0 | 50K |
| 2/19/2005 | Tornado | F0 | 0 | 0 | 15K |

(Reference: NOAA Satellite and Information Service, 2006)

Based on these data, Orange County has experienced only one tornado greater than F-2, and never suffered a casualty from a tornado. The majority of the tornados have been either an F0 or F1. The first reported tornado was in 1958, and they have continued somewhat frequently. Historically, most tornadoes occur between November and March within Orange County, and tornadoes have caused approximately $13 million in total damage.

The worst tornado in the county's history occurred on February 9, 1978. It was an F3 tornado that injured six people and caused $2.5 million in damage. The tornado originated in Irvine and traveled two miles. At its greatest width, the tornado was 67 yards wide. Another devastating tornado occurred on January 17, 1993. Known as the Lake Forest Tornado, the tornado was actually categorized as an F0, but caused $5 million in damage to infrastructure. There was one person injured in the tornado, as well.

### *4.3.11.3 Location and Extent/ Probability of Occurrence and Magnitude*

Tornadoes have struck every state, but most impact the area known as 'Tornado Alley" during the spring. Tornado Alley extends from Nebraska to central Texas. Orange County, California is not within this area, but is susceptible to tornadoes. Tornadoes in Orange County can strike any part of the County, including coastal areas, and are not regulated to a season, like spring (most occur during winter in the County). There is a possibility that Orange County can be impacted by a major tornado (F3 or greater). Accordingly, the dense population and overdeveloped parts of the County can be affected significantly. The impacts of a tornado to water and wastewater would be from the resulting power outages and potential impacts to buildings.

## 4.3.12 Wildland/Urban Fire

### *4.3.12.1 Nature of Hazard*

A variety of fire protection challenges exist within Orange County, including structure, urban fires, wildland fires, and fires at the wildland/urban interface. This hazard analysis focuses on wildland fires, but also addresses issues specifically related to the wildland/urban interface. There are three categories of interface fire: the classic wildland/urban interface exists where well-defined urban and suburban development presses up against open expanses of wildland areas, the mixed wildland/urban interface is characterized by isolated homes, subdivisions and small communities situated predominantly in wildland settings, and the occluded wildland/urban interface existing where islands of wildland vegetation occur inside a largely urbanized area. Certain conditions must be present for significant interface fires to occur. The most common conditions include: hot, dry and windy weather, the inability of fire protection forces to contain or suppress the fire, the occurrence of multiple fires that overwhelm committed resources, and a large fuel load (dense vegetation). Once a fire has started, several conditions influence its behavior, including fuel topography, weather, drought, and development.

Orange County has two distinct areas of risk for wildland fire (Figure 4.3-6). The foothills and lower mountain areas are most often covered with scrub brush or chaparral. A key challenge Orange County faces regarding the wildfire hazard is the increasing number of houses being built in the wildland/urban interface. Every year the growing population has expanded further and further into the hills and mountains, including forest lands. The increased "interface" between urban/suburban areas and open space areas has produced a significant increase in threats to life and property from fires and has pushed existing fire protection systems beyond original or current design and capability. Several critical water and wastewater facilities are located near the wildland/urban interface; vegetation management is a critical component to maintaining safe water/wastewater facilities in these areas. It should be noted that the maps used to indicate fire threat were largely created for wildland fire evaluation, and did not include to the extent preferred the threat analysis for urban wildland interfaces.

The magnitude of the California 2003 fires is the result of three primary factors: (1) severe drought, accompanied by a series of storms that produce thousands of lightning strikes and windy conditions; (2) an infestation of bark beetles that had killed thousands of mature trees; and (3) the effects of wildfire suppression over the past century that has led to buildup of brush and small diameter trees in the forests. These same factors are present in Orange County.

### *4.3.12.2 Disaster History*

Large fires have been part of the Southern California landscape for millennia. “Written documents reveal that during the 19th century, human settlement of southern California altered the fire regime of coastal California by increasing the fire frequency. This was an era of very limited fire suppression, and yet like today, large crown fires covering tens of thousands of acres were not uncommon. The USGS website (www.usgs.gov) describes one of the largest fires in Los Angeles County (60,000 acres), occurring in 1878. The largest fire according to the USGS site in Orange County’s history, in 1889, was over half a million acres. Figure 6 lists some of the historic fires from 1961 to 2003.

During the 2002 fire season, more than 6.9 million acres of public and private lands burned in the United States, resulting in loss of property, damage to resources and disruption of community services. Taxpayers spent more than $1.6 billion to combat more than 88,400 fires nationwide. Many of these fires burned in wildland/urban interface areas and exceeded the fire suppression capabilities of those areas. According to the California Division of Forestry (CDF), there were over 7,000 reportable fires in California in 2003, with over one million acres burned. According to CDF statistics, in the October 2003 Firestorms, over 4,800 homes were destroyed and 22 lives were lost.

The fall of 2003 marked the most destructive wildfire season in California history. In a ten day period, 12 separate fires raged across Southern California in Los Angeles, Riverside, San Bernardino, San Diego, and Ventura counties. The massive Cedar Fire in San Diego County alone consumed of 2,800 homes and burned over 250,000 acres. Since the fires of 2003, several other large fires have burned in southern California that included portions of Orange County. Most recently, the Sierra Fire took place in Orange and Riverside Counties between February 6-12, 2006, and burned 10,584 acres.

#### *4.3.12.3 Location of Extent/ Probability of Occurrence and Magnitude*

California experiences large, destructive wildland fires almost every year and Orange County is no exception. Wildland fires have occurred within the county, particularly in the fall, ranging from small, localized fires to disastrous fires covering thousands of acres. The most severe fire protection problem in the unincorporated areas is wildland fire during Santa Ana wind conditions. The combination of the need for water fire flow and the potential for power failure due to winds is a dangerous combination.

### 4.3.13 Manmade Hazards

#### *4.3.13.1 Nature of Hazard*

Manmade hazards are distinct from natural hazards in that they result directly from the actions of people. Two types of manmade hazards include: non-malicious and malicious. Non-malicious hazards refer to incidents that can arise from human activities such as the manufacturing, storage, transport, and use of hazardous materials, which include toxic chemicals, radioactive materials, and infectious substances. Non-malicious hazards are assumed to be accidental and their consequences unintended. Malicious, on the other hand, encompasses intentional, and criminal acts involving weapons of mass destruction (WMD) or conventional weapons. WMD can involve the deployment of biological, chemical, nuclear, and radiological weapons with the result of affecting a large percentage of the population either directly or indirectly. Conventional weapons and techniques include the use of arson, incendiary explosives, armed attacks, intentional hazardous materials release, and cyber-terrorism (attack via computer). Typically, conventional weapons have a very specific target and are limited in scope and affect.

#### *Non-Malicious Hazards*

Non-malicious hazards can occur because of human carelessness, technological failure, intentional acts, and natural hazards. When caused by natural hazards, these incidents are known as secondary hazards, whereas intentional acts are terrorism. Hazardous materials releases, depending on the substance involved and type of release, can directly cause injuries and death and contaminate air, water, and soils. While the probability of a

major release at any particular facility or at any point along a known transportation corridor is relatively low, the consequences of releases of these materials can be very serious.

Some hazardous materials present a radiation risk. Radiation is any form of energy propagated as rays, waves or energetic particles that travel through the air or a material medium. Radioactive materials, e.g., uranium, plutonium, radium, and thorium, are composed of unstable atoms. An unstable atom gives off its excess energy until it becomes stable. The energy emitted is radiation. The process by which an atom changes from an unstable state to a more stable state by emitting radiation is called radioactive decay or radioactivity.

Radiological materials have many uses including:

- use by doctors to detect and treat serious diseases,
- use by educational institutions and companies for research,
- use by the military to power large ships and submarines, and
- use as a critical base material to help produce the commercial electrical power that is generated by a nuclear power plant.

Radioactive materials, if handled improperly, or radiation accidentally released into the environment, can be dangerous because of the harmful effects of certain types of radiation on the human body and the human environment. The longer a person is exposed to radiation and the closer the person is to the radiation, the greater the risk. Although radiation cannot be detected by the senses, scientists can easily detect it with sophisticated instruments that can detect even the smallest levels of radiation. Under extreme circumstances, an accident or intentional explosion involving radiological materials can cause very serious problems. Consequences may include death, severe health risks to the public, damage to the environment, and extraordinary loss of, or damage to, property.

### *Terrorism*

Following a number of serious international and domestic terrorist incidents during the 1990's and early 2000's, citizens across the United States have paid increased attention to the potential for deliberate, harmful terrorist actions by individuals or groups with political, social, cultural, and religious motives. There is no single, universally accepted definition of terrorism, and it can be interpreted in a variety of ways. However, terrorism is defined in the Code of Federal Regulations as "…the unlawful use of force and violence against persons or property to intimidate or coerce a government, the civilian population, or any segment thereof, in furtherance of political or social objectives" (28 CFR, Section 0.85). The Federal Bureau of Investigation further characterizes terrorism as either domestic or international, depending on the origin, base, and objectives of the terrorist organization. However, the origin of the terrorist or person causing the hazard is far less relevant to mitigation planning than the hazard itself and its consequences. Terrorists utilize a wide variety of agents and delivery systems.

The dams in Orange County are considered as potential terrorist targets. The weapon most likely used could include explosives with the goal of collapsing the dam. Such an event would result in a dam failure and an inundation event with little or no warning. The potential of using other types of weapons such as chemical or

biological are considered low due to the large amount of material that would be required to contaminate the water system. This scenario would only apply to those dams where the reservoirs are used for drinking water.

### *4.3.13.2 Disaster History*

#### *Hazardous Material Releases*

Hazardous materials can include toxic chemicals, radioactive materials, infectious substances, and hazardous wastes. The State of California defines a hazardous material as a substance that is toxic, ignitable or flammable, or reactive and/or corrosive. An extremely hazardous material is defined as a substance that shows high acute or chronic toxicity, carcinogenicity, bio-accumulative properties, persistence in the environment, or is water reactive (California Code of Regulations, Title 22). “Hazardous waste,” a subset of hazardous materials, is material that is to be abandoned, discarded, or recycled, and includes chemical, radioactive, and bio-hazardous waste (including medical waste). An accidental hazardous material release can occur wherever hazardous materials are manufactured, stored, transported, or used. Such releases can affect nearby populations and contaminate critical or sensitive environmental areas.

Numerous facilities in Orange County generate hazardous wastes in addition to storing and using large numbers of hazardous materials. Although the scale is usually small, emergencies involving the release of these substances can occur daily at both fixed sites and on the County’s streets and roadways. Facilities that use, manufacture, or store hazardous materials in California must comply with several state and federal regulations. The Superfund Amendments and Reauthorization Act (SARA Title III), which was enacted in 1986 as a legislative response to airborne releases of methyl isocyanides at Union Carbide plants in Bhopal, India and in Institute, West Virginia. SARA Title III, also known as the Emergency Planning and Community-Right-To-Know Act (EPCRA), directs businesses that handle, store or manufacture hazardous materials in specified amounts to develop emergency response plans and report releases of toxic chemicals. Additionally, Section 312 of Title III requires businesses to submit an annual inventory report of hazardous materials to a state-administering utility. The California legislature passed Assembly Bill 2185 in 1987, incorporating the provisions of SARA Title III into a state program. The community right-to-know requirements keep communities abreast of the presence and release of hazardous wastes at individual facilities.

Additional information about the chemicals handled by manufacturing or processing facilities is contained in the U.S. EPA's Toxic Release Inventory (TRI) database. The TRI is a publicly available EPA database that contains information on toxic chemical emissions and waste management activities reported by certain industry groups as well as federal facilities. This inventory was established under EPCRA and expanded by the Pollution Prevention Act of 1990. Facilities that exceed threshold emissions levels must report TRI information to the U.S. EPA, the federal enforcement agency for SARA Title III.

Chemical air emissions, surface water discharges, underground injections, and releases to land are considered chemical releases. The release of a biological agent capable of causing illness in people is considered an infectious release. The only known release of radiological agents into the air in the County was the result of an accident at San Onofre Nuclear Generating Station (SONGS). In 1981, an accidental "ignition" of hydrogen gases in a holding tank of the SONGS caused an explosion which bent the bolts of an inspection hatch on the tank, allowing radioactive gases in the tank to escape into a radioactive waste room. From there, the radioactive material was released into the atmosphere. The plant was shut down for several weeks following

the event (W.I.S.E. Vol.3 No.4 p.18). This incident occurred during the plant's operation of its Unit 1 generator, which has since been decommissioned. No serious injuries occurred.

On February 3, 2001, another accident occurred at SONGS when a circuit breaker fault caused a fire that resulted in a loss of offsite power. Published reports suggest that rolling blackouts during the same week in California were partially due to the shutdown of the SONGS reactors in response to the 3-hour fire. Although no radiation was released and no nuclear safety issues were involved, the federal Nuclear Regulatory Commission sent a Special Inspection Team to the plant site to investigate the accident.

**Terrorism**

While Orange County has not experienced any high profile attacks by groups or individuals associated with international terrorist organizations, Orange County has several groups for advisory notification, investigation, and analysis of terrorist events and activities. These groups include:

**Terrorism Working Group (TWG):** TWG was formed in 1998 to address first responder safety issues, incident management and public health consequences of WMD incidents that result from acts of terrorism. TWG membership consists of law enforcement, fire departments, hazardous materials, public and environmental health, emergency medical services (EMS), the FBI, bomb squads, hospitals, ambulance companies, vector control, animal control, coroner, and volunteer law enforcement advisory components.

**Orange County Terrorism Early Warning Group (TEWG):** Orange County's TEWG is a multi-disciplinary subcommittee (including law, health, fire) of the Terrorism Working Group. It is designed to obtain and analyze information and intelligence needed to formulate an effective response to threats and acts of terrorism. As part of the TEWG mission, a threat and vulnerability assessment of potential terrorist targets in Orange County was developed in August 2001. After September 11th, the Orange County TEWG became fully integrated into the national mutual aid structure, thereby increasing the number of participants.

**Orange County Private Sector Terrorism Response Group (PSTRG):** The PSTRG was formed in December 2001 to create a private sector partnership with the TEWG to effectively address private sector safety, incident management, employee education and public health consequences of potential attacks on the critical infrastructure within Orange County. Two large groups involved with PSTRG are the Orange County Business Council, of which 80% of the major businesses in Orange County are members, and TechNet, a consortium of 28 high-tech firms. The objectives of the PSTRG include physical resource sharing, information exchange, virtual reach-back capabilities, and subject/industry matter experts cross-utilization. The PSTRG is an instrument which allows the Sheriff's Department to maximize all resources and prepare community members for the potential of terrorism and recovery in its aftermath.

**Orange County Joint Terrorism Task Force (OCJTTF):** Immediately after the September 11, 2001, attacks on America, Sheriff Mike Corona, along with the Orange County Chiefs of Police, the FBI and the California Department of Justice met to discuss the formation of a Joint Terrorism Task Force. As a result, 20 police departments joined with five State and Federal departments to comprise the FBI-led Orange County Joint Terrorism Task Force.

**California Anti-Terrorism Information Center (CATIC):** The purpose of CATIC is to serve as a statewide information clearinghouse accessible to law enforcement agencies engaged in counter-terrorism activities. Orange County law enforcement, the OCJTTF, and TEWG have integrated CATIC into the Homeland Security Strategy to increase their effectiveness in combating terrorism and thwarting terrorist acts within the state and county.

**Law Enforcement Mutual Aid:** Orange County law enforcement has long recognized the need for standardization and uniformity of organization and response on the part of public safety providers involved in major multi-discipline and multi-jurisdictional incidents. The collaborative efforts of Orange County law enforcement leaders over the past 53 years have forged a collective voice in mutual assistance and mutual aid. All major components tasked with public safety (law, fire, health, emergency management) are actively involved in developing emergency plans and insuring emergency preparedness.

## 4.4 VULNERABILITY ASSESSMENT

Vulnerability describes how exposed or susceptible to damage an asset is, and depends on an asset's construction, contents and the economic value of its functions. A vulnerability analysis predicts the extent of injury and damage that may result from a hazard event of a given intensity in a given area on the existing and future built environment. Like indirect damages, the vulnerability of one element of the community is often related to the vulnerability of another. Indirect effects can be much more widespread and damaging than direct effects. For example, damage to a major water utility line could result in significant inconveniences and business disruption that would far exceed the cost of repairing the utility line. MWDOC has developed data to help evaluate the economic impacts from short-term (10 days) to long term (3-years) shortages from either emergency or drought induced shortages. This will be discussed in a later section.

Following the events of September 11, 2001, the EPA received a supplemental appropriation to improve the safety and security of the water supply systems. As a result, the Bioterrorism Act of 2002 was adopted. The EPA is the federal agency assigned to ensure that the Act's regulations regarding water are enacted at each level of government. The Bioterrorism Act requires water utilities to conduct a vulnerability assessment, which also includes updating their Emergency Response Plan (ERP). Within six months after submitting the vulnerability assessment to the EPA, the ERP must also be amended to address counterterrorism measures. The authorization to conduct a vulnerability assessment falls under Presidential Decision Directive (PDD) 63, issued on May 22, 1998. Under this directive, the EPA was designated as the lead federal agency to assess and address vulnerabilities of the nation's water supply infrastructure.

Pursuant to the Bioterrorism Act of 2002 some of the participating water utilities have completed vulnerability assessments for their water and wastewater facilities. These assessments were utilized by each PWU to identify hazards that could not be modeled in GIS that may affect their facilities. Further, this information was a component in developing objectives and action items to enhance the security of water and wastewater facilities.

### 4.4.1 Asset Inventory

Hazards that occur in Orange County can impact critical facilities located in the County. For this HMP, a critical facility is defined as public infrastructure used to provide potable water to the public and to maintain

wastewater services in order to maintain public health and safety. Critical facilities associated with potable water services located within the PWU include: wells, water storage tanks, reservoirs with dams, water treatment plants, pump stations, pressure reducing stations, emergency interties, service connections, pipelines, and administrative buildings and utility yards (Table 4.4.2-2). Critical facilities associated with wastewater services located within the PWU include: wastewater treatment plants, lift stations, pipelines, and administrative buildings and utility yards.

GIS and other modeling tools were used to map these types of critical facilities within PWUs and to determine which would most likely be affected by each of the profiled hazards. Orange County covers 948 square miles with several different climate patterns and types of terrain, which allows for several hazards to affect several different parts of the County and several jurisdictions at once or separately. The hazards are described in Section 4.3.

### 4.4.2 Estimating Potential Exposure and Losses

GIS analysis was used to estimate exposure to water and wastewater infrastructure from earthquakes, flooding, structure fire/wildfire, landslide and liquefaction. An analysis conducted by MWDOC was also used to look at potential short term and longer term outages of the regional and local water systems based on shaking that could occur from any of the five major faults within Orange County. Although other hazards are addressed in the plan, including tsunami, dam failure, drought and Santa Ana winds, suitable GIS data for these hazards either was not available (tsunami and dam failure) or the data was not suitable for GIS modeling (drought and Santa Ana winds). For these hazards, quantitative analyses were not performed. Vulnerability assessments associated with these hazards is based on historic incidents, described in Section 4.3 and the knowledge that water and wastewater experts have of their critical facilities and the susceptibility of those facilities to these hazards. When appropriate, PWUs noted these hazards in their objectives and action items in Section 5.0, below.

The specific methods and results of the GIS analyses are presented below. The results are shown as potential exposure in thousands of dollars. For water and wastewater infrastructure pipelines, the length of exposure/impact is given in miles. Other critical facilities are identified by structure type. Exposure characterizes the value of structures within the hazard zone, and is shown as estimated exposure based on the overlay of the hazard on the critical facilities which are assigned a cost of replacement for each type of structure exposed. These replacement costs for the critical facilities were identified by each PWU. The loss or exposure value is then determined with the assumption that the given structure is totally destroyed (worst case scenario), which is not always the case in hazard events. This assumption was valuable in the planning process, so that the total potential damage value was identified when determining capabilities and mitigation measures for each PWU. Table 4.4.2-1 provides abbreviations and average replacement costs used for critical facilities and infrastructure listed in all subsequent exposure/loss tables. Table 4.4.2-2 provides the total inventory and exposure estimates for the critical facilities and infrastructure by jurisdiction. Table 4.4.2-3 to 4.4.2-19 shows the estimated exposure for infrastructure by jurisdiction. The costs identified in the far right column reflect cost of replacement in a worse case scenario (defined as the highest cost submitted from among all of the PWUs in the study process, excluding the regional facilities (this would have the effect of overstating the local costs). For any detailed proposals to be provided to FEMA, actual costs for mitigation and detailed estimates of the benefits of the mitigation measure will be prepared and submitted. The costs included herein

provide a relative measure of the impacts of the various hazards. For example, Garden Grove may have identified a cost of $3 million to replace a well and Buena Park may identify a cost of $3.5 million to replace a well but; in this instance, $3.5 million would be used as the replacement cost for all wells within the PWU. This methodology was used for consistency across the PWUs and selection of the highest cost helps assure that those PWUs with more expensive infrastructure have their needs met when requesting grants.

For details on exposure of facilities by PWU, please refer to Section 5, General Overview of Assets, Goals and Objectives. Section 5 presents each of the PWUs in alphabetical order, identifying estimated loss associated with each of the hazards modeled in GIS, and a discussion of their capabilities to address these losses (administratively, fiscally, technically, etc.) A discussion of each PWU's goals, objectives and action items identified to help mitigate their infrastructure against hazards identified in the risk analysis is also presented in Section 5.

Tables 4.4.2-3 to 4.4.2-14 are organized by hazard threat. For example, Table 4.4.2-3 represents loss estimates for Moderate Earthquake threat (based on USGS modeling) and Table 4.4.2-4 represents loss estimate, for High Earthquake threat. It is important to note that FEMA mandates that an asset or facility can only be recognized by one level of a particular hazard. For example, El Toro shows that a total of 22 facilities will be damaged by a Moderate Level Earthquake threat where as 33 facilities will be damaged by a High Earthquake threat. These 33 do not reflect an addition of 11 facilities, but rather reflect unique facilities that may be damaged by the event.

Tables 4.4.2-14 to 4.4.2-18 reflect loss to features to pipelines based on the same hazards discussed above, and using the same methodology. Numbers reflected include potable water (PW) and waste water (WW) pipelines per mile distance of line that would be destroyed by the event. These tables seem to clearly reflect that for many districts, their greatest potential losses, in terms of value, are pipelines in their jurisdictions. Regionally, MWDOC and the PWU are committed to upgrading existing lines, designing alternate operating facilities and delivery routes for water, and maintaining them to assure a safe water supply and a reliable wastewater management system.

Specific hazard types were classified as follows:

| Hazard | Basis of Exposure |
|---|---|
| Moderate Earthquake | Peak ground acceleration of 0.5 to 0.6 g |
| High Earthquake | Peak ground acceleration of 0.6 to 0.8 g |
| Extreme Earthquake | Peak ground acceleration of 0.8 to1.2 g |
| Landslide | Slopes > 25% |
| Liquefaction Moderate | Soil Type D or E with PGA of <0.3 |

| | |
|---|---|
| Liquefaction High | Soil Type D with PGA of >0.3 |
| Liquefaction Very High | Soil Type E with PGA of >0.3 |
| Little or No Fire Threat | Urban Areas without Vegetation |
| Moderate Fire Threat | Urban Area with Little Vegetation |
| High Fire Threat | Foothill Areas with High Vegetation |
| Very High Fire Threat | Lower Mountain Areas with High Vegetation |
| Extreme Fire Threat | Mountain Areas with High Forestation |

#### 4.4.2.1 MWDOC Analysis of Water System Needs During Outage Situations

The following analysis provides an estimate of the water shortages that utilities might incur in the event of supply interruption caused by a powerful earthquake. It is noted that it is difficult to predict exactly what part of a water supply/distribution system will fail in an earthquake. Therefore, this analysis is intended to provide a feel for the range of possible shortages that would result from a powerful earthquake striking within OC.

MWDOC has adopted a policy that every retail utility is to have the ability to sustain a seven-day interruption of MET water during average demand conditions. Therefore, this analysis analyzed a planned MET facility outage (or "shutdown") of 7 days duration during average demand conditions. But, an outage due to a powerful earthquake could occur at any time of year. The worst condition would be in summer when demands are highest. Therefore, the emergency scenarios analyzed were an emergency outage at either maximum month (1.35 times annual average) or "hot summer" (1.52 times annual average) demand level.

Emergency outages of the water system can be due to a variety of causes including earthquake, flood, power interruption, electronics failure, and human error, et al. Most of these except earthquakes would result in only local impacts. Earthquakes have the potential to inflict significant damage over large areas.

There are at least five geologic faults that could produce earthquakes that could cause significant water system outages in OC. These fault lines are shown in Figure 4.4.2.1-1. Magnitude and other data on these faults were previously summarized on Table 4.3.5.7-1. The San Andreas Fault can generate a more powerful quake, but it is over 50 miles from OC. The more local faults are expected to result in more damage to the water infrastructure of OC.

The simplest earthquake model would have a point epicenter, from which energy waves would travel radially away, producing ground acceleration and shaking of intensity decreasing in perfect circular patterns. In Southern California, earthquakes tend to occur along several-mile long fault lines so the energy pattern is a

narrow ellipse or oval shape rather than circular. Figures 4.4.2.1-2 through 6 show the shaking intensity patterns for five simulated events on local faults. These specific shaking maps provide the ability for any of the PWU's to tailor the estimated earthquake damage provided by the GIS analysis to their specific service areas.

Damage resulting from earthquakes could consist of broken water and transmission mains, disruption of treatment plants, separation of inlet/outlet lines at storage tanks, damage to well casings or at wellhead piping, and a variety of other problems to water systems. It is not possible to determine exactly what damage will occur due to earthquakes to the OC water systems due to different ages of facilities, pipe materials, methods of construction, soils, etc. However, anecdotal evidence provides a good indication of what might be expected.

- Sylmar (San Fernando), CA, 1971 Magnitude 6.6 - The entire water supply of the small city of San Fernando was lost in the 1971 Sylmar quake due to either well, pump or reservoir damage. Due to pipe leaks, reservoir cracks, and lack of controls, the five city reservoirs emptied within a few hours. The city then contracted for water trucks to bring in drinking water, and for portable toilets. Emergency interconnections were made to neighboring water systems. About 500 leaks in the San Fernando system were repaired, and 28,000 feet of water pipe had to be replaced. Several wells and reservoirs had to be repaired or abandoned.

  - The MET Jensen Filtration Plant, and then still under construction, suffered severe structural damage to its finished water reservoir. On the influent pipe, a joint opened 4½ to 6 inches with an offset of about 4 inches. The effluent pipe failed in lateral shear.

- Loma Prieta, CA, 1989 Magnitude 7.1 - Water service was maintained to most of the millions of San Francisco Bay area residents following the Loma Prieta quake of October 17, 1989. East Bay Municipal Utility District suffered over 100 pipeline breaks, the worst of which was a 60-inch main break that took 5 days to repair. The City and County of San Francisco reported 115 breaks; 65 of the breaks were in the Marina area and were repaired within 5 days. The City of Santa Cruz experienced 50 breaks, issued a boil-water order; and service was restored to almost the entire city within one week.

- Northridge, CA 1994 Magnitude 6.7 - A MET feeder (main trunk line) ruptured, and was repaired in 3 days. The most damage was incurred by the Los Angeles Dept. of Water and Power (LADWP) that suffered over 1,000 breaks:

  - The Northridge quake caused damage at 15 locations in three transmission systems [LA Aqueducts 1 & 2, MET Foothill Feeder], 74 locations in water trunk lines [24" and larger], with damage concentrated in the LADWP Van Norman complex, and 1,013 locations in the LADWP distribution piping system.[2]
  - LADWP's water system facilities incurred extensive damage throughout the San Fernando Valley and in the Sherman Oaks area. There was also localized damage to water supply systems in the West Los Angeles area and throughout the eastern San Fernando Valley. Immediately following the earthquake, approximately 100,000 customers were without water, and a citywide

[2] "Using GIS to Assess Water Supply Damage from the Northridge Earthquake" O'Rourke, Thomas and S. Toprak. NCEER Bulletin Vol. 11 No. 3 July, 1997.

"boil water" advisory was issued. Within 5 days, water service was restored to all but a few thousand customers; after 10 days, less than 100 scattered customers were without water. All "boil water" orders were lifted after 12 days. The Department of Water and Power estimates that repairs of earthquake damage to the city's water system will cost approximately $40 million.[3]

– Several water tanks in the region had to be taken out of service because of broken and damaged valves. One tank in Valencia collapsed totally. But, there were no reported wells damaged by the 1994 Northridge quake, although well supply was interrupted in places due to power outages. With power restored, groundwater supply then depended on whether the street mains in the vicinity of the well were intact or not.

[3] "Preparing for the Big One" – Saving Lives Through Earthquake Mitigation in Los Angeles, CA US Dept. of Housing and Urban Development, Jan. 1995.

**Figure 4.4.2.1-1**
**Active Geologic Faults in/near Orange County**

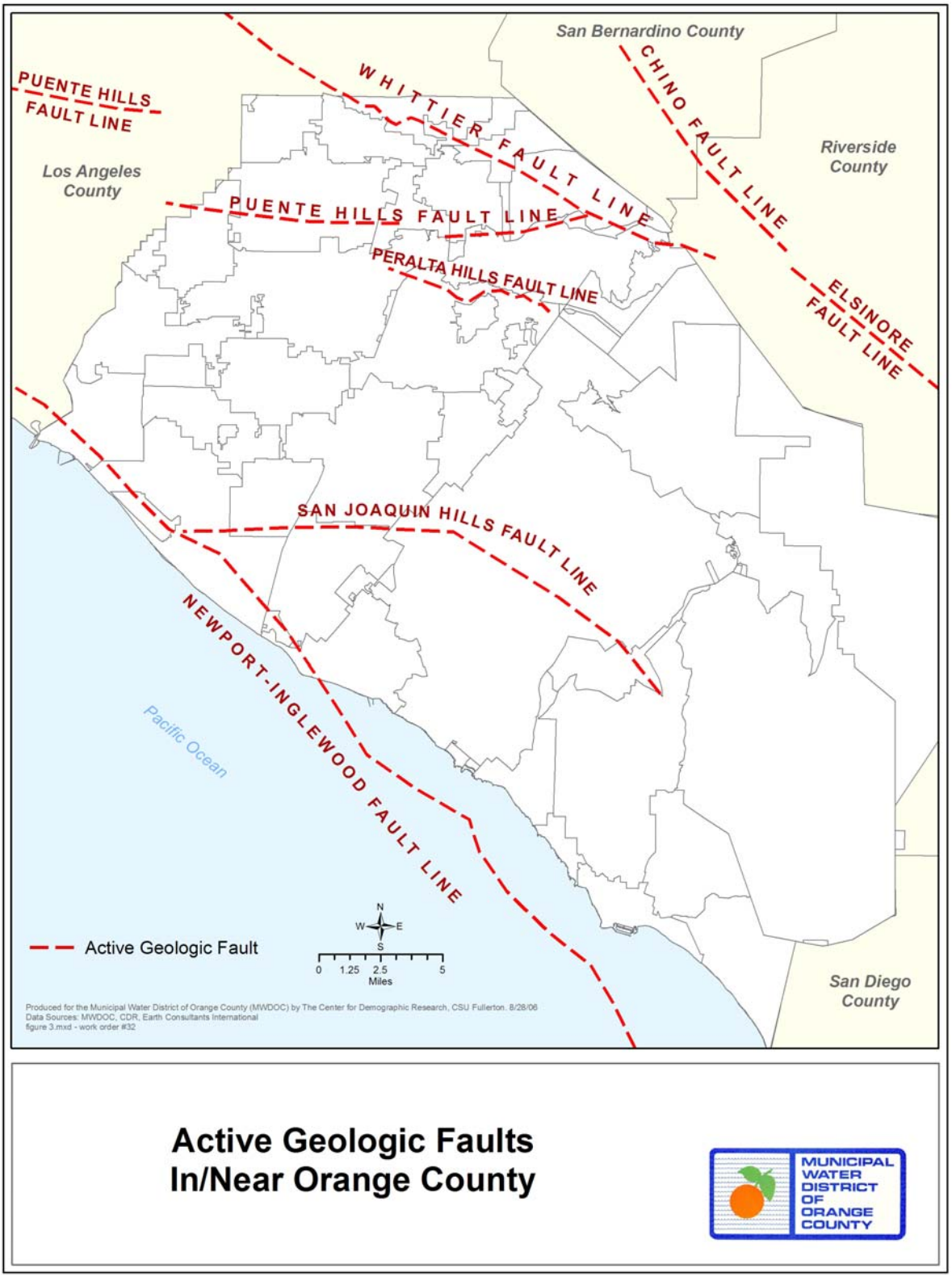


**Figure 4.4.2.1-2**
**Shaking Pattern Due to a Simulated Earthquake Magnitude 6.9 Newport Inglewood Fault**

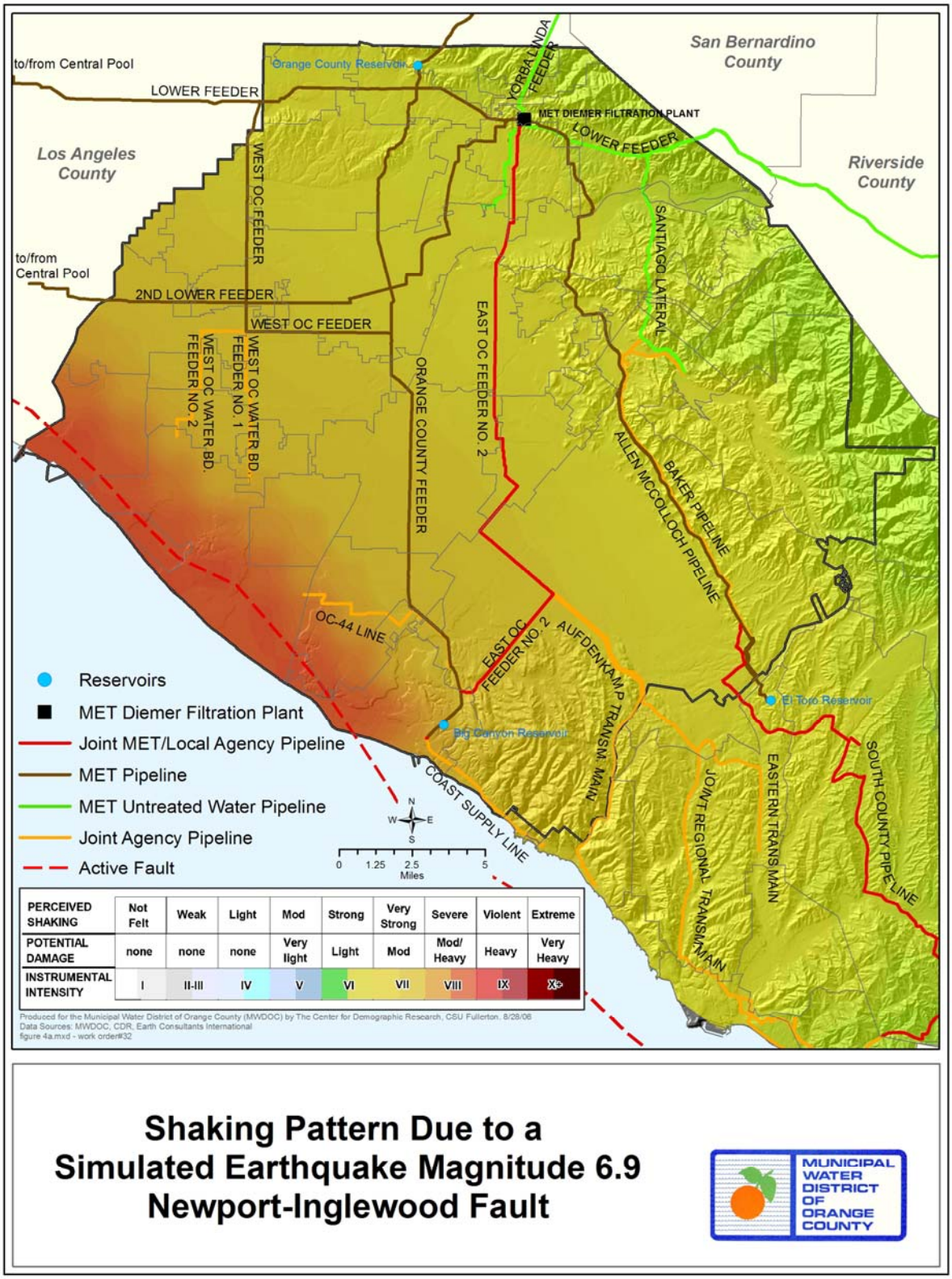


**Figure 4.4.2.1-3**
**Shaking Pattern Due to a Simulated Earthquake Magnitude 6.8 Peralta Hills Fault**

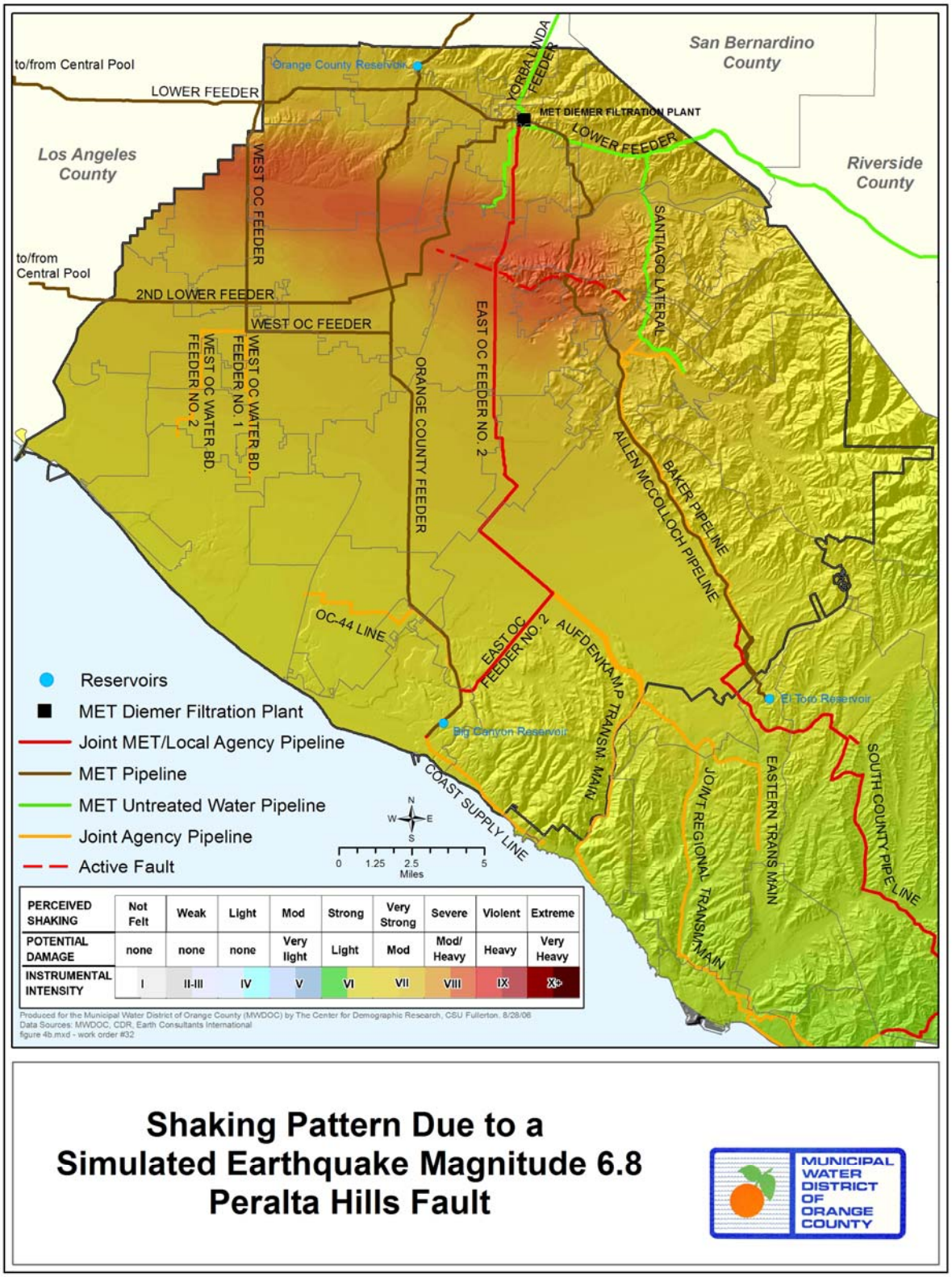


**Figure 4.4.2.1-4**
**Shaking Pattern Due to a Simulated Earthquake Magnitude 7.5 Puente Hills Fault**

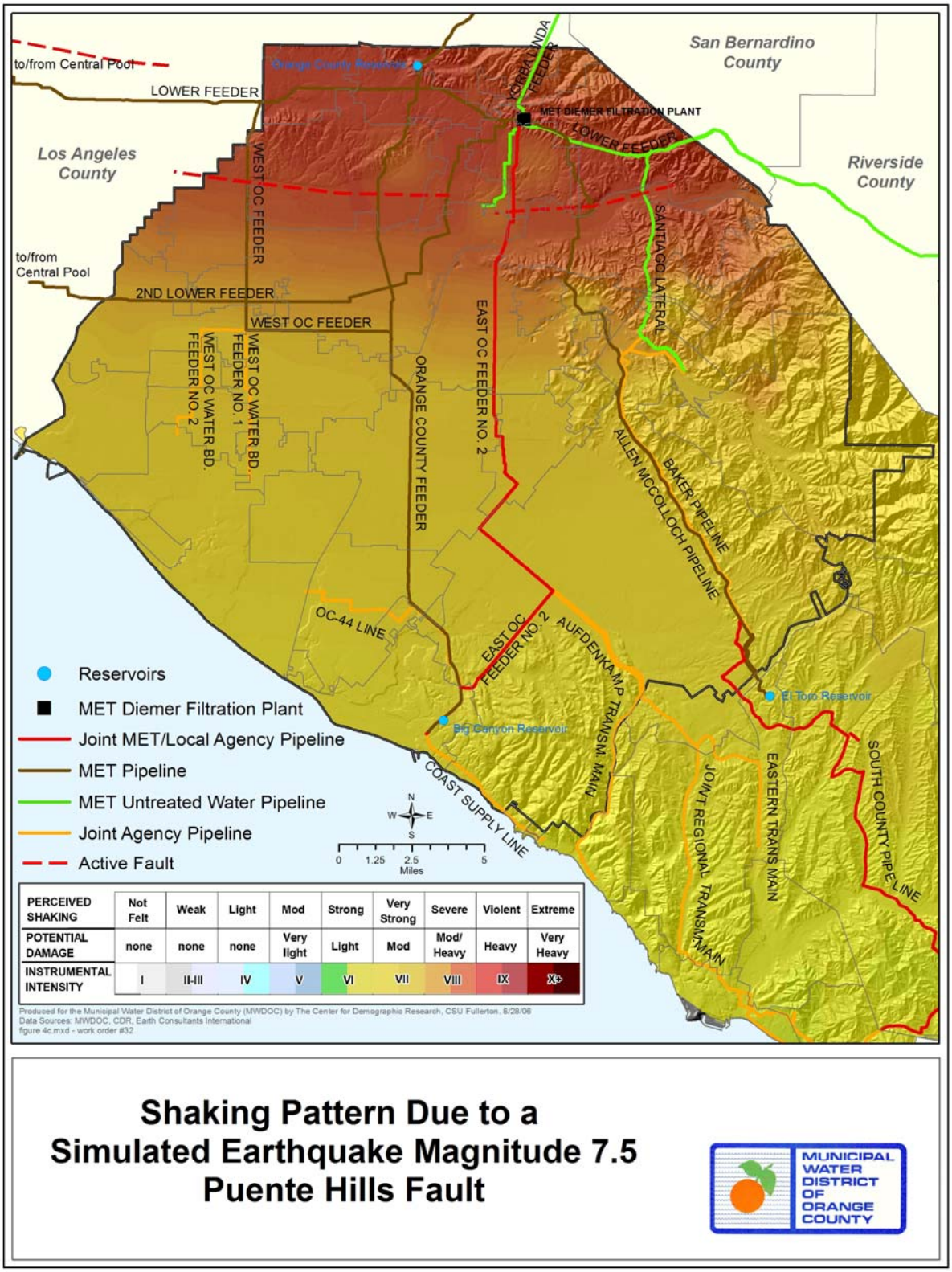


**Figure 4.4.2.1-5**
**Shaking Pattern Due to a Simulated Earthquake Magnitude 6.6 San Joaquin Hills Fault**

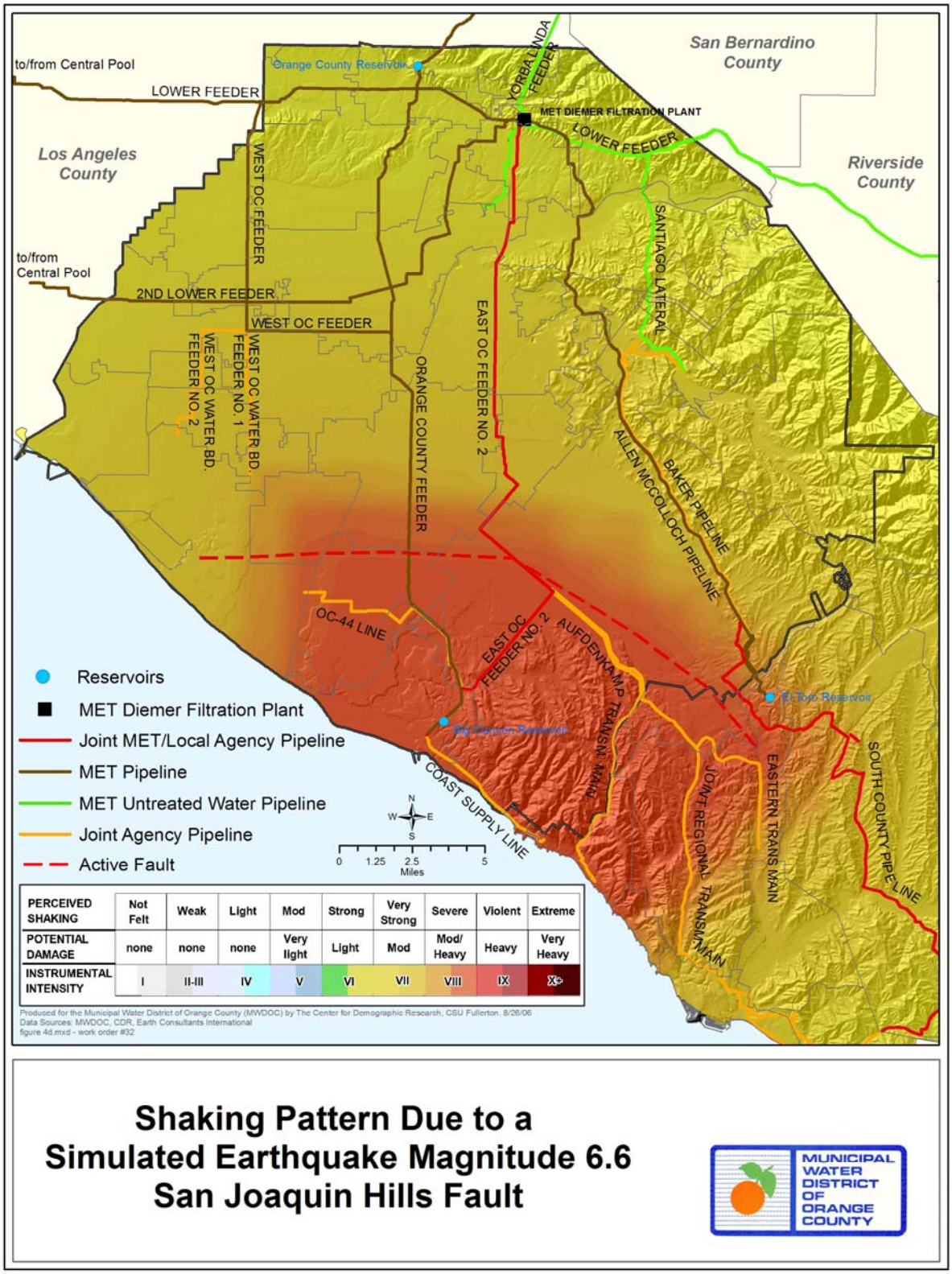
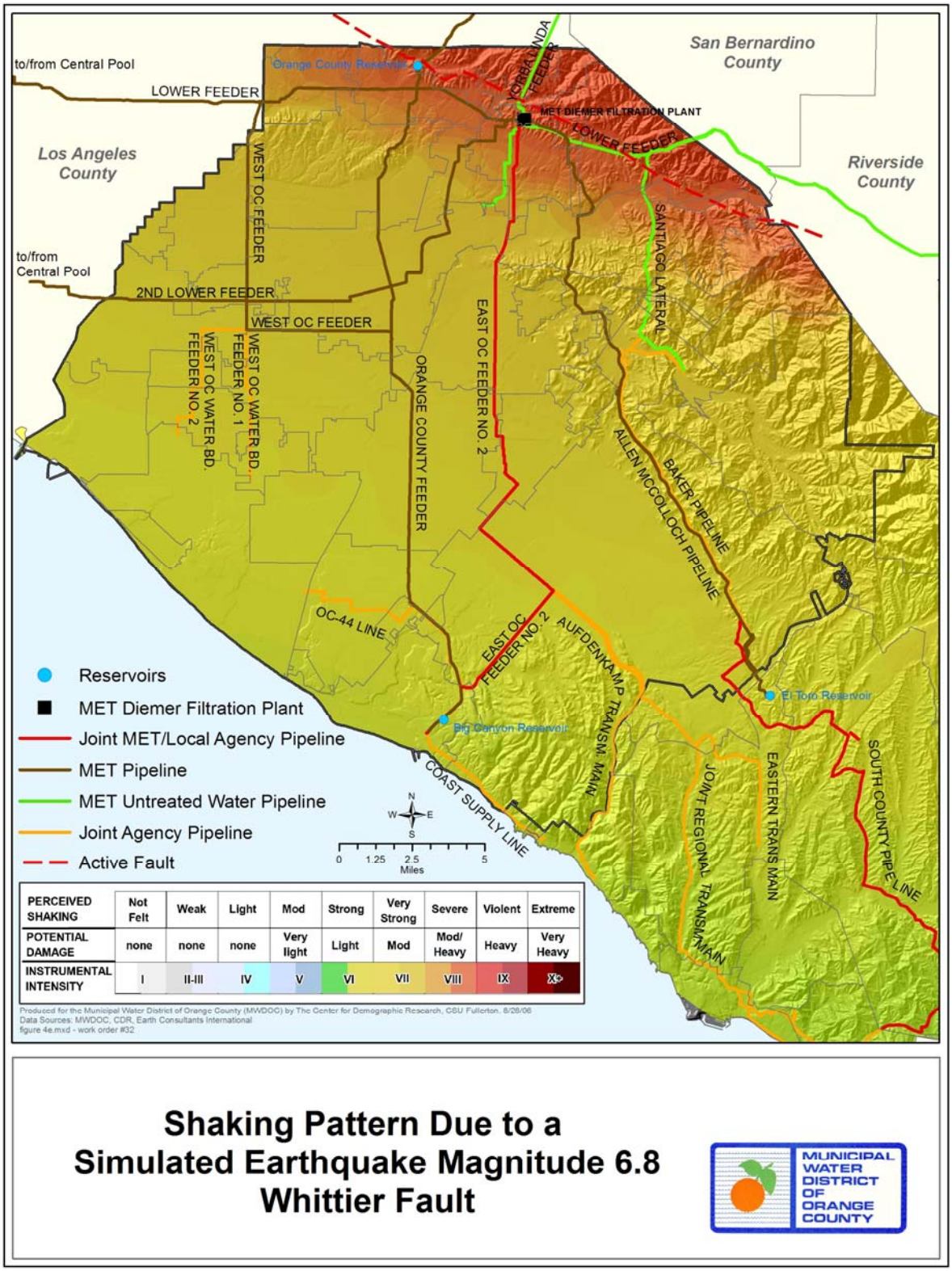


**Figure 4.4.2.1-6**
**Shaking Pattern Due to a Simulated Earthquake Magnitude 6.8 Whittier Fault**



#### 4.4.2.2 Percentage of Water Supply Outage Caused by Earthquake

Loss of water supply in a major earthquake could range from zero to 100% depending on the specifics of the earthquake and the impacts to the local and regional water system. The percentage of supply loss depends very much on whether there are redundant supply systems, such as local wells and the MET imported water system. It is not possible to determine exactly what damage a certain earthquake will cause to the individual water systems in Orange County that have different pipe materials, different tank construction, different soils, etc. The approach taken herein is to derive a "supply loss function", an educated estimate of "local" (non-MET) supply loss (or temporary interruption) due to a major earthquake. The percent of local supply loss will increase with quake magnitude and decrease with distance from the subject fault. The local supply loss function is shown at the top of Table 4.4.2.2-1. The assumed percentage of temporary local supply losses for each water utility due to strong quakes on each of five faults are shown in the main portion of the table 4.4.3-6. These percentages are based on the assumed magnitude of the particular quake and on each utility's proximity to the subject fault. The entire service area of each utility is assumed to suffer the same loss of local supply. For example, for Huntington Beach in a Newport-Inglewood 6.9 quake, the shaking intensity map indicates shaking intensity VIII, and the loss function gives 40% loss of local supply, which is well water. That is, in this scenario, Huntington Beach temporarily loses 40% of its well water supply that is normally 40.6 cfs (see Section 1.3 Table 1.3-5); 60% or 24.4 cfs remains available to deliver to customers.

In addition to the local supply loss, a powerful quake could also damage the MET Diemer Treatment Plant and/or the MET distribution feeders. Pipelines crossing a particular fault are more likely to be damaged than pipelines not crossing. Due to the existence of mainline valves and feeder interconnections, other portions of a MET feeder may remain in service while one reach is severed. An estimate of water supply outage including both MET system damage and local supply (usually wells) loss is shown on Table 4.4.2.2-2.

**Table 4.4.2.2-1**
**Possible Loss (1) of Local Water Supply due to Earthquake in/near Orange County**
**by Retail Agency as a Percentage of Normal Local Supply Rate**

| | | Newport-Inglewood M6.8 | | Peralta Hills M6.8 | | Puente Hills M7.5 | | San Joaquin Hills M6.6 | | Whittier Fault M6.8 | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Sub-Region** | **Local Supply Loss (1) as a Function of Quake Intensity** | **Intensity** | **%Loss** | **Intensity** | **%Loss** | **Intensity** | **%Loss** | **Intensity** | **%Loss** | **Intensity** | **%Loss** |
| | | <V | 1 | <V | 1 | <V | 1 | <V | 1 | <V | 1 |
| | | VI | 10 | VI | 10 | VI | 10 | VI | 10 | VI | 10 |
| | | VII | 20 | VII | 20 | VII | 20 | VII | 20 | VII | 20 |
| | | VIII | 40 | VIII | 40 | VIII | 40 | VIII | 40 | VIII | 40 |
| | | IX | 60 | IX | 60 | IX | 60 | IX | 60 | IX | 60 |
| | | X | 80 | X | 80 | X | 80 | X | 80 | X | 80 |
| Brea/ LaHabra | Brea | VI | | VII | | IX | | VI | | VIII | |
| | La Habra | VI | | VII | | IX | | VI | | VIII | |
| OCWD Basin | Anaheim | VII | | VIII | | IX | | VII | | VII | |
| | Buena Park | VII | | VIII | | IX | | VII | | VII | |
| | East Orange CWD | VI | | VIII | | VIII | | VII | | VII | |
| | Fountain Valley | VIII | | VII | | VII | | VIII | | VI | |
| | Fullerton | VII | | VIII | | IX | | VII | | VII | |
| | Garden Grove | VII | | VII | | VIII | | VII | | VII | |
| | Golden State–East | VI | | VIII | | VIII | | VII | | VII | |
| | Gold. State- Plac./YL | VI | | VIII | | IX | | VII | | VIII | |
| | Gold. State -West OC | VII | | VII | | VIII | | VII | | VII | |
| | Huntington Beach | III | | VII | | VII | | VII | | VI | |
| | Irvine Ranch WD | VII | | VII | | VII | | VIII | | VI | |
| | La Palma | VII | | VII | | VIII | | VII | | VII | |
| | Mesa | VIII | | VII | | VII | | VIII | | VI | |
| | Newport Beach | VIII | | VII | | VII | | VIII | | VI | |
| | Orange | VII | | VII | | VII | | VII | | VII | |
| | Orange Park Acres | VI | | VIII | | VIII | | VII | | VII | |
| | Santa Ana | VII | | VII | | VII | | VIII | | VII | |
| | Seal Beach | VIII | | VII | | VII | | VII | | VI | |
| | Serrano WD | VI | | VIII | | VIII | | VII | | VII | |
| | Tustin | VII | | VII | | VIII | | VIII | | VII | |
| | Westminster | VIII | | VII | | VII | | VII | | V1 | |
| | Yorba Linda WD | VI | | VIII | | IX | | VI | | VIII | |
| South OC | El Toro WD | VI | | VI | | VI | | VIII | | VI | |
| | Laguna Bch CWD | VI | | VI | | VI | | VIII | | VI | |
| | Moulton Niguel | VI | | VI | | VI | | VIII | | VI | |
| | San Clemente | VI | | VI | | VI | | VII | | VI | |
| | San Juan Capo | VI | | VI | | VI | | VII | | VI | |
| | Santa Margarita WD | VI | | VI | | VI | | VII | | VI | |
| | South Coast WD | VI | | VI | | VI | | VII | | VI | |
| | SDCWA San Onofre | VI | | VI | | VI | | VII | | VI | |
| | Trabuco Canyon WD | VI | | VI | | VI | | VII | | VI | |

(1) The possible loss of local water supply shown could be due to direct damage or indirect causes. Direct damage could include damage to well columns or the well head piping, damage to well pump equipment, damage to distribution system piping, potable water tanks, et al. Indirect causes could include electrical power outage, electronic device problems, sewage contamination, et al. In general, problems are expected to be worse the closer the subject area is to the active fault, although soil conditions can also be a significant factor. The magnitudes of losses shown here are somewhat speculative. Loss factor does not apply to imported (Metropolitan) water supply.

(2) "Characteristic" Moment Magnitude of earthquake faults in or near Orange County. Source: Five Earthquake Scenario Ground Motion Maps for Northern Orange County report prepared by Earth Consultants International for MWDOC in July 2005.

**Table 4.4.2.2 -2**
**Possible Water Shortage in Event of a Major Earthquake in Orange County**
**by Retail Water Agency**

**Scale of Shortage:** ● over 25% ●●over 50% ●●● over 75% ●●●●over 90%

| Sub-Region | Retail Water Agency | Newport-Inglewood Fault | Peralta Hills Fault | Puente Hills Fault | San Joaquin Hills Fault | Whittier Fault |
|---|---|---|---|---|---|---|
| Brea/ LaHabra | Brea | | | ●●●● | | (1) |
| | La Habra | | | ●●●● | | (1) |
| OCWD Basin | Anaheim | | ● | | | |
| | Buena Park | | | | | |
| | East Orange CWD | | ● | | | |
| | Fountain Valley | | | | | |
| | Fullerton | | | | | |
| | Garden Grove | | | | | |
| | Golden State–East | | ●● | | | ●● |
| | Gold. State- Plac./YL | | | | | |
| | Gold. State -West OC | | | | | |
| | Huntington Beach | | | | | |
| | Irvine Ranch WD | | | | | |
| | La Palma | | | | | |
| | Mesa Consol. WD | ●● | ● | | ●● | |
| | Newport Beach | ● | | | ● | |
| | Orange | | ● | | | |
| | O.Park AMWD | | ● | | | ● |
| | Santa Ana | | ● | | | |
| | Seal Beach | | | | | |
| | Serrano WD | | | | | |
| | Tustin | | ● | | | ● |
| | Westminster | | | | | |
| | Yorba Linda WD | | ● | ●● | | ●● |
| South OC | El Toro WD | | ●● | ●● | | ●● |
| | Laguna Bch CWD | | (2) | (2) | (2) | (2) |
| | Moulton Niguel | ●●●● | ●●●● | | | ●●●● |
| | San Clemente | | ●●● | ●●● | | ●●● |
| | San Juan Capo | | ●● | ●● | | ●● |
| | Santa Marg. WD | | ●●● | ●●● | | ●●● |
| | South Coast WD | | ●●● | ●●● | | ●●● |
| | SDCWA San Onofre | ●●● | ●●● | ●●● | ●●● | ●●● |
| | Trabuco Can. WD | ● | ● | | | ● |

Source: MWDOC's earthquake outage assessment as described in Section 4.4.2.1.

1. Little or no shortage for Brea and La Habra assumes MET water will be available through the Lower Feeder.
2. Little or no shortage for Laguna Beach CWD assumes MET water will be available through the Coast Supply Line..

#### 4.4.2.3 Economic Impacts from Water Shortages

MWDOC and the Orange County Business Council (OCBC) analyzed the impacts of water shortages for both short-term emergency situations and for longer-term drought situations. "Determining the Value of Water Supply Reliability in Orange County California" was published in September 2003. The findings from the study are included in Appendix A. Use of the data provides a basis for valuing the benefits of mitigation projects that reduce shortages. Cost impact evaluations were run for the three regions of Orange County (Brea/La Habra, OCWD, South Orange County) under the following scenarios:

Emergency Shortages: 20%, 40%, 60% and 80% for durations of 10, 20, 30 and 60 days.

Drought Shortages: 5% and 20%, for durations of one, two and three years.

The loss estimation values performed via the GIS system (Section 4.4) did not include the economic impacts due to business losses and residential inconveniences from suffering shortages. It is expected that specific proposals submitted to FEMA for funding will include these estimates, as they can be considerable. For example, a 10-day shortage of 80% in South Orange County will involve business impacts of $238 million and residential impacts of $55 million for a total impact of $293 million in 2002 dollars. An 80% shortage can easily occur in South Orange County in the event one of the major fault lines experiences a major earthquake that could disrupt the Diemer Filtration Plant (single source of treated imported water to South Orange County) or the two main pipelines that deliver the water to South Orange County.

### 4.4.3 At Risk Populations

At-risk populations were addressed in the Orange County HMP and the HMWG anticipates those same populations would be at risk by hazards that affect water and wastewater infrastructure. However, individuals working within the facilities (i.e. administrative buildings, wastewater treatment plants) that are found to be at risk from specific hazards would be at risk if a disaster occurred during working hours.

### 4.4.4 Analysis of Land Use

Land use was analyzed as a component of the Orange County HMP. The PWU in the Orange County Water and Wastewater Multi-Jurisdictional HMP took land use patterns into consideration in developing their goals and objectives for mitigating hazards within their jurisdictions.

### 4.4.5 Analysis of Development Trends

Development trends were analyzed as a component of the Orange County HMP developed by the County and participating cities. The PWUs in the MWDOC HMP took these development trends into consideration in developing their goals and objectives for mitigating hazards within their jurisdictions.

## 4.5 MULTI-JURISDICTIONAL ASSESSMENT

It should be noted that individual risk assessment maps were completed for each of the 19 PWUs districts as well as MWDOC. Hazard profile maps were created at a 1:24,000 scale. Critical facility information, infrastructure and hazard areas for each of the jurisdictions were reviewed with respect to the Hazard maps. Jurisdictional HMWG leads worked within their Local Mitigation Planning teams to review damage and identify their jurisdictional Goals, Objectives, and Mitigation Measures. Due to concern for sensitivity of information depicted on these localized maps, only the County-scale maps are included in the Plan.

### 4.5.1 Data Limitations

It should be noted that the analysis presented here is based upon "best available data". See Appendix B for a complete listing of sources and their unique data limitations (if any). Data used in updates to this plan should be reassessed upon each review period to incorporate new or more accurate data if/when possible.

**Table 4.4.2-1**
**Unit Replacement Costs of Facilities**
**$1,000's (1)**

| Abberiation | Name | Replacement Cost ($1,000's) |
|---|---|---|
| WST | Water Storage Tank | $13,000 |
| RES | Reservoir | $22,300 |
| WTP | Water Treatment Plant (Diemer Filtration Plant) | $250,000 |
| PS | Pump Station (South County Pump Station) | $35,000 |
| PRS | Pressure Reducing Station (MET facility) | $2,900 |
| EIT | Emergency Interties | $300 |
| SC | Service Connector | $1,800 |
| ADM | Administration (large administration building) | $30,000 |
| LS | Wastewater Pump Station/Lift Station | $444 |
| WWTP | Wastewater Water Treatment Plant | $30,000 |
| WELL | Well | $3,500 |
| PP | Power Plant (MET Yorba Linda Power Plant) | $12,000 |

(1) Based on the highest cost for typical facility from among the PWUs' facility values submitted. These results are conservatively high replacement costs for some retail agencies.

**Table 4.4.2-2**
**Summary Assets**

| District Agency | EXISTING | | | | | | | | | | | | | | | | FUTURE | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Facility/Infrastructure | Wells | Dams/Reservoirs | Water Treatment Plant | Potable Water System Pipeline (mile) | Water Storage Tank | Pump Stations | Pressure Reducing Station | Imported Water Connections | Emergency Intertie | Hydrants | Potable Service Connections | Administrative/ Office/ Maintenance Facilities | Wastewater System Pipeline (mile) | Wastewater / Water Reclamation Plant | WW Service Connections | Sewer Lift Stations | Wells | Dams/Reservoirs | Potable Water System Pipeline (mile) | Water Treatment Plant | Administrative/ Office/ Maintenance Facilities | Water Storage Tank | Pump Stations | Pressure Reducing Station | Wastewater System Pipeline (mile) | **Lab** |
| Buena Park | | 8 | 0 | 0 | 225 | 1 | 1 | 18 | 4 | 0 | 2,600 | 19,250 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 |
| El Toro WD | | 0 | 1 | 0 | 130 | 5 | 11 | 24 | 4 | 13 | 1,900 | 10,080 | 3 | 142 | 1 | 10,000 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Garden Grove | | 12 | 0 | 0 | 418 | 8 | 5 | 2 | 4 | 8 | 4,114 | 33,928 | 2 | 330 | 0 | 33,928 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 |
| La Habra | | 1 | 0 | 0 | 143 | 0 | 7 | 57 | 4 | 6 | 1,479 | 12,548 | 0 | 152 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 |
| Laguna Beach County WD | | 0 | 0 | 0 | 134 | 21 | 11 | 9 | 3 | 6 | 0 | 8,488 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Mesa Consolidated WD (MESA) | | 9 | 0 | 1 | 349 | 3 | 2 | 3 | 3 | 15 | 3,463 | 23,568 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| MNWD | | 0 | 0 | 0 | 700 | 41 | 28 | 15 | 14 | 17 | 4,500 | 52,123 | 2 | 530 | 0 | 50,782 | 17 | 0 | 1 | 5 | 0 | 0 | 0 | 0 | 0 | 20 | 0 |
| Newport Beach | | 2 | 1 | 0 | 230 | 2 | 5 | 43 | 6 | 13 | 1,650 | 26,500 | 1 | 200 | 0 | 23,500 | 20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Orange County Sanitation District | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 753 | 2 | 0 | 19 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| Orange County Water District | | 0 | 17 | 1 | 56 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 3 | 16 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Orange | | 16 | 0 | 0 | 437 | 18 | 18 | 11 | 8 | 16 | 4,233 | 34,000 | 3 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 0 | 0 |
| Santa Margarita WD | | 2 | 2 | 0 | 552 | 35 | 49 | 33 | 22 | 4 | 4,250 | 57,002 | 1 | 548 | 3 | 60,000 | 19 | 1 | 3 | 25 | 0 | 0 | 6 | 10 | 5 | 20 | 0 |
| Serrano WD | | 3 | 1 | 1 | 43 | 2 | 5 | 0 | 2 | 0 | 370 | 2,350 | 2 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| SOCWA | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 25 | 4 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| South Coast WD | | 0 | 1 | 0 | 185 | 13 | 9 | 19 | 4 | 19 | 1,500 | 12,551 | 5 | 151 | 1 | 16,500 | 14 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Trabuco Canyon WD | | 3 | 2 | 1 | 65 | 8 | 12 | 8 | 5 | 5 | 600 | 4,000 | 2 | 47 | 1 | 3,600 | 8 | 1 | 0 | 2 | 1 | 0 | 4 | 4 | 0 | 0 | 0 |
| Tustin | | 13 | 0 | 2 | 170 | 6 | 4 | 0 | 7 | 4 | 1,925 | 14,500 | 3 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Westminster | | 14 | 0 | 0 | 149 | 2 | 4 | 0 | 1 | 0 | 2,590 | 19,900 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Yorba Linda WD | | 9 | 0 | 0 | 640 | 13 | 12 | 37 | 4 | 10 | 3,615 | 22,739 | 2 | 143 | 0 | 0 | 1 | 1 | 0 | 10 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| Joint Water Systems[1] | | 0 | 2 | 0 | 94 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| MET So. Cal | | 0 | 1 | 1 | 122 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| MWDOC | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

(1) Regional water systems identified here are co-owned and managed by multiple utilities.

**Table 4.4.2-3**
**Moderate Earthquake Threat (1) (2)**
**Inventory of Critical Facilities and Infrastructure and Exposure Value by Jurisdiction**

| JURISDICTION | WST | RES | WTP | PS | PRS | EIT | SC | ADM | LS | WWTP | WELL | DIEMER | OC-88 PS | PRS-MET | PP | WWTP-SOCWA | WWTP-OCSD | LS-OCSD | PWL | WWL | Replacement Cost $M |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Buena Park | 1 | 0 | 0 | 1 | 13 | 0 | 4 | 2 | 0 | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 139.7 | 0.0 | $ 190.2 |
| El Toro WD | 1 | 1 | 2 | 5 | 2 | 6 | 3 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8.6 | 0.0 | $ 86.4 |
| Garden Grove | 8 | 0 | 0 | 5 | 2 | 8 | 4 | 2 | 0 | 0 | 12 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 57.0 | 273.0 | $ 360.6 |
| La Habra | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | $ - |
| Laguna Beach CWD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | $ - |
| MESA | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | $ - |
| MNWD | 11 | 1 | 0 | 10 | 0 | 7 | 5 | 0 | 4 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 30.6 | 0.0 | $ 235.3 |
| MWDOC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | $ 3.0 |
| Newport Beach | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | $ - |
| OCSD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0.0 | 287.3 | $ 153.7 |
| OCWD | 0 | 4 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 11.6 | $ 127.8 |
| Orange | 6 | 0 | 0 | 8 | 3 | 7 | 4 | 3 | 0 | 0 | 15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 310.0 | 0.0 | $ 470.6 |
| Serrano | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0.0 | $ 10.3 |
| SMWD | 38 | 2 | 0 | 32 | 33 | 21 | 6 | 1 | 22 | 3 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 103.7 | 12.8 | $ 778.4 |
| SOCWA | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0.0 | 12.1 | $ 36.1 |
| So. Coast WD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0.0 | $ 3.3 |
| Trabuco | 8 | 2 | 1 | 12 | 8 | 5 | 1 | 1 | 8 | 1 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 26.7 | 0.0 | $ 250.1 |
| Tustin | 6 | 0 | 2 | 4 | 0 | 5 | 7 | 2 | 0 | 0 | 13 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 183.7 | 0.0 | $ 346.9 |
| Westminster | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 45.2 | 0.0 | $ 60.3 |
| Yorba Linda WD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | $ - |
| JOINT | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 55.0 | 0.0 | $ 55.0 |
| MET | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 46.3 | 0.0 | $ 83.3 |
| | | | | | | | | | | | | | | | | | | | | | **$ 3,251** |

(1) Moderate earthquake defined as having a peak ground acceleration of 0.5 to 0.6g
(2) Based on the highest cost for typical facility from among the PWUs' facility values submitted. These results are conservatively high replacement costs for some retail agencies.

**Abbreviation Key**

| | | | | | |
|---|---|---|---|---|---|
| WST | Water Storage Tank | PRS | Pressure Reducing Station | LS | Wastewater Pump Station/Lift Station |
| RES | Reservoir | EIT | Emergency Interties | WWTP | Wastewater Water Treatment Plant |
| WTP | Water Treatment Plant | SC | Service Connector | WELL | Well |
| PS | Pump Station | ADM | Administration | PP | Power Plant |

**Table 4.4.2-4**
**High Earthquake Threat (1)**
**Inventory of Critical Facilities and Infrastructure and Exposure Value By Jurisdiction**

| JURISDICTION | WST | RES | WTP | PS | PRS | EIT | SC | ADM | LS | WWTP | WELL | DIEMER | OC-88 PS | PRS-MET | PP | WWTP-SOCWA | WWTP-OCSD | LS-OCSD | PWL | WWL | Replacement Cost $M |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Buena Park | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 93.5 | 0.0 | $ 93.5 |
| El Toro WD | 4 | 1 | 0 | 5 | 1 | 7 | 1 | 4 | 9 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9.7 | 0.0 | $ 125.2 |
| Garden Grove | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.3 | 34.9 | $ 23.4 |
| La Habra | 3 | 0 | 0 | 3 | 24 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6.4 | 0.0 | $ 63.0 |
| Laguna Beach CWD | 21 | 0 | 0 | 12 | 4 | 4 | 3 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 16.7 | 0.0 | $ 323.5 |
| MESA | 3 | 0 | 1 | 3 | 3 | 15 | 3 | 2 | 0 | 0 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 32.8 | 0.0 | $ 135.7 |
| MNWD | 18 | 1 | 0 | 16 | 0 | 6 | 4 | 2 | 13 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 60.9 | 0.0 | $ 382.3 |
| MWDOC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | $ 6.0 |
| Newport Beach | 2 | 1 | 0 | 5 | 43 | 13 | 6 | 1 | 16 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 61.6 | 37.3 | $ 178.7 |
| OCSD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | | | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 19 | 0.0 | 251.9 | $ 818.9 |
| OCWD | 1 | 14 | 1 | 1 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 66.8 | $ 484.4 |
| Orange | 12 | 0 | 0 | 10 | 9 | 10 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 158.6 | 0.0 | $ 342.4 |
| Serrano | 2 | 2 | 1 | 2 | 4 | 1 | 2 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12.4 | 0.0 | $ 118.2 |
| SMWD | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4.1 | 0.0 | $ 5.0 |
| SOCWA | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 1 | 0 | | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0.0 | 25.6 | $ 109.8 |
| So. Coast WD | 15 | 1 | 0 | 12 | 4 | 16 | 0 | 4 | 14 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 25.9 | 0.0 | $ 303.1 |
| Trabuco | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | $ 0.0 |
| Tustin | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 11.8 | 0.0 | $ 11.8 |
| Westminster | 2 | 0 | 0 | 1 | 0 | 2 | 2 | 1 | 0 | 0 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 210.6 | 0.0 | $ 278.4 |
| Yorba Linda WD | 1 | 0 | 0 | 1 | 8 | 4 | 0 | 1 | 1 | 0 | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 18.1 | 6.0 | $ 70.3 |
| JOINT | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 68.3 | 0.0 | $ 69.5 |
| MET | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 43.1 | 0.0 | $ 43.1 |
| | | | | | | | | | | | | | | | | | | | | | **$ 3,986** |

(1) High earthquake threat defined as having a peak ground acceleration of 0.6 to 0.8g
(2) Based on the highest cost for typical facility from among the PWUs' facility values submitted. These results are conservatively high replacement costs for some retail agencies.

**Abbreviation Key**

| | | | | | |
|---|---|---|---|---|---|
| WST | Water Storage Tank | PRS | Pressure Reducing Station | LS | Wastewater Pump Station/Lift Station |
| RES | Reservoir | EIT | Emergency Interties | WWTP | Wastewater Water Treatment Plant |
| WTP | Water Treatment Plant | SC | Service Connector | WELL | Well |
| PS | Pump Station | ADM | Administration | PP | Power Plant |

**Table 4.4.2-5**
**Extreme Earthquake (1)**
**Inventories of Critical Facilities and Infrastructure and Exposure Value by Jurisdiction**

| JURISDICTION | WST | RES | WTP | PS | PRS | EIT | SC | ADM | LS | WWTP | WELL | DIEMER | OC-88 PS | PRS-MET | PP | WWTP-SOCWA | WWTP-OCSD | LS-OCSD | PWL | WWL | Replacement Cost $M |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Buena Park | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | $ - |
| El Toro WD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | $ - |
| Garden Grove | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | $ - |
| La Habra | 2 | 0 | 0 | 3 | 33 | 3 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 13.2 | 0.0 | $ 55.1 |
| Laguna Beach CWD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | $ - |
| MESA | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | $ - |
| MNWD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | $ - |
| MWDOC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | $ - |
| Newport Beach | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3.3 | 2.2 | $ 5.6 |
| OCSD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0.0 | 9.7 | $ 34.9 |
| OCWD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | $ - |
| Orange | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | $ - |
| Serrano | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | $ - |
| SMWD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | $ - |
| SOCWA | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | $ - |
| So. Coast WD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | $ - |
| Trabuco | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | $ - |
| Tustin | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | $ - |
| Westminster | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | $ - |
| Yorba Linda WD | 12 | 0 | 0 | 11 | 29 | 6 | 4 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 53.7 | 4.7 | $ 250.6 |
| JOINT | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | $ - |
| MET | 0 | 1 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 3 | 0 | 0 | 0 | 0.0 | 0.0 | $ 316.0 |
| | | | | | | | | | | | | | | | | | | | | | **$ 662** |

(1) Extreme earthquake threat defined as having a peak ground acceleration of 0.8 to 1.2g
(2) Based on the highest cost for typical facility from among the PWUs' facility values submitted. These results are conservatively high replacement costs for some retail agencies.

**Abbreviation Key**

| | | | | | |
|---|---|---|---|---|---|
| WST | Water Storage Tank | PRS | Pressure Reducing Station | LS | Wastewater Pump Station/Lift Station |
| RES | Reservoir | EIT | Emergency Interties | WWTP | Wastewater Water Treatment Plant |
| WTP | Water Treatment Plant | SC | Service Connector | WELL | Well |
| PS | Pump Station | ADM | Administration | PP | Power Plant |

**Table 4.4.2-6**
**500 Year Flood Plain**
**Inventory of Critical Facilities and Infrastructure and Exposure Value By Jurisdiction**

| JURISDICTION | WST | RES | WTP | PS | PRS | EIT | SC | ADM | LS | WWTP | WELL | DIEMER | OC-88 PS | PRS-MET | PP | WWTP-SOCWA | WWTP-OCSD | LS-OCSD | PWL | WWL | Replacement Cost $M |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Buena Park | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 2 | 0 | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 199.0 | 243.2 | $ 352.8 |
| El Toro WD | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0.0 | $ 1.3 |
| Garden Grove | 8 | 0 | 0 | 5 | 2 | 7 | 3 | 1 | 2 | 0 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 44.2 | 0.0 | $ 201.3 |
| La Habra | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.7 | 0.0 | $ 0.7 |
| Laguna Beach CWD | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0.0 | $ 15.1 |
| MESA | 1 | 0 | 1 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2.2 | 0.0 | $ 34.8 |
| MNWD | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2.2 | 0.0 | $ 3.2 |
| MWDOC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | $ - |
| Newport Beach | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5.8 | 4.5 | $ 11.6 |
| OCSD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 0.0 | 196.2 | $ 158.1 |
| OCWD | 0 | 0 | 6 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 11.1 | $ 67.5 |
| Orange | 1 | 0 | 0 | 1 | 1 | 5 | 0 | 0 | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 103.3 | 0.0 | $ 141.0 |
| Serrano | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.8 | 0.0 | $ 4.3 |
| SMWD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0.0 | $ 0.2 |
| SOCWA | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0.0 | 5.0 | $ 5.5 |
| So. Coast WD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.6 | 0.0 | $ 4.4 |
| Trabuco | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0.0 | $ 0.2 |
| Tustin | 1 | 0 | 1 | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 62.6 | 0.0 | $ 113.3 |
| Westminster | 2 | | | 1 | 1 | 3 | 3 | 1 | | | 11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 182.7 | 0.0 | $ 255.1 |
| Yorba Linda WD | 0 | 0 | 0 | 0 | 1 | 3 | 0 | 1 | 0 | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6.5 | 0.6 | $ 35.4 |
| JOINT | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 15.6 | 0.0 | $ 16.8 |
| MET | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 36.3 | 0.0 | $ 36.3 |
| | | | | | | | | | | | | | | | | | | | | | **$ 1,459** |

(1) Based on the highest cost for typical facility from among the PWUs' facility values submitted. These results are conservatively high replacement costs for some retail agencies.

**Abbreviation Key**

| | | | | | |
|---|---|---|---|---|---|
| WST | Water Storage Tank | PRS | Pressure Reducing Station | LS | Wastewater Pump Station/Lift Station |
| RES | Reservoir | EIT | Emergency Interties | WWTP | Wastewater Water Treatment Plant |
| WTP | Water Treatment Plant | SC | Service Connector | WELL | Well |
| PS | Pump Station | ADM | Administration | PP | Power Plant |

**Table 4.4.2-6**
**100 Year Flood Plain**
**Inventory of Critical Facilities and Infrastructure and Exposure Value By Jurisdiction**

| JURISDICTION | WST | RES | WTP | PS | PRS | EIT | SC | ADM | LS | WWTP | WELL | DIEMER | OC-88 PS | PRS-MET | PP | WWTP-SOCWA | WWTP-OCSD | LS-OCSD | PWL | WWL | Replacement Cost $M |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Buena Park | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2.9 | 0.0 | $ 2.9 |
| El Toro WD | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.8 | 0.0 | $ 2.3 |
| Garden Grove | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 14.1 | 64.7 | $ 61.2 |
| La Habra | 0 | 0 | 0 | 0 | 3 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0.0 | $ 1.5 |
| Laguna Beach CWD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 0.0 | $ 0.4 |
| MESA | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8.8 | 0.0 | $ 38.0 |
| MNWD | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3.5 | 0.0 | $ 38.8 |
| MWDOC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | $ 3.0 |
| Newport Beach | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 9 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10.0 | 9.6 | $ 52.1 |
| OCSD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | | | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 10 | 0.0 | 10.9 | $ 608.4 |
| OCWD | 1 | 11 | 1 | 1 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 47.9 | $ 384.9 |
| Orange | 1 | 0 | 0 | 1 | 0 | 1 | 2 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 29.3 | 0.0 | $ 52.8 |
| Serrano | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4.6 | 0.0 | $ 5.8 |
| SMWD | 0 | 0 | 0 | 3 | 0 | 1 | 3 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5.8 | 0.6 | $ 15.0 |
| SOCWA | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 8.4 | $ 4.6 |
| So. Coast WD | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.1 | 0.0 | $ 20.9 |
| Trabuco | 0 | 0 | 1 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2.1 | 0.0 | $ 18.1 |
| Tustin | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.3 | 0.0 | $ 1.3 |
| Westminster | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 72.7 | 0.0 | $ 83.2 |
| Yorba Linda WD | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3.5 | 0.9 | $ 11.6 |
| JOINT | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 9.6 | $ 4.8 |
| MET | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 7.2 | $ 3.6 |
| | | | | | | | | | | | | | | | | | | | | | **$ 1,415** |

(1) Based on the highest cost for typical facility from among the PWUs' facility values submitted. These results are conservatively high replacement costs for some retail agencies.

**Abbreviation Key**

| | | | | | |
|---|---|---|---|---|---|
| WST | Water Storage Tank | PRS | Pressure Reducing Station | LS | Wastewater Pump Station/Lift Station |
| RES | Reservoir | EIT | Emergency Interties | WWTP | Wastewater Water Treatment Plant |
| WTP | Water Treatment Plant | SC | Service Connector | WELL | Well |
| PS | Pump Station | ADM | Administration | PP | Power Plant |

**Table 4.4.2-7**
**Slope Over 25%: Landslide Hazard**
**Inventory of Critical Facilities and Infrastructure and Exposure Value By Jurisdiction**

| JURISDICTION | WST | RES | WTP | PS | PRS | EIT | SC | ADM | LS | WWTP | WELL | DIEMER | OC-88 PS | PRS-MET | PP | WWTP-SOCWA | WWTP-OCSD | LS-OCSD | PWL | WWL | Replacement Cost $M |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Buena Park | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0.0 | $ 0.1 |
| El Toro WD | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.9 | 0.0 | $ 33.9 |
| Garden Grove | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | $ - |
| La Habra | 0 | 0 | 0 | 1 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 0.0 | $ 3.0 |
| Laguna Beach CWD | 9 | 0 | 0 | 4 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4.5 | 0.0 | $ 130.0 |
| MESA | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0.0 | $ 0.1 |
| MNWD | 18 | 1 | 0 | 12 | 0 | 1 | 1 | 0 | 4 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 25.2 | 0.0 | $ 320.7 |
| MWDOC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | $ 3.0 |
| Newport Beach | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2.1 | 2.8 | $ 4.3 |
| OCSD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 6.0 | $ 3.0 |
| OCWD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.2 | $ 0.1 |
| Orange | 7 | 0 | 0 | 6 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 30.6 | 0.0 | $ 134.6 |
| Serrano | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.7 | 0.0 | $ 32.9 |
| SMWD | 16 | 0 | 0 | 2 | 10 | 2 | 1 | 0 | 8 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 22.7 | 2.7 | $ 251.0 |
| SOCWA | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0.0 | 6.2 | $ 93.1 |
| So. Coast WD | 6 | 0 | 0 | 3 | 0 | 4 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3.4 | 0.0 | $ 89.0 |
| Trabuco | 2 | 1 | 0 | 4 | 0 | 2 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3.7 | 0.0 | $ 69.5 |
| Tustin | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0.0 | $ 0.3 |
| Westminster | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0.0 | $ 0.1 |
| Yorba Linda WD | 10 | 0 | 0 | 5 | 10 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12.6 | 0.3 | $ 156.0 |
| JOINT | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 11.9 | 0.0 | $ 11.9 |
| MET | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 11.9 | 0.0 | $ 35.9 |
| | | | | | | | | | | | | | | | | | | | | | **$ 1,372** |

(1) Based on the highest cost for typical facility from among the PWUs' facility values submitted. These results are conservatively high replacement costs for some retail agencies.

**Abbreviation Key**

| | | | | | |
|---|---|---|---|---|---|
| WST | Water Storage Tank | PRS | Pressure Reducing Station | LS | Wastewater Pump Station/Lift Station |
| RES | Reservoir | EIT | Emergency Interties | WWTP | Wastewater Water Treatment Plant |
| WTP | Water Treatment Plant | SC | Service Connector | WELL | Well |
| PS | Pump Station | ADM | Administration | PP | Power Plant |

**Table 4.4.2-8**
**Liquefaction - Moderate**
**Inventory of Critical Facilities and Infrastructure and Exposure Value By Jurisdiction**

| JURISDICTION | WST | RES | WTP | PS | PRS | EIT | SC | ADM | LS | WWTP | WELL | DIEMER | OC-88 PS | PRS-MET | PP | WWTP-SOCWA | WWTP-OCSD | LS-OCSD | PWL | WWL | Replacement Cost $M |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Buena Park | 1 | 0 | 0 | 1 | 5 | 0 | 1 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 44.4 | 0.0 | $ 68.0 |
| El Toro WD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | $ - |
| Garden Grove | 5 | 0 | 0 | 2 | 0 | 1 | 2 | 1 | 2 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 23.7 | 129.3 | $ 180.2 |
| La Habra | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | $ - |
| Laguna Beach CWD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | $ - |
| MESA | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | $ 42.5 |
| MNWD | 1 | 1 | 0 | 2 | 0 | 0 | 2 | 1 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | $ 57.0 |
| MWDOC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | $ 3.0 |
| Newport Beach | 0 | 0 | 0 | 0 | 2 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | $ 1.6 |
| OCSD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |  | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 0.0 | 141.3 | $ 140.6 |
| OCWD | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 5.0 | $ 62.5 |
| Orange | 4 | 0 | 0 | 5 | 2 | 3 | 2 | 3 | 0 | 0 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 216.1 | 0.0 | $ 324.6 |
| Serrano | 0 | 0 | 1 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | $ 14.7 |
| SMWD | 1 | 0 | 0 | 2 | 1 | 1 | 3 | 0 | 5 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8.7 | 3.6 | $ 45.2 |
| SOCWA | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |  | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | $ - |
| So. Coast WD | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | $ 28.0 |
| Trabuco | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | $ - |
| Tustin | 1 | 0 | 1 | 1 | 0 | 1 | 2 | 0 | 0 | 0 | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 76.5 | 0.0 | $ 131.0 |
| Westminster | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 48.3 | 0.0 | $ 59.1 |
| Yorba Linda WD | 0 | 0 | 0 | 0 | 3 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | $ 2.4 |
| JOINT | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 18.3 | 0.0 | $ 18.3 |
| MET | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 21.3 | 0.0 | $ 21.3 |
| | | | | | | | | | | | | | | | | | | | | | **$ 1,200** |

(1) Based on the highest cost for typical facility from among the PWUs' facility values submitted. These results are conservatively high replacement costs for some retail agencies.

**Abbreviation Key**

| | | | | | |
|---|---|---|---|---|---|
| WST | Water Storage Tank | PRS | Pressure Reducing Station | LS | Wastewater Pump Station/Lift Station |
| RES | Reservoir | EIT | Emergency Interties | WWTP | Wastewater Water Treatment Plant |
| WTP | Water Treatment Plant | SC | Service Connector | WELL | Well |
| PS | Pump Station | ADM | Administration | PP | Power Plant |

**Table 4.4.2-9**
**Liquefaction - High**
**Inventory of Critical Facilities and Infrastructure and Exposure Value By Jurisdiction**

| JURISDICTION | WST | RES | WTP | PS | PRS | EIT | SC | ADM | LS | WWTP | WELL | DIEMER | OC-88 PS | PRS-MET | PP | WWTP-SOCWA | WWTP-OCSD | LS-OCSD | PWL | WWL | Replacement Cost $M |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Buena Park | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 175.9 | 0.0 | $ 204.1 |
| El Toro WD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | $ - |
| Garden Grove | 1 | 0 | 0 | 1 | 2 | 2 | 0 | 1 | 1 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 17.6 | 84.7 | $ 89.8 |
| La Habra | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | $ - |
| Laguna Beach CWD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | $ - |
| MESA | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8.3 | 0.0 | $ 27.3 |
| MNWD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | $ - |
| MWDOC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | $ 3.0 |
| Newport Beach | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6.8 | 0.1 | $ 14.3 |
| OCSD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | | | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 5 | 0.0 | 213.1 | $ 659.6 |
| OCWD | 1 | 14 | 1 | 2 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 41.5 | $ 473.7 |
| Orange | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 20.8 | 0.0 | $ 31.5 |
| Serrano | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.4 | 0.0 | $ 1.4 |
| SMWD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | $ - |
| SOCWA | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 1.7 | $ 0.8 |
| So. Coast WD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | $ - |
| Trabuco | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | $ - |
| Tustin | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 61.2 | 0.0 | $ 72.2 |
| Westminster | 2 | 0 | 0 | 1 | 1 | 2 | 3 | 1 | 0 | 0 | 11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 207.5 | 0.0 | $ 279.6 |
| Yorba Linda WD | 0 | 0 | 0 | 1 | 1 | 2 | 0 | 1 | 0 | 0 | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9.2 | 0.1 | $ 46.5 |
| JOINT | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 14.8 | 0.0 | $ 16.0 |
| MET | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10.8 | 0.0 | $ 10.8 |
| | | | | | | | | | | | | | | | | | | | | | **$ 1,931** |

(1) Based on the highest cost for typical facility from among the PWUs' facility values submitted. These results are conservatively high replacement costs for some retail agencies.

**Abbreviation Key**

| | | | | | |
|---|---|---|---|---|---|
| WST | Water Storage Tank | PRS | Pressure Reducing Station | LS | Wastewater Pump Station/Lift Station |
| RES | Reservoir | EIT | Emergency Interties | WWTP | Wastewater Water Treatment Plant |
| WTP | Water Treatment Plant | SC | Service Connector | WELL | Well |
| PS | Pump Station | ADM | Administration | PP | Power Plant |

**Table 4.4.2-10**
**Liquefaction – Very High**
**Inventory of Critical Facilities and Infrastructure and Exposure Value By Jurisdiction**

| JURISDICTION | WST | RES | WTP | PS | PRS | EIT | SC | ADM | LS | WWTP | WELL | DIEMER | OC-88 PS | PRS-MET | PP | WWTP-SOCWA | WWTP-OCSD | LS-OCSD | PWL | WWL | Replacement Cost $M |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Buena Park | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | $ - |
| El Toro WD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | $ - |
| Garden Grove | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | $ - |
| La Habra | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | $ - |
| Laguna Beach CWD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | $ - |
| MESA | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | $ - |
| MNWD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | $ - |
| MWDOC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | $ - |
| Newport Beach | 0 | 0 | 0 | 0 | 8 | 1 | 0 | 0 | 11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | $ 6.3 |
| OCSD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0.0 | 13.0 | $ 46.5 |
| OCWD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 1.5 | $ 0.8 |
| Orange | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | $ - |
| Serrano | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | $ - |
| SMWD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | $ - |
| SOCWA | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | $ - |
| So. Coast WD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | $ - |
| Trabuco | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | $ - |
| Tustin | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | $ - |
| Westminster | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | $ - |
| Yorba Linda WD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | $ - |
| JOINT | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.8 | 0.0 | $ 1.8 |
| MET | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 0.0 | $ 0.4 |
| | | | | | | | | | | | | | | | | | | | | | **$ 56** |

(1) Based on the highest cost for typical facility from among the PWUs' facility values submitted. These results are conservatively high replacement costs for some retail agencies.

**Abbreviation Key**

| | | | | | |
|---|---|---|---|---|---|
| WST | Water Storage Tank | PRS | Pressure Reducing Station | LS | Wastewater Pump Station/Lift Station |
| RES | Reservoir | EIT | Emergency Interties | WWTP | Wastewater Water Treatment Plant |
| WTP | Water Treatment Plant | SC | Service Connector | WELL | Well |
| PS | Pump Station | ADM | Administration | PP | Power Plant |

**Table 4.4.2-11**
**Low Fire Threat**
**Inventories of Critical Facilities and Infrastructure and Exposure Value By Jurisdiction**

| JURISDICTION | WST | RES | WTP | PS | PRS | EIT | SC | ADM | LS | WWTP | WELL | DIEMER | OC-88 PS | PRS-MET | PP | WWTP-SOCWA | WWTP-OCSD | LS-OCSD | PWL | WWL | Replacement Cost $M |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Buena Park | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5.5 | 0.0 | $ 9.0 |
| El Toro WD | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0.0 | $ 28.3 |
| Garden Grove | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.9 | 3.8 | $ 6.3 |
| La Habra | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0.0 | $ 0.3 |
| Laguna Beach CWD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0.0 | $ 0.3 |
| MESA | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2.8 | 0.0 | $ 6.5 |
| MNWD | 2 | 0 | 0 | 1 | 0 | 1 | 2 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9.1 | 0.0 | $ 39.8 |
| MWDOC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | $ - |
| Newport Beach | 0 | 1 | 0 | 0 | 3 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3.3 | 5.9 | $ 37.6 |
| OCSD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |  | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0.0 | 24.6 | $ 42.3 |
| OCWD | 0 | 17 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 15.0 | $ 522.5 |
| Orange | 2 | 0 | 0 | 4 | 2 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12.3 | 0.0 | $ 50.5 |
| Serrano | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.6 | 0.0 | $ 4.1 |
| SMWD | 6 | 2 | 0 | 7 | 7 | 0 | 3 | 1 | 5 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 23.6 | 5.0 | $ 189.9 |
| SOCWA | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 4.2 | $ 2.1 |
| So. Coast WD | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0.0 | $ 13.9 |
| Trabuco | 2 |  |  |  | 2 |  |  |  | 1 |  | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2.7 | 0.0 | $ 33.0 |
| Tustin | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.6 | 0.0 | $ 1.6 |
| Westminster | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5.7 | 0.0 | $ 37.2 |
| Yorba Linda WD | 1 | 0 | 0 | 2 | 9 | 0 | 1 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8.8 | 0.6 | $ 35.5 |
| JOINT | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 22.6 | 0.0 | $ 22.6 |
| MET | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 15.8 | 0.0 | $ 27.8 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | **$ 1,111** |

(1) Based on the highest cost for typical facility from among the PWUs' facility values submitted. These results are conservatively high replacement costs for some retail agencies.

(2) Tustin disagrees with the Hazus methodology assessment of Wildfire & building fire threats within the City of Tustin and surrounding unincorporated water service areas.

**Abbreviation Key**

| | | | | | |
|---|---|---|---|---|---|
| WST | Water Storage Tank | PRS | Pressure Reducing Station | LS | Wastewater Pump Station/Lift Station |
| RES | Reservoir | EIT | Emergency Interties | WWTP | Wastewater Water Treatment Plant |
| WTP | Water Treatment Plant | SC | Service Connector | WELL | Well |
| PS | Pump Station | ADM | Administration | PP | Power Plant |

**Table 4.4.2-12**
**High Fire Threat**
**Inventory of Critical Facilities and Infrastructure and Exposure Value By Jurisdiction**

| JURISDICTION | WST | RES | WTP | PS | PRS | EIT | SC | ADM | LS | WWTP | WELL | DIEMER | OC-88 PS | PRS-MET | PP | WWTP-SOCWA | WWTP-OCSD | LS-OCSD | PWL | WWL | Replacement Cost $M |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Buena Park | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | $ - |
| El Toro WD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | $ - |
| Garden Grove | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | $ - |
| La Habra | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | $ 0.2 |
| Laguna Beach CWD | 1 | 0 | 0 | 4 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.3 | 0.0 | $ 22.9 |
| MESA | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0.0 | $ 0.1 |
| MNWD | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.3 | 0.0 | $ 29.3 |
| MWDOC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | $ - |
| Newport Beach | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0.6 | $ 0.6 |
| OCSD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 1.3 | $ 0.7 |
| OCWD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.1 | $ 0.1 |
| Orange | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3.1 | 0.0 | $ 29.1 |
| Serrano | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2.7 | 0.0 | $ 33.3 |
| SMWD | 2 | 0 | 0 | 4 | 4 | 5 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5.2 | 1.5 | $ 43.0 |
| SOCWA | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 3.2 | $ 1.6 |
| So. Coast WD | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0.0 | $ 26.2 |
| Trabuco | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.9 | 0.0 | $ 7.2 |
| Tustin | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | $ - |
| Westminster | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | $ - |
| Yorba Linda WD | 7 | 0 | 0 | 4 | 3 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5.1 | 0.2 | $ 106.0 |
| JOINT | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7.6 | 0.0 | $ 7.6 |
| MET | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 9.4 | 0.0 | $ 21.4 |
| | | | | | | | | | | | | | | | | | | | | | **$ 329** |

(1) Based on the highest cost for typical facility from among the PWUs' facility values submitted. These results are conservatively high replacement costs for some retail agencies.

(2) Tustin disagrees with the Hazus methodology assessment of Wildfire & building fire threats within the City of Tustin and surrounding unincorporated water service areas.

**Abbreviation Key**

| | | | | | |
|---|---|---|---|---|---|
| WST | Water Storage Tank | PRS | Pressure Reducing Station | LS | Wastewater Pump Station/Lift Station |
| RES | Reservoir | EIT | Emergency Interties | WWTP | Wastewater Water Treatment Plant |
| WTP | Water Treatment Plant | SC | Service Connector | WELL | Well |
| PS | Pump Station | ADM | Administration | PP | Power Plant |

**Table 4.4.2-13**
**Extreme Fire Threat**
**Inventory of Critical Facilities and Infrastructure and Exposure Value By Jurisdiction**

| JURISDICTION | WST | RES | WTP | PS | PRS | EIT | SC | ADM | LS | WWTP | WELL | DIEMER | OC-88 PS | PRS-MET | PP | WWTP-SOCWA | WWTP-OCSD | LS-OCSD | PWL | WWL | Replacement Cost $M |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Buena Park | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | $ - |
| El Toro WD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | $ - |
| Garden Grove | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | $ - |
| La Habra | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | $ - |
| Laguna Beach CWD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | $ 0.0 |
| MESA | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | $ - |
| MNWD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0.0 | $ 0.2 |
| MWDOC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | $ - |
| Newport Beach | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | $ - |
| OCSD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | $ - |
| OCWD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | $ - |
| Orange | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | $ - |
| Serrano | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | $ - |
| SMWD | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0.2 | $ 13.4 |
| SOCWA | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | $ - |
| So. Coast WD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | $ - |
| Trabuco | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.3 | 0.0 | $ 14.3 |
| Tustin | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | $ - |
| Westminster | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | $ - |
| Yorba Linda WD | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | $ 13.0 |
| JOINT | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0.0 | $ 0.1 |
| MET | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0.0 | $ 0.3 |
| | | | | | | | | | | | | | | | | | | | | | **$ 41** |

(1) Based on the highest cost for typical facility from among the PWUs' facility values submitted. These results are conservatively high replacement costs for some retail agencies.

(2) Tustin disagrees with the Hazus methodology assessment of Wildfire & building fire threats within the City of Tustin and surrounding unincorporated water service areas.

**Abbreviation Key**

| | | | | | |
|---|---|---|---|---|---|
| WST | Water Storage Tank | PRS | Pressure Reducing Station | LS | Wastewater Pump Station/Lift Station |
| RES | Reservoir | EIT | Emergency Interties | WWTP | Wastewater Water Treatment Plant |
| WTP | Water Treatment Plant | SC | Service Connector | WELL | Well |
| PS | Pump Station | ADM | Administration | PP | Power Plant |

**Table 4.4.2-14**
**Moderate to Extreme Earthquake (1)**
**Inventory of Potable Water Line and Waste Water Line By Jurisdiction**

| JURISDICTION | Moderate Earthquake | | High Earthquake | | Extreme Earthquake | |
|---|---|---|---|---|---|---|
| | PWL | WWL | PWL | WWL | PWL | WWL |
| Buena Park | 139.67 | 0 | 93.47 | 0 | 0 | 0 |
| El Toro WD | 8.64 | 0 | 9.73 | 0 | 0 | 0 |
| Garden Grove | 56.96 | 272.97 | 1.27 | 34.87 | 0 | 0 |
| La Habra | 0 | 0 | 6.43 | 0 | 13.25 | 0 |
| Laguna Beach WD | 0 | 0 | 16.73 | 0 | 0 | 0 |
| MESA | 0 | 0 | 32.80 | 0 | 0 | 0 |
| MWDOC | 46.34 | 0 | 43.08 | 0 | 0 | 0 |
| MNWD | 30.63 | 0 | 60.88 | 0 | 0 | 0 |
| Newport Beach | 0 | 0 | 61.60 | 37.29 | 3.27 | 2.24 |
| OCSD | 0 | 287 | 0 | 251.88 | 0 | 9.72 |
| OCWD | 0 | 11.59 | 0 | 66.79 | 0 | 0 |
| Orange | 310.00 | 0 | 158.59 | 0 | 0 | 0 |
| SMWD | 103.69 | 12.83 | 4.07 | 0 | 0 | 0 |
| SCWD | 0.28 | 0 | 25.92 | 0 | 0 | 0 |
| Serrano | 0.28 | 0 | 25.92 | 0 | 0 | 0 |
| SOCWA | 0 | 12.14 | 0 | 25.64 | 0 | 0 |
| Trabuco | 26.66 | 0 | 0.3 | 0 | 0 | 0 |
| Tustin | 183.71 | 0 | 11.79 | 0 | 0 | 0 |
| Westminster | 45.23 | 0 | 210.64 | 0 | 0 | 0 |
| Yorba Linda WD | 0 | 0 | 18.09 | 6.01 | 53.70 | 4.71 |
| JOINT | 55.03 | 0 | 68.27 | 0 | 0 | 0 |
| MET | 46.34 | 0 | 4308 | 0 | 0 | 0 |

(1) Moderate, high and extreme earthquake events defined as having peak ground accelerations of 0.5 to 0.6g, 0.6 to 0.8g and 0.8 to 1.2g, respectively.
(2) Based on the highest cost for typical facility from among the PWUs' facility values submitted. These results are conservatively high replacement costs for some retail agencies.
(3) Pipeline is measured in miles and includes 12" and larger pipes with some exceptions.

**Abbreviation Key**

| | |
|---|---|
| PWL | Miles of Potable Water Line |
| WWL | Miles of Wastewater or Recycled Water Line |

**Table 4.4.2-15**
**Flood: 100 Year and 500 Year**
**Inventory of Potable Water Line and Waste Water Line By Jurisdiction**

| JURISDICTION | Flood – 100 Year | | Flood 500 Year | |
|---|---|---|---|---|
| | PWL | WWL | PWL | WWL |
| Buena Park | 2.94 | 0 | 198.96 | 243.17 |
| El Toro WD | 0.83 | 0 | 0.16 | 0 |
| Garden Grove | 14.07 | 64.67 | 44.16 | 0 |
| La Habra | 0.34 | 0 | 0.75 | 0 |
| Laguna Beach WD | 0.43 | 0 | 0.10 | 0 |
| MESA | 8.81 | 0 | 2.24 | 0 |
| MWDOC | 0 | 7.21 | 36.30 | 0 |
| MNWD | 3.52 | 0 | 2.17 | 0 |
| Newport Beach | 10.1 | 9.61 | 5.83 | 4.50 |
| OCSD | 0 | 10.89 | 0 | 196.15 |
| OCWD | 0 | 47.89 | 0 | 11.07 |
| Orange | 29.26 | 0 | 103.31 | 0 |
| SMWD | 5.80 | 0.55 | 0.17 | 0 |
| SCWD | 1.09 | 0 | 0.57 | 0 |
| Serrano | 1.09 | 0 | 0.57 | 0 |
| SOCWA | 0 | 8.38 | 0 | 4.96 |
| Trabuco | 1.32 | 0 | 0.23 | 0 |
| Tustin | 2.07 | 0 | 62.55 | 0 |
| Westminster | 72.66 | 0 | 182.71 | 0 |
| Yorba Linda WD | 3.54 | 0.87 | 6.52 | 0.60 |
| JOINT | 0 | 9.56 | 15.55 | 0 |
| MET | 0 | 7.21 | 36.30 | 0 |

(1) Based on the highest cost for typical facility from among the PWUs' facility values submitted. These results are conservatively high replacement costs for some retail agencies.
(2) Pipeline is measured in miles and includes 12" and larger pipes with some exceptions.

**Abbreviation Key**

PWL Miles of Potable Water Line
WWL Miles of Wastewater or Recycled Water Line

**Table 4.4.2-16**
**Landslide**
**Inventory of Potable Water Line and Waste Water Line By Jurisdiction**

| JURISDICTION | Landslide | |
|---|---|---|
| | PWL | WWL |
| Buena Park | 0.10 | 0 |
| El Toro WD | 0.94 | 0 |
| Garden Grove | 0 | 0 |
| La Habra | 0.37 | 0 |
| Laguna Beach WD | 4.55 | 0 |
| MESA | 0.15 | 0 |
| MWDOC | 11.87 | 0 |
| MNWD | 25.16 | 0 |
| Newport Beach | 2.07 | 2.79 |
| OCSD | 0 | 5.96 |
| OCWD | 0 | 0.24 |
| Orange | 30.60 | 0 |
| SMWD | 22.73 | 2.66 |
| SCWD | 3.45 | 0 |
| Serrano | 3.45 | 0 |
| SOCWA | 0 | 6.22 |
| Trabuco | 3.70 | 0 |
| Tustin | 0.25 | 0 |
| Westminster | 0.09 | 0 |
| Yorba Linda WD | 12.60 | 0.35 |
| JOINT | 11.90 | 0 |
| MET | 11.87 | 0 |

(1) Pipeline is measured in miles and includes 12" and larger pipes with some exceptions.

**Abbreviation Key**

PWL Miles of Potable Water Line
WWL Miles of Wastewater or Recycled Water Line

**Table 4.4.2-17**
**Moderate to Very High Liquefaction**
**Inventory of Potable Water Line and Waste Water Line By Jurisdiction**

| JURISDICTION | Moderate Liquefaction | | High Liquefaction | | Very High Liquefaction | |
|---|---|---|---|---|---|---|
| | PWL | WWL | PWL | WWL | PWL | WWL |
| Buena Park | 44.40 | 0 | 175.90 | 0 | 0 | 0 |
| El Toro WD | 0 | 0 | 0 | 0 | 0 | 0 |
| Garden Grove | 23.73 | 129.28 | 17.56 | 84.72 | 0 | 0 |
| La Habra | 0 | 0 | 0 | 0 | 0 | 0 |
| Laguna Beach WD | 0 | 0 | 0 | 0 | 0 | 0 |
| MESA | 0 | 0 | 8.34 | 0 | 0 | 0 |
| MWDOC | 21.32 | 0 | 10.77 | 0 | 0.37 | 0 |
| MNWD | 0 | 0 | 0 | 0 | 0 | 0 |
| Newport Beach | 0 | 0 | 6.85 | 0.11 | 0 | 0 |
| OCSD | 0 | 141.27 | 0 | 213.10 | 0 | 12.98 |
| OCWD | 0 | 4.95 | 0 | 41.46 | 0 | 1.54 |
| Orange | 216.05 | 0 | 20.77 | 0 | 0 | 0 |
| SMWD | 8.66 | 3.27 | 0 | 0 | 0 | 0 |
| SCWD | 0 | 0 | 0 | 0 | 0 | 0 |
| Serrano | 0 | 0 | 0 | 0 | 0 | 0 |
| SOCWA | 0 | 0 | 0 | 1.68 | 0 | 0 |
| Trabuco | 0 | 0 | 0 | 0 | 0 | 0 |
| Tustin | 76.48 | 0 | 61.21 | 0 | 0 | 0 |
| Westminster | 48.33 | 0 | 207.54 | 0 | 0 | 0 |
| Yorba Linda WD | 0 | 0 | 9.15 | 0.13 | 0 | 0 |
| JOINT | 18.29 | 0 | 14.81 | 0 | 1.75 | 0 |
| MET | 21.32 | 0 | 10.77 | 0 | 0.37 | 0 |

(1) Pipeline is measured in miles and includes 12" and larger pipes with some exceptions.

**Abbreviation Key**

| | |
|---|---|
| PWL | Miles of Potable Water Line |
| WWL | Miles of Wastewater or Recycled Water Line |

**Table 4.4.2-18**
**Low to Extreme Wildlife/Structure Fire**
**Inventory of Potable Water Line and Waste Water Line By Jurisdiction**
**Miles**

| JURISDICTION | Low Wildlife/Structure Fire | | High Wildlife/Structure Fire | | Extreme Wildlife/Structure Fire | |
|---|---|---|---|---|---|---|
| | PWL | WWL | PWL | WWL | PWL | WWL |
| Buena Park | 5.51 | 0 | 0 | 0 | 0 | 0 |
| El Toro WD | 0.33 | 0 | 0 | 0 | 0 | 0 |
| Garden Grove | 0.87 | 3.83 | 0 | 0 | 0 | 0 |
| La Habra | 0.31 | 0 | 0 | 0 | 0 | 0 |
| Laguna Beach WD | 0.30 | 0 | 1.31 | 0 | 0.01 | 0 |
| MESA | 2.79 | 0 | 0.08 | 0 | 0 | 0 |
| MWDOC | 15.79 | 0 | 9.42 | 0 | 0.25 | 0 |
| MNWD | 9.14 | 0 | 1.25 | 0 | 0.20 | 0 |
| Newport Beach | 3.26 | 5.88 | 0.10 | 0.57 | 0 | 0 |
| OCSD | 0 | 24.59 | 0 | 1.30 | 0 | 0 |
| OCWD | 0 | 14.98 | 0 | 0.14 | 0 | 0 |
| Orange | 12.34 | 0 | 3.07 | 0 | 0 | 0 |
| Santa Margarita | 23.64 | 5.03 | 5.20 | 1.46 | 0.32 | 0.16 |
| SCWD | 0.19 | 0 | 0.24 | 0 | 0 | 0 |
| Serrano | 0.19 | 0 | 0.24 | 0 | 0 | 0 |
| SOCWA | 0 | 4.16 | 0 | 3.17 | 0 | 0 |
| Trabuco | 2.70 | 0 | 0.93 | 0 | 1.33 | 0 |
| Tustin | 1.55 | 0 | 0 | 0 | 0 | 0 |
| Westminster | 5.70 | 0 | 0 | 0 | 0 | 0 |
| Yorba Linda WD | 8.84 | 0.59 | 5.11 | 0.23 | 0.02 | 0 |
| JOINT | 22.62 | 0 | 7.58 | 0 | 0.12 | 0 |
| MET | 15.76 | 0 | 9.42 | 0 | 0.25 | 0 |

(1) Pipeline is measured in miles and includes 12" and larger pipes with some exceptions.
(2) Tustin disagrees with the Hazus methodology assessment of Wildfire & building fire threats within the City of Tustin and surrounding unincorporated water service areas.

**Abbreviation Key**

| | |
|---|---|
| PWL | Miles of Potable Water Line |
| WWL | Miles of Wastewater or Recycled Water Line |

# SECTION 5 GENERAL OVERVIEW OF ASSETS, GOALS AND OBJECTIVES

## 5.1 PURPOSE OF THE PLAN

Planning is the cornerstone to successful hazard mitigation efforts. Citizens, local government, and private interests with proactive policies can reduce the damages and impacts to the man-made environment in harms way. Benefits realized by implementing hazard mitigation measures include:

- Saving lives by removing people from hazard prone situations
- Limiting property damage by regulating development in hazard areas
- Reducing economic impacts by minimizing outages of essential services during and after these events.
- Saving money for taxpayers by reducing the need for services during a disaster
- Speeding disaster recovery and post-disaster relief funds
- Demonstrating a strong commitment to the health and safety of the community.

Relocating people, institutions, and businesses from hazard prone areas saves property and lives. Removal or protection of the structures means that there is less to pay for disaster recovery or for services during an event. Having alternative service plans for essential services, such as water, protects structures from fire and allows residents and businesses to continue functioning or to restore normal functions quicker following a disaster. Post-event, recovery crews will have less to do because there will be less damage. Implementation of these measures speeds the overall recovery process.

### 5.1.2 Develop Mitigation Goals and Objectives

Mitigation goals are defined as general guidelines explaining what each jurisdiction wants to achieve in terms of hazard and loss prevention. Goal statements are typically long-range, policy-oriented statements representing jurisdiction-wide visions. Objectives are statements that detail how each jurisdiction's goals will be achieved, and typically define strategies or implementation steps to attain identified goals. Other important inputs to the development of jurisdiction-level goals and objectives include performing reviews of existing local plans, policy documents, and regulations for consistency and complementary goals, as well as soliciting input from the public.

Each jurisdiction reviewed the Risk Assessment presented in Section 4 and utilized the information as a guideline for developing mitigation goals and objectives. Other information was considered, especially local knowledge of the risks and mitigation options. Jurisdictional leads then met with their individual LRP to identify appropriate jurisdiction-level goals, objectives, and mitigation action items. Section 5 of the Plan incorporates each of the twenty (20) PWUs: 1) mitigation goals and objectives, 2) mitigation actions (listed in priority order), 3) an implementation plan, and 4) documentation of the mitigation planning process. Each of these steps is described below.

### 5.1.3 Identify and Prioritize Mitigation Actions

Mitigation actions that address the goals and objectives developed in the previous step were identified, evaluated, and prioritized. These actions form the core of the mitigation plan. Jurisdictions conducted a capabilities assessment, reviewing existing local plans, policies and regulations for any other capabilities relevant to hazard mitigation planning. An analysis of their capability to carry out these implementation measures with an eye toward hazard and loss prevention was conducted. The capabilities assessment required an inventory of each jurisdiction's legal, administrative, fiscal and technical capacities to support hazard mitigation planning. After completion of the capabilities assessment, each jurisdiction evaluated and prioritized their proposed mitigations. Each jurisdiction considered the social, technical, administrative, political, legal, economic, and environmental (STAPLEE) opportunities and constraints of implementing a particular mitigation action:

Social Criteria – This includes community consensus and acceptability of implementation of the plan without disenfranchisement of a particular segment of the community. During the process for adoption of the plan, community meetings were held, notices were published and posted on websites and the final approval from each jurisdiction took place in a public setting. Based on these meetings the local support for hazard mitigation projects was very high.

Technical criteria – This addresses the feasibility of projects and actions and the technical capacity of each PWU for implementation of projects. This criterion is evaluated for each PWU in Section Five in a specific table that considers the Administrative and Technical Capability.

Administrative criteria – The Administrative capacity for implementing projects is evaluated for each PWU in Section Five in a specific table that considers the Administrative and Technical Capability.

Political criteria – This refers to having political support from stakeholders for moving forward with projects. The political support needed for implementation of projects is typically generated by the staff and governing body of the entity involved in working with stakeholders. During preparation of the Plan political support was evident at several key junctures: during three community meetings, in presentation of the concept to multiple county wide emergency groups, and during the approval of the plan by each governing board of the PWU.

Legal criteria – This covers whether or not the local entity has the legal authority to implement identified goals and actions. This was specifically covered in Section Five for each entity in a specific table that considers the Legal and Regulatory Capability.

Economic criteria – Economic criteria should take into consideration the cost-effectiveness of an action and the benefits derived from the project. This is a primary motivation for implementing mitigation projects at water and wastewater utilities. Past disasters have shown the cost-benefit of mitigating water utilities against identifiable hazards. For example the recent cold weather system that has

impacted a majority of the United States, has resulted in pipeline breaks across the State of California. Those ruptures primarily occurred on a specific type of pipeline that has been gradually phased out of use in California. The replacement of this type of pipeline prior to the cold front could have not only prevented the cost of pipeline breaks, but also costs related to flooding, landslides, loss of water supply, other secondary affects of the broken pipelines.

MWDOC conducted a study in 2004 that identified business loss estimates based on water system outages of different lengths of time (Section 4.4.2.3 summarizes the data, with the full study attached as Appendix A). An example of information found in the study shows that a 10-day 80% reduction in water to South Orange County would result in a financial impact of $293 million dollars to both businesses and residents alike. Longer outages during many disaster situations are probable and would be proportionally more devastating. Each affected agency would share in the economic impacts based on its mix of business and residential customers.

In addition to the consideration of the secondary costs of response, business loss impacts, and recovery due to loss of water service, the PWU also considered the Loss Estimation Tables presented in Section 4 of Plan. The final prioritization that was completed by each agency depended on these underlying economic premises combined with identification of facilities critical to continued operations of the system. Much of this effort was completed with informal cost-benefit analysis based on the knowledge and expertise of the participants (many of them certified operators, water quality experts, or engineers), previous planning documents, and the concepts identified above.

Environmental criteria – Most of the projects included in the plan have only short-term environmental impacts that would occur during the construction phase and can mostly be mitigated to some degree. A more important aspect is that the environment will benefit from having a working water and wastewater system (especially in preventing potential spills or untreated wastewater discharges). The capacity for each entity to deal with the regulatory aspects of implementing the projects was reviewed for each agency in Section Five. This ensures that full regulatory compliance for each project being implemented can be attained.

This STAPLEE review of hazards and potential mitigation actions resulted in the current list of acceptable and realistic actions that address the hazards identified as affecting each jurisdiction (table below with hazards that do not pose a threat indicated by an “N”). In consideration of the fact that water and wastewater services fulfill a basic human need that must be continued to protect public health and safety, the goals and objectives of each PWU were determined to be of equal priority. Actions identified within each Goal and Objective was then listed in priority order (highest priority first within each objective). Goals are numbered for reference, Objectives are identified by letter, and then actions are numbered for both reference and priority. Following each set of PWU goals, objectives and actions, there is a table cross-referencing that utility’s goals with the identified hazards.

**Hazards Within Orange County**
**Orange County Regional Water & Wastewater HMP**

| District Agency / Hazard | Flood/Storm | Wildland/Urban Fire | Earthquake | Dam Failure/Water Tank Failure | Landslide / Mudslide | Tornado | Tsunami | Extreme Heat/ Drought | Expansive Soils/Land Subsidence / Liquefaction | Man-Made Hazards | Hazardous Material Release | Power Failure |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Buena Park | | N | | | | N | N | | N | | | |
| El Toro WD | | | | | | N | N | | | | | |
| Garden Grove | | | | | N | N | N | | | | | |
| La Habra | | | | | | N | N | | | | | |
| LBCWD | | | | | | | | | | | | |
| Mesa | | | | | N | | | N | N | | | |
| Moulton Niguel | | | | | | | | | | | | |
| MWDOC | | | | | | N | N | | | | | |
| Newport Beach | | | | | | | | | | | | |
| OCSD | | N | | | N | | | N | | | | |
| OCWD | | | | | N | N | | N | | | N | |
| Orange | | | | | | | N | | | | | |
| Santa Margarita | | | | | | N | N | | | | | |
| Serrano WD | | | | | | | N | | | | | |
| SOCWA | | | | | | | | N | | | | |
| South Coast WD | | | | | | | | | | | | |
| Trabuco Canyon | | | | | | N | N | | | | | |
| Tustin | | | | | | N | N | | | | | |
| Westminster | | | | N | N | N | | | | | | |
| Yorba Linda | | | | | | N | N | | | | | |
| Regional | | | | | | | | | | | | |

### 5.1.4 Prepare an Implementation Plan

Each jurisdiction will prepare a strategy for implementing the mitigation actions identified in the previous step in the coming year. The implementation strategies will identify who is responsible for each action, what kind of funding mechanisms and other resources are available or will be pursued, and when the strategies will be completed. Each agency will utilize current approved planning documents that identify specific implementation strategies for capital improvement, risk reduction, system upgrades, and operations, which include details regarding who is responsible for project management, estimated costs, possible funding sources, and timelines for implementation. These plans complement the Plan and include but are not limited to:

A. Strategic Plans

B. Capital Improvement Plans

C. General Plans

D. EPA Vulnerability Assessments and ERP

E. Asset Management Plan

Each jurisdiction determined that the Risk Assessment identified all of the significant hazards that exist for the overall regional planning area. Although certain hazards (e.g. coastal hazards) affect limited jurisdictions, no new or previously unidentified hazards were identified by any of the jurisdictions for inclusion in the jurisdictional-specific elements of this Plan.

## 5.2 REGIONAL CONSIDERATIONS

This section of the Plan incorporates the goals, objectives, and actions developed by the HMWG for each jurisdiction as well as the regional planning area as a whole. The Plan includes specific goals, objectives, and mitigation action items that each of the participating jurisdictions developed to help minimize the effects of the specified hazards that potentially affect their jurisdiction. In addition, regional goals, objectives, and actions were identified for the HMWG for both water and wastewater.

It is envisioned that the mitigation actions for the most part will be implemented on a jurisdiction-by-jurisdiction basis. MWDOC will provide facilitation, as appropriate, of this process to help reduce duplication of efforts between jurisdictions and to spearhead coordination of initiatives and action items that could be accomplished more efficiently on a regional level. In its role as a regional planning agency, MWDOC will act as lead on water related hazard mitigation projects that are regional in nature, such as projects including projects that cross several jurisdictional boundaries and work planned on behalf of MET. OCSD and SOCWA will take the lead on wastewater related hazard mitigation projects that are regional in nature and within their individual service areas.

The Risk Assessment (Section 4) indicates that each participating jurisdiction is susceptible to a variety of potentially serious hazards in the region. The approach to emergency planning in California has been comprehensive in its planning for and preparedness to respond to all hazards utilizing the Standardized

Emergency Management System (SEMS) and a coordinated Incident Command System. A program managed by MWDOC, the Water Emergency Response Organization of Orange County (WEROC), acts as coordination point (Area Command) to support an effective emergency response to major disasters by the thirty four Orange County water and wastewater utilities. WEROC provides services that promote planning and preparedness activities for both the utilities, as well as its own Emergency Operations Center (EOC) staff. WEROC also helps maintain two turn-key EOCs. WEROC receives guidance from a steering committee, which includes representatives from Orange County water utilities, MET, the County of Orange and the California Department of Health Service's Office of Drinking Water. WEROC and its steering committee help ensure water and wastewater utilities remain current with state and national emergency response procedures and plans for potential disasters.

The Disaster Mitigation Act of 2000 requires that in addition to having emergency response and emergency preparedness documents, regions should develop and maintain a document outlining measures that can be implemented before a hazard event occurs that would help minimize the damage to life and property. MWDOC has accepted the role of coordinating the development the Plan as a multi-jurisdictional plan.

All hazard mitigation planning efforts within the region are the responsibility of the jurisdictions. The capabilities of the jurisdictions to perform hazard mitigation planning are detailed in the annex for each jurisdiction, starting with Buena Park in Section 5.6.

### 5.2.1 Regional Fiscal Resources

One of MWDOC's primary roles in coordinating the development of the Plan is to identify and obtain grant funding for preparing and implementing the Plan. This is consistent with WEROC's role, as a program managed by MWDOC, for hazard mitigation and preparedness. MWDOC applied for and received a grant from FEMA for the development and implementation of the Multi-Jurisdictional HMP. WEROC will continue to provide guidance to the PWU with hazard mitigation project grant applications and their implementation. Additional fiscal capabilities of the jurisdictions to implement a hazard mitigation project are detailed in their individual write-ups.

### 5.2.2 Joint Facilities and MET Loss Calculations

The following Tables 5.2.3-1 and 5.2.3-2 present the Joint Facilities and MET loss calculations determined via the GIS loss analysis. These are defined as follows:

- Joint Facilities are defined as those regional facilities owned by one or more local agencies, including situations in which there is partial ownership by MET. These facilities are generally pipelines that were constructed under a Joint Powers Authority with investments made by several agencies. This also includes the East Orange County Feeder No. 2 and the South County Pipeline, which include both local ownership and ownership by MET. The El Toro R-6 Reservoir is considered a Joint Facility since it serves ETWD, SMWD and MNWD.

- MET Facilities are defined as those facilities owned 100% by MET, which treat water in Orange County or convey water in Orange County. The facilities include the Diemer Treatment Plant,

the Lower Feeder, Allen McColloch Pipeline, the Orange County Reservoir, MET power plants and the South County Pump Station.

The Regional Loss calculations do not include the residential, business or landscape costs of short term emergency or longer term drought shortages as outlined by MWDOC in Section 4. Therefore, the values noted may be understated. We have left the detailed calculation and application of these additional loss values up to each agency to work out to determine their priority needs and mitigation actions.

## 5.3 Regional Goals and Objectives for Hazard Mitigation Planning for Water

The regional goals and objectives for hazard mitigation planning for water in Orange County can be broken into the following areas:

1. **Evaluation of Existing Water System Vulnerability**
2. **Emergency Operations and Response Planning**
3. **Build New Storage, Regional Interconnections, and Local Resources to better respond to emergency situations**
4. **Monitor and Maintain Water Quality**
5. **Monitor and Maintain Water System Security**

Each of these is outlined in more detail below.

**GOAL 1: Evaluation of Existing Water System Vulnerability** – Involves evaluations to determine the areas of risk to the continuation of delivery of water in the event of a disaster situation, evaluation of methods to facilitate recovery or to provide alternate delivery systems during and following a disaster. (All Hazard)

Objective A: Work with those responsible for importing our water into the region to evaluate the reliability and recovery time of the systems.

1. MET – Colorado River Water
2. DWR – Levee and State Water Project reliability
3. MET – Regional System Reliability within Orange County

Objective B: Evaluate the reliability and flexibility of the regional and local water delivery systems within Orange County.

1. Work with MET on reliability improvements to the Diemer Filtration Plant
2. Work with MET on assuring timely response efforts for pipeline outages

Objective C: Identify vulnerable locations for pipeline outages and develop systems to protect those areas, if feasible, or develop systems to allow delivery of water to customers via alternative systems.

**GOAL 2: Emergency Operations and Response Planning** – Involves planning exercises and keeping the Emergency Operations systems in a state of readiness to proceed in the event of a disaster. (All Hazard)

Objective A: Maintain and exercise the emergency preparedness plan

1. Update plans
2. Maintain EOC Staffing
    a. Staff training
    b. Cross training
3. Conduct test exercises
    a. WEROC only
    b. Involve other agencies
4. Improve the efficiency within the Emergency Operations Centers

Objective B: Improve the emergency response system

1. Identify staging areas
2. Coordinate Red Cross Response for bottled water

Objective C: Improve on the coordination and operational flexibility to reroute water supplies.

1. Improve knowledge, understanding and ability to move water through emergency interconnections.

Objective D: Keep current on earthquake and other hazards.

1. Identify hazard areas
2. Update plan as new information becomes available
3. Plug back into goal #1 above.

**GOAL 3: Build New Storage, Regional Interconnections, and Local Resources** –Involves construction or implementation of systems to improve emergency response or alternative systems of delivery.

Objective A: Support MET proceeding with reliability improvements to the Diemer Filtration Plant

Objective B: Support MET on assuring response efforts for pipeline failures

Objective C: Improve the ability to transfer water from the OCWD service area to areas of need

1. Phase 1 Emergency Service Program
2. Phase 2 Regional Well field and Pump into the EOCF#2

Objective D: Develop the ability to control irrigation on a regional basis to help reduce emergency water needs

1. Develop protocol for Smart Irrigation Controllers within the Public Domain

Objective E: Develop additional local resources to improve system reliability

Objective F: Build new regional storage to help serve emergency needs and system reliability.

Objective G: Build new regional interconnections to serve emergency needs

1. Connect MET's Second Lower Feeder to the East Orange County Feeder No. 2
2. Connect the IRWD system to the Joint Regional Transmission Main
3. Connect the IRWD system to the Allen McColloch Pipeline and the South County Pump Station

Objective H: Strengthen portions of the systems deemed to be vulnerable

Objective I: Develop systems to delivery water when other critical systems suffer outages

**GOAL 4: Monitor and Maintain Water Quality** – Involves monitoring of water quality constituents to ensure safe drinking water supplies. (TS, CO, DF, DH, EQ, LQ, ES, FS, LM, LS, HC)

Objective A: Monitor quality and develop an alert system to man-induced water contamination

Objective B: Monitor and protect against groundwater contamination

Objective C: Provide clean-up response when necessary

**GOAL 5: Monitor and Maintain Water System Security** – Involves the use of deterrent or early warning systems to ensure the integrity of the water systems. (CO, DF, HC)

Objective A: Deter access to key facilities

1. Fencing
2. Cameras

Objective B: Look into early warning system for water quality alerts to contaminants that might have been intentionally introduced into the system.

Objective C: Maintain GIS mapping system of assets and hazards and delivery systems.

**Regional Water - Goals, Objectives and Actions**
**Cross-referenced with identified Hazards Within Orange County**

| Goal, Objective, and Action | Flood/Storm | Wildland/Urban Fire | Earthquake | Dam Failure/Water Tank Failure | Landslide / Mudslide | Tornado / High Winds | Tsunami | Extreme Heat/ Drought | Expansive Soils/Land Subsidence / Liquefaction | Man-Made Hazards/ Contamination |
|---|---|---|---|---|---|---|---|---|---|---|
| G1/A/1 | | | X | X | X | | | X | X | X |
| G1/A/2 | X | | X | X | X | X | | X | X | X |
| G1/A/3 | X | X | X | X | X | X | | X | X | X |
| G1/B/1 | | X | X | X | X | X | | | X | X |
| G1/B/2 | X | | X | | X | | | | X | |
| G1/C | X | | X | | X | | | | X | |
| G2/A/1 | X | X | X | X | X | X | | X | X | X |
| G2/A/2 | X | X | X | X | X | X | | X | X | X |
| G2/A/3 | X | X | X | X | X | X | | X | X | X |
| G2/A/4 | X | X | X | X | X | X | | X | X | X |
| G2/B/1 | X | X | X | X | X | X | | X | X | X |
| G2/B/2 | X | X | X | X | X | X | X | X | X | X |
| G2/C/1 | X | X | X | X | X | X | X | X | X | X |
| G2/D/1 | X | X | X | X | X | X | X | X | X | X |
| G2/D/2 | X | X | X | X | X | X | X | X | X | X |
| G2/D/3 | X | X | X | X | X | X | X | X | X | X |
| G3/A | | | X | | | | | | | X |
| G3/B | X | | X | | X | | | | X | |
| G3/C/1 | | | X | | | | | | | X |
| G3/C/2 | | | X | | | | | | | X |
| G3/D/1 | X | | X | X | X | | | X | X | |
| G3/E | X | | X | X | X | | | X | X | |
| G3/F | X | | X | X | X | | | X | X | |
| G3/G/1 | X | | X | X | X | | | X | X | |
| G3/G/2 | X | | X | X | X | | | X | X | |
| G3/G/3 | X | | X | X | X | | | X | X | |
| G3/H | X | | X | X | X | | | X | X | |
| G3/I | X | | X | X | X | | | X | X | |
| G4/A | X | | X | X | X | | X | | | X |
| G4/B | X | | X | X | X | | X | | | X |
| G4/C | X | | X | X | X | | X | | | X |
| G5/A/1 | | | | | | | | | | X |
| G5/A/2 | | | | | | | | | | X |
| G5/B | | | | | | | | | | X |
| G5/C | | | | | | | | | | X |

## 5.4 Regional Goals and Objectives for Hazard Mitigation Planning for Wastewater

Orange County Sanitation District and the South Orange County Wastewater Authority are the regional wastewater entities for north and south Orange County, respectively. OCSD and SOCWA have the regional facilities, the responsibility and the resources to assist its members with respect to hazard mitigation and response to emergency situations. Following are five major goals for hazard mitigation planning purposes by the regional wastewater entities. The five goals are followed up with detailed objectives and actions:

**1. Minimize damages to facilities/infrastructure due to natural disasters**

**2. Minimize disruption of service due to hazard-induced outages**

**3. Eliminate or minimize wastewater spills and potential contamination of potable supplies**

**4. Reduce potential loss and injury to human life and to existing assets, facilities, and infrastructure due to human-caused hazards**

**5. Promote public understanding, support and demand for hazard mitigation.**

The objectives and actions under each of the five goals are listed below:

**GOAL 1: Minimize damages to facilities/infrastructure due to natural disasters**

Objective A: Protect existing assets with the highest vulnerability and greatest service value to the effects of natural disasters.

1. Implement Vulnerability Risk Assessment recommendations.
2. Keep Emergency Operations Plan up-to-date
3. Secure above-ground assets in all buildings, water reclamation plants, lift stations, pipelines and bridge crossings.
4. Protect assets from a major earthquake event.
5. Perform a seismic study analysis for all structures and facilities.
6. Update standard specifications to comply with latest UBC seismic design codes for structures and pipelines.
7. Conduct routine site inspections of structures and facilities and follow-up on any reported structural deficiencies or mitigation measures.

Objective B: Reduce the High Fire Threat to facilities/infrastructure.

1. Develop a comprehensive approach to reducing the possibility of damage and losses due to structural fire/wildfire.

2. Create a fire management plan outlining various impacted facilities and vulnerabilities.
3. Share all infrastructures/building information with local, county, and state fire agencies.
4. Adopt a policy for design of non-combustible facilities to reduce the threat and impact of structure fires.
5. Provide redundant underground communication systems for critical facilities to insure reliability of operating systems.
6. Provide routine maintenance around facilities to avoid the chance of fire threat and reducing the fuel source.

Objective C: Evaluate impacts to facilities from earthquake, tsunami, winter storm and Prado Dam failure (OCSD only for Prado Dam)

**GOAL 2: Minimize disruption of service due to hazard-induced outages**

Objective A: Provide backup system for critical facilities

1. Build redundancy into the wastewater collection, treatment, disposal and non-potable distribution system to mitigate major structural defects.
2. Follow the Asset Management Plan for replacement and refurbishment of facilities
3. Protect and reinforce facilities within flood plain areas, rivers and creeks or relocate facilities out of harms way.
4. Install jointless pipelines in all creek crossings and slope easements.

Objective B: Take the appropriate steps to respond to any emergency that could affect OCSD operations and the community.

1. Keep Integrated Emergency Response Plan up-to-date
2. Update system maps to reflect current conditions
3. Maintain stand-by crews, equipment and resources needed for emergency repair
4. Develop procedures with the OCFA and local Hazmat Teams for hazardous waste clean up and disposal operations.
5. Develop procedures for mobilizing District personnel and pre-positioning resources and equipment.
6. Identify the process and develop procedures for checking critical wastewater facilities and equipment, including testing systems.
7. Identify locations and install sensors/alarms for harmful contaminants entering the treatment system.

**GOAL 3: Eliminate or minimize wastewater spills and potential contamination to potable supplies**

Objective A: Protect potable water from contamination

1. Strictly enforce standard separation between water and wastewater infrastructure
2. Improve security at key facilities and install surveillance equipment
3. Maintain operations daily/weekly site visit monitoring program to each facility
4. Upgrade SCADA system to existing sites as needed
5. Protect facilities within flood plain areas
6. Standardize and upgrade older lift station electrical and instrumentation systems
7. Install permanent emergency power at all critical infrastructure sites.

**GOAL 4: Reduce potential loss and injury to human life and to existing assets, facilities, and infrastructure due to human-caused hazards**

Objective A: Develop a comprehensive approach to reduce damage and loss due to human caused hazards

1. Continue and expand cooperation with all outside agencies regarding human caused hazards.
2. Continue and expand education for administrative and field personnel on possible human caused hazards.
3. Survey and improve site fencing and other forms of hardening deterrence to facilities including the use of camera and wireless communications
4. Continue daily site checks at critical locations
5. Improve response time to alarm and emergency events
6. Modify SCADA system, when feasible, to look for additional parameters of operation that may indicate problem areas

Objective B: Increase the knowledge of employees and the public of extremely hazardous substance handling procedures and terrorism awareness.

1. Continue and expand safety training for all district personnel who may come in contact with said materials
2. Conduct additional workshops for awareness of hazardous materials incidents for all employees
3. Examine opportunities for on-line water quality sensing relative to potential human induced contamination, and implement if feasible

4. Public education on disposal of hazardous materials.

**GOAL 5: Promote public and corporate understanding, support and demand for hazard mitigation.**

1. Educate the public regarding natural and man-made hazards and opportunities for mitigation actions to protect local residents and businesses.
2. Prepare an emergency response preparedness brochure for the local community identifying all types of natural hazards.
3. Promote a partnership between the local, county, state governments to identify, prioritize, and implement mitigation actions.
4. Promote emergency response planning, business continuity planning and hazard mitigation in the business community.
5. Make the media aware of mitigation activities and request their support in helping to educate the general public.
6. Develop full cooperation with all outside agencies regarding human caused hazards.

## 5.5 Implementation Through Existing Programs

MWDOC, OCSD and SOCWA, along with each PWU will update their respective General Plans and Emergency Response Plans with changes that affect both the specific jurisdictions as well as changes that affect the overall, multi-jurisdictional planning area.

**Regional Wastewater - Goals, Objectives and Actions**
**Cross-referenced with identified Hazards Within Orange County**

| Goal, Objective, and Action | Flood/Storm | Wildland/Urban Fire | Earthquake | Dam Failure/Water Tank Failure | Landslide / Mudslide | Tornado / High Winds | Tsunami | Extreme Heat/ Drought | Expansive Soils/Land Subsidence / Liquefaction | Man-Made Hazards/ Contamination |
|---|---|---|---|---|---|---|---|---|---|---|
| G1/A/1 | | | | | | | | | | X |
| G1/A/2 | X | X | X | X | X | X | X | | X | X |
| G1/A/3 | | | | | | | | | | X |
| G1/A/4 | | | X | | | | X | | X | |
| G1/A/5 | | | X | | | | | | | |
| G1/A/6 | | | X | | | | | | | |
| G1/A/7 | | | X | | | | | | | |
| G1/B/1 | | X | | | | | | | | |
| G1/B/2 | | X | | | | | | | | |
| G1/B/3 | | X | | | | | | | | |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| G1/B/4 | | X | | | | | | | | |
| G1/B/5 | | X | | | | X | X | | | X |
| G1/B/6 | | X | | | | | | | | |
| G1/C | X | | X | X | | | X | | | |
| G2/A/1 | X | | X | | | | X | | | X |
| G2/A/2 | X | X | X | X | X | X | X | | X | X |
| G2/A/3 | X | | | | | | X | | | |
| G2/A/4 | X | | | | X | | | | X | |
| G2/B/1 | X | X | X | X | X | X | X | | X | X |
| G2/B/2 | X | X | X | X | X | X | X | | X | X |
| G2/B/3 | X | X | X | X | X | X | X | | X | X |
| G2/B/4 | | | | | | | | | | X |
| G2/B/5 | X | X | X | X | X | X | X | | X | X |
| G2/B/6 | X | X | X | X | X | X | X | | X | X |
| G2/B/7 | | | | | | | | | | X |
| G3/A/1 | | | | | | | | | | X |
| G3/A/2 | | | | | | | | | | X |
| G3/A/3 | | | | | | | | | | X |
| G3/A/4 | | | | | | | | | | X |
| G3/A/5 | | | | | | | | | | X |
| G3/A/6 | | | | | | | | | | X |
| G3/A/7 | X | X | X | X | X | X | X | | X | X |
| G4/A/1 | | | | | | | | | | X |
| G4/A/2 | | | | | | | | | | X |
| G4/A/3 | | | | | | | | | | X |
| G4/A/4 | | | | | | | | | | X |
| G4/A/5 | | | | | | | | | | X |
| G4/A/6 | | | | | | | | | | X |
| G4/B/1 | | | | | | | | | | X |
| G4/B/2 | | | | | | | | | | X |
| G4/B/3 | | | | | | | | | | X |
| G4/B/4 | | | | | | | | | | X |
| G5/1 | X | X | X | X | X | X | X | | X | X |
| G5/2 | X | X | X | X | X | X | X | | X | X |
| G5/3 | X | X | X | X | X | X | X | | X | X |
| G5/4 | X | X | X | X | X | X | X | | X | X |
| G5/5 | X | X | X | X | X | X | X | | X | X |
| G5/6 | | | | | | | | | | X |

**Table 5.2.3-1 Joint Regional Facilities Lost Estimation Table for Water**

| Hazard Type | Item-> | WST | RES | WTP | PS | PRS | EIT | SC | ADM | LS | WWTP | WELL | DIEMER | OC-88 PS | PRS-MET | PP | WWTP-SOCWA | WWTP-OCSD | LS-OCSD | PWL | WWL | Total Loss Value [1] $M |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Replacement Cost | $M -> | 13.0 | 30.0 | 10.0 | 2.0 | 0.2 | 0.3 | 0.6 | 3.0 | 0.4 | 5.0 | 3.5 | 250.0 | 35.0 | 12.0 | 12.0 | 30.0 | 250.0 | 10.0 | 1.0 | 0.5 | |
| Earthquake | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 55.0 | 0.0 | |
| Moderate | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 55.0 | $ - | $ 55.0 |
| | Number | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 68.3 | 0.0 | |
| High | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ 1.2 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 68.3 | $ - | $ 69.5 |
| | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | |
| Extreme | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| Flood | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 9.6 | |
| 100 yr | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 4.8 | $ 4.8 |
| | Number | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 15.6 | 0.0 | |
| 500 yr | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ 1.2 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 15.6 | $ - | $ 16.8 |
| Landslide | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 11.9 | 0.0 | |
| | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 11.9 | $ - | $ 11.9 |
| Liquifaction | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 18.3 | 0.0 | |
| Moderate | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 18.3 | $ - | $ 18.3 |
| | Number | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 14.8 | 0.0 | |
| High | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ 1.2 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 14.8 | $ - | $ 16.0 |
| Very High | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.8 | 0.0 | |
| | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 1.8 | $ - | $ 1.8 |
| Wildlife/Structure Fire | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 22.6 | 0.0 | |
| Low | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 22.6 | $ - | $ 22.6 |
| | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7.6 | 0.0 | |
| High | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 7.6 | $ - | $ 7.6 |
| | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0.0 | |
| Extreme | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 0.1 | $ - | $ 0.1 |
| | | | | | | | | | | | | | | | | | | | | | Grand Total | **$ 224.3** |

**[1] Loss value is asset replacement value in 2006 dollars. Value shown is found as count of assets at risk from the particular hazard times high-end unit asset value.**
**[2] Grand Total Loss value shown may include the same assets counted multiple times for different hazards.**

Table 5.2.3-2 MET Loss Estimation Table for Orange County Facilities

| Hazard Type | Item-> | WST | RES | WTP | PS | PRS | EIT | SC | ADM | LS | WWTP | WELL | DIEMER | OC-88 PS | PRS-MET | PP | WWTP-SOCWA | WWTP-OCSD | LS-OCSD | PWL | WWL | Total Loss Value [1] $M |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Replacement Cost | $M -> | 13.0 | 30.0 | 10.0 | 2.0 | 0.2 | 0.3 | 0.6 | 3.0 | 0.4 | 5.0 | 3.5 | 250.0 | 35.0 | 12.0 | 12.0 | 30.0 | 250.0 | 10.0 | 1.0 | 0.5 | |
| Earthquake | Number | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 46.3 | 0.0 | |
| Moderate | Exposure ($M) | $ - | $ - | $ - | $ 2.0 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 35.0 | $ - | $ - | $ - | $ - | $ - | $ 46.3 | $ - | $ 83.3 |
| | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 43.1 | 0.0 | |
| High | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 43.1 | $ - | $ 43.1 |
| | Number | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 3 | 0 | 0 | 0 | 0.0 | 0.0 | |
| Extreme | Exposure ($M) | $ - | $ 30.0 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 250.0 | $ - | $ - | $ 36.0 | $ - | $ - | $ - | $ - | $ - | $ 316.0 |
| Flood | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 7.2 | |
| 100 yr | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 3.6 | $ 3.6 |
| | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 36.3 | 0.0 | |
| 500 yr | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 36.3 | $ - | $ 36.3 |
| Landslide | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 11.9 | 0.0 | |
| | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 24.0 | $ - | $ - | $ - | $ 11.9 | $ - | $ 35.9 |
| Liquifaction | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 21.3 | 0.0 | |
| Moderate | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 21.3 | $ - | $ 21.3 |
| | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10.8 | 0.0 | |
| High | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 10.8 | $ - | $ 10.8 |
| Very High | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 0.0 | |
| | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 0.4 | $ - | $ 0.4 |
| Wildlife/Structure Fire | Number | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 15.8 | 0.0 | |
| Low | Exposure ($M) | $ - | $ - | $ 10.0 | $ 2.0 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 15.8 | $ - | $ 27.8 |
| | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 9.4 | 0.0 | |
| High | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 12.0 | $ - | $ - | $ - | $ 9.4 | $ - | $ 21.4 |
| | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0.0 | |
| Extreme | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 0.3 | $ - | $ 0.3 |
| | | | | | | | | | | | | | | | | | | | | | Grand Total | **$ 600.1** |

**[1] Loss value is asset replacement value in 2006 dollars. Value shown is found as count of assets at risk from the particular hazard times high-end unit asset value.**
**[2] Grand Total Loss value shown may include the same assets counted multiple times for different hazards.**

## 5.6 BUENA PARK – OBJECTIVES, GOALS AND ACTIONS

The City of Buena Park (Buena Park) reviewed a set of jurisdictional-level hazard maps including detailed critical facility information and localized potential hazard exposure/loss estimates to help identify the top hazards threatening their jurisdiction. See Section 4 for additional details.

Buena Park Loss Assessment Table is located at the end of this section.

### 5.6.1 Capability Assessment

The LPG identified current capabilities available for implementing hazard mitigation activities. The Capability Assessment (Assessment) portion of the jurisdictional mitigation plan identifies administrative, technical, legal and fiscal capabilities. This includes a summary of departments and their responsibilities associated to hazard mitigation planning as well as codes, ordinances, and plans already in place associated to hazard mitigation planning. The second part of the Assessment provides Buena Park's fiscal capabilities that may be applicable to providing financial resources to implement identified mitigation action items.

### 5.6.2 Existing Institutions, Plans, Policies and Ordinances

The legal and regulatory capabilities of Buena Park are shown in Table 5.6.2-1, which presents the existing ordinances and codes that affect the physical or built environment of Buena Park. Examples of legal and/or regulatory capabilities can include: the City's building codes, zoning ordinances, subdivision ordinances, special purpose ordinances, growth management ordinances, site plan review, general plans, capital improvement plans, economic development plans, emergency response plans, and real estate disclosure plans.

**Table 5.6.2-1**
**Legal and Regulatory Capability**

| Regulatory Tools (ordinances, codes, plans) | Local Authority (Yes/No) | State Authority (Yes/No) | Other Level Jurisdiction Authority (Yes/No) | Comments |
|---|---|---|---|---|
| A. Building code | Yes | Yes | Yes | Buena Park (Building Dept)<br>OCFA (Fire)<br>AQMD (Air Quality) |
| B. Zoning ordinance | Yes | No | No | Buena Park (Planning) |
| C. Subdivision ordinance or regulations | Yes | No | No | Buena Park (Building) |

**Table 5.6.2-1 (continued)**
**Legal and Regulatory Capability**

| Regulatory Tools (ordinances, codes, plans) | Local Authority (Yes/No) | State Authority (Yes/No) | Other Level Jurisdiction Authority (Yes/No) | Comments |
|---|---|---|---|---|
| D. Special purpose ordinances (floodplain management, storm water management, hillside or steep slope ordinances, wildfire ordinances, hazard setback requirements) | Yes | Yes | Yes | County Of Orange<br>Regional Water (RWQCB) Control board |
| E. Growth management ordinances (also called "smart growth" or anti-sprawl programs) | Yes | Yes | No | Buena Park (Management Plan)<br>County of Orange<br>LAFCO |
| F. Site plan review requirements | Yes | Yes | Yes | Buena Park (Engineering / Planning)<br>OCFA (Fire)<br>Buena Park (Permits) |
| G. General or comprehensive plan | Yes | No | No | Buena Park (Master Plan) |
| H. A capital improvements plan | Yes | No | No | Buena Park (CIP Plan) |
| I. An economic development plan | Yes | No | No | Buena Park (Master Plan) |
| J. An emergency response plan | Yes | Yes | Yes | SEMS<br>NIMS<br>WEROC<br>Buena Park (EOC) |
| K, A post-disaster recovery plan | Yes | Yes | Yes | NIMS |
| L. A post-disaster recovery ordinance | Yes | Yes | Yes | Buena Park<br>County of Orange<br>State of California |
| M. Real estate disclosure requirements | No | Yes | No | State Real Estate Board |
| N. CA DHS (Security Issues) | Yes | Yes | Yes | Vulnerability Assessment |
| O. Title 22 Potable Water<br>Air Quality / AQMD<br>EPA / VA & ERP | Yes<br>Yes<br>Yes | Yes<br>Yes<br>Yes | Yes<br>Yes<br>Yes | State Health Services<br>Emergency Generators<br>Reporting |

## 5.6.3 Administrative and Technical Capacity

The following is a summary of existing departments in Buena Park and their responsibilities related to hazard mitigation planning and implementation, as well as existing planning documents and regulations related to mitigation efforts within the community. The administrative and technical capabilities of Buena Park, as shown in Table 5.6.3-1, provides an identification of the staff, personnel, and department

resources available to implement the actions identified in the mitigation section of the Plan. Specific resources reviewed include those involving technical personnel such as planners/engineers with knowledge of land development and land management practices, engineers trained in construction practices related to building and infrastructure, planners and engineers with an understanding of natural or manmade hazards, floodplain managers, surveyors, personnel with GIS skills and scientists familiar with hazards in the community.

**Table 5.6.3-1**
**Administrative and Technical Capacity**

| Staff/Personnel Resources | Yes/No | Department/Agency and Position |
|---|---|---|
| A. Planner(s) or engineer(s) with knowledge of land development and land management practices | Yes | Buena Park / Planners & Engineers<br>City Hires (Outside Private Consultants) |
| B. Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure | Yes | City Coordinates With Outside Consultants<br>City Building Dept. (City Inspectors)<br>Engineering Dept. (City Engineer & Const. Inspectors) |
| C. Planners or Engineer(s) with an understanding of natural and/or human-caused hazards | Yes | City Coordinates with Outside Consultants |
| D. Floodplain manager | Yes | County Of Orange |
| E. Surveyors | Yes | City Coordinates With Outside Consultants |
| F. Staff with education or expertise to assess the community's vulnerability to hazards | Yes | City Staff<br>County of Orange<br>WEROC / Staff |
| G. Personnel skilled in GIS and/or HAZUS | Yes | City Personnel / Engineering Tech.<br><br>City Coordinates With Outside Consultants |
| H. Scientists familiar with the hazards of the community | Yes | City Coordinates With Cal State Fullerton |
| I. Emergency manager | Yes | City Engineer / EOC<br>City Manager / EOC Manager |
| J. Grant writers | Yes | Engineering Dept. / Assoc. Engineer |
| K. Lab Specialist & Lab Staff | No | OCWD<br>Clinical Lab. of San Bernardino |

### 5.6.4 Fiscal Capability

Table 5.6.4-1 shows specific financial and budgetary tools available to Buena Park such as community development block grants; capital improvements project funding; authority to levy taxes for specific purposes; fees for water, sewer, gas, or electric services; impact fees for homebuyers or developers for new development; ability to incur debt through general obligations bonds; and withholding spending in hazard-prone areas.

**Table 5.6.4-1**
**Fiscal Capability**

| Financial Resources | Accessible or Eligible to Use (Yes/No/Don't Know) |
|---|---|
| A. Community Development Block Grants (CDBG) | Yes |
| B. Capital improvements project funding | Yes |
| C. Authority to levy taxes for specific purposes | Yes |
| D. Fees for water, sewer, gas, or electric service | Yes |
| E. Impact fees for homebuyers or developers for new developments/homes | Yes |
| F. Incur debt through general obligation bonds | Yes |
| G. Incur debt through special tax and revenue bonds | Yes |
| H. Incur debt through private activity bonds | Unknown |
| I. Withhold spending in hazard-prone areas | Yes |

### 5.6.5 Local Mitigation Capability Assessment

**Table 5.6.5-1**
**Local Mitigation Capability Assessment**

| Agency Name (Mission/Function) | Programs, Plans, Policies, Regulations, Funding, or Practices | Point of Contact Name, Address, Phone, Email | Effect on Loss Reduction* | | | Comments |
|---|---|---|---|---|---|---|
| | | | Support | Facilitate | Hinder | |
| A. City of Buena Park (Owner) | 1.Building Dept. | B.P. / City Hall<br>6650 Beach Blvd.<br>Buena Park, CA 90622<br>714-562-33636 | X | | | |
| | 2.Planning Dept. | 714 - 562-3620 | X | | | |
| | 3.Engineering Dept. | 714 - 562-3670 | X | | | |
| | 4.Manager | 714 – 562-3550 | X | | | |
| B. OCFA / Fire | 1.Division Chief | Jerry Hunter 714-527-0537 | X | | | |
| | 2.Battalion Chief | 714 – 527 5509 | X | | | |

#### *5.6.5.1 City of Buena Park Goals*

Listed below are Buena Park's specific hazard mitigation goals, objectives and related potential actions. For each goal, one or more objectives have been identified that provide strategies to attain the goal. Where appropriate, the City has identified a range of specific actions to achieve the objective and goal.

The goals and objectives were developed by considering the risk assessment findings, localized hazard identification and loss/exposure estimates, and an analysis of the jurisdiction's current capabilities assessment. These preliminary goals, objectives and actions were developed to represent a vision of long-term hazard reduction or enhancement of capabilities. To help in further development of these goals and objectives, the LPG compiled and reviewed current jurisdictional sources including the City's planning documents, codes, and ordinances. In addition, City representatives met with consultant staff and/or MWDOC to specifically discuss these hazard-related goals, objectives and actions as they related to the overall Plan. Once developed, City staff presented them to the Buena Park City Council for their approval.

Public meetings were held throughout the County to present these preliminary goals, objectives and actions to citizens and to receive public input. At these meetings, specific consideration was given to hazard identification/profiles and the vulnerability assessment results. The following sections present the hazard-related goals, objectives and actions as prepared by Buena Park's LPG in conjunction with the Hazard Mitigation Working Group, locally elected officials, and local citizens.

For the City Buena Park, following are five major potential goals for hazard mitigation planning purposes. The five goals are followed up with detailed objectives and actions:

1. **Minimize damages to facilities/infrastructure due to natural disasters**

1. **Minimize disruption of service due to hazard induced outages**

2. **Eliminate or minimize wastewater spills**

3. **Reduce potential loss and injury to human life and to existing assets, facilities, and infrastructure due to human caused hazards**

4. **Promote public understanding, support and demand for hazard mitigation.**

The objectives and actions under each of the six goals are listed below:

1. **Minimize damages to facilities / infrastructure due to natural disasters**

   A. Protect existing assets with the highest vulnerability and greatest service value to the effects of natural disasters.

      1. Implement Vulnerability Risk Assessment recommendations.
      2. Keep Emergency Operations Plan up-to-date
      3. Install seismic valves at critical reservoir sites
      4. Loop water sources where possible
      5. Intertie supply sources where possible
      6. Construct interties with neighboring water purveyors
      7. Secure above ground assets in all buildings, booster stations, reservoirs, pressure reducing stations, emergency interties, water systems, water reclamation plant, lift stations, pipelines and bridge crossings.
      8. Identify all major fuel pipelines, rail transportation corridors, manufacturing facilities, and their relative vulnerability relative to hazardous material releases.

   B. Protect the public water supply from contamination caused by backflow or back-siphonage in the event of an earthquake

      1. Continued with backflow prevention program
      2. Monitor low-pressure areas in the water system
      3. Upgrade all potential hazardous potable water services with the required backflow prevention device to prevent backpressure or back-siphonage that could contaminate the public water supply.
      4. Require all single check fire systems in the District to be upgraded to a Double-Check Detector Assembly. Single-check fire systems cannot be tested to

determine if they are working properly. The Double-Check Detector Assembly can be tested and requires an annual test to determine if it is functioning properly. The water quality in fire systems has been proven not safe for human consumption. Random tests on fire system water quality exceeded maximum contaminant levels for potable water including iron, lead, cadmium, manganese, and total Coliform.

C. Protect potable water from contamination

1. Strictly enforce standard separation between water infrastructure and other utilities
2. Implement Vulnerability Risk Assessment recommendations
3. Improve security at certain facilities and install surveillance equipment
4. Maintain operations daily/weekly site visit monitoring program to each facility
5. Install and maintain equipment at essential facilities
6. Upgrade SCADA system to existing sites as needed
7. Install emergency collection structures at each tank site to capture released water
8. Keep Emergency Operations Plan up-to-date

D. Protect assets from a major Earthquake event.

1. Perform a seismic study analysis for all structures and facilities.
2. Update the standard specification to comply with latest UBC seismic design codes for structures and pipelines.
3. Conduct routine site inspections of structures and facilities and follow-up on structural deficiencies.
4. Adopt Structural Design Criteria which will resist the most severe earthquake anticipated.

E. Reduce the High Fire Threat to the District facilities/infrastructure.

1. Develop a comprehensive approach to reducing the possibility of damage and losses due to structural fire/wildfire.
2. Create a fire management plan outlining various impacted facilities and vulnerabilities.
3. Share all infrastructures/building information with local, county, and state fire agencies.
4. Adopt a policy for design of non-combustible facilities to reduce the threat and impact of Wildfire on structures.
5. Provide redundant underground communication systems for critical facilities to insure reliability of operating systems.

6. Provide routine maintenance around facilities to avoid the chance of fire threat and reducing the fuel source.

**2. Minimize disruption of service due to hazard induced outages**

A. Provide backup system for critical facilities

1. Build redundancy into the water supply source to mitigate major structural defects to main transmission water pipelines.
2. Loop water sources where possible
3. Intertie supply sources where possible
4. Construct interties with neighboring water purveyors
5. Provide containment structure for additional response time
6. Replace existing force mains if necessary
7. Protect facilities within flood plain areas
8. Place protective measures in rivers and creeks or relocate facilities out of harms way
9. Install jointless pipelines in all creek crossings
10. Improve structural characteristics of reservoirs and pump stations; consider flexible connections at reservoirs for seismic activity
11. Install isolation valves at all locations when feasible
12. Design facilities with flexible connections
13. Install camera and wireless communication at all facilities
14. Continuing with daily site check

B. Improve response time

1. Keep Emergency Response Plans up-to-date
2. Update system maps to reflect current conditions
3. Maintain stand-by crew for emergency repair

**3. Eliminate or minimize wastewater spills**

A. Provide emergency storage structure for all sewage lift facilities

B. Protect facilities within flood plain areas

C. Construct an emergency storage structure (where needed) at sewage lift stations

D. Standardize and upgrade older lift station electrical and instrumentation systems

E. Install permanent emergency power at all older lift stations

F. Place protective measures in rivers and creeks

G. Install jointless pipelines in all creek crossings and slope easements

**4. Reduce potential loss and injury to human life and to existing assets, facilities, and infrastructure due to human caused hazards**

A. Develop a comprehensive approach to reduce damage and loss due to human caused hazards

1. Continue and expand cooperation with all outside agencies regarding human caused hazards.
2. Continue and expand education for administrative and field personnel on possible human caused hazards.
3. Survey and improve site fencing and other forms of hardening facility deterrence
4. Improve response time to alarm and emergency events
5. Modify SCADA system, when feasible, to look for additional parameters of operation that may indicate problem areas

B. Increase the knowledge of employees and the public of extremely hazardous substance handling procedures and terrorism awareness.

1. Continue and expand safety training for all personnel who may come in contact with said materials
2. Conduct additional workshops for awareness of hazardous materials incidents for all employees
3. Examine opportunities for on-line water quality sensing relative to potential human induced contamination, and implement if feasible

**5. Promote public understanding, support and demand for hazard mitigation.**

A. Educate the public regarding natural and man-made hazards and opportunities for mitigation actions to protect local residents and businesses.

B. Prepare an emergency response preparedness brochure for the local community identifying all types of natural hazards.

C. Promote a partnership between the local, county, state governments to identify, prioritize, and implement mitigation actions.

D. Promote hazard mitigation in the business community.

E. Use the public media to cover mitigation activities.

F. Publish newsletters for the public and business leaders with information regarding mitigation of natural and man-made hazards.

G. Develop full cooperation with all outside agencies regarding human caused hazards.

**Buena Park - Goals, Objectives and Actions**
**Cross-referenced with identified Hazards Within Orange County**

| Goal, Objective, and Action | Flood/Storm | Wildland/Urban Fire | Earthquake | Dam Failure/Water Tank Failure | Landslide / Mudslide | Tornado / High Winds | Tsunami | Extreme Heat/ Drought | Expansive Soils/Land Subsidence / Liquefaction | Man-Made Hazards/ Contamination |
|---|---|---|---|---|---|---|---|---|---|---|
| G1/A/1 | | | | | | | | | | X |
| G1/A/2 | X | X | X | X | X | X | | X | | X |
| G1/A/3 | | | X | X | | | | | | |
| G1/A/4 | | X | | | | | | | | |
| G1/A/5 | X | | X | | | | | X | | |
| G1/A/6 | X | X | X | X | X | X | | X | | X |
| G1/A/7 | X | | X | | | | | | | X |
| G1/A/8 | | | | | | | | | | X |
| G1/B/1 | | | X | | | | | | | |
| G1/B/2 | | | X | | | | | | | |
| G1/B/3 | | | X | | | | | | | |
| G1/B/4 | | | X | | | | | | | |
| G1/C/1 | | | | | | | | | | X |
| G1/C/2 | | | | | | | | | | X |
| G1/C/3 | | | | | | | | | | X |
| G1/C/4 | | | | | | | | | | X |
| G1/C/5 | | | | | | | | | | X |
| G1/C/6 | | | | | | | | | | X |
| G1/C/7 | | | | | | | | | | X |
| G1/C/8 | | | | | | | | | | X |
| G1/D/1 | | | X | | | | | | | |
| G1/D/2 | | | X | | | | | | | |
| G1/D/3 | | | X | | | | | | | |
| G1/D/4 | | | X | | | | | | | |
| G1/E/1 | | X | | | | | | | | |
| G1/E/2 | | X | | | | | | | | |
| G1/E/3/ | | X | | | | | | | | |
| G1/E/4 | | X | | | | | | | | |
| G1/E/5 | | X | | | | | | | | |
| G1/E/6 | | X | | | | | | | | |
| G2/A/1 | X | | X | | | | | | | |
| G2/A/2 | | X | | | | | | | | |
| G2/A/3 | X | | X | | | | | X | | |
| G2/A/4 | X | X | X | X | X | X | | X | | X |
| G2/A/5 | X | | | | | | | | | X |
| G2/A/6 | X | | X | | | | | | | X |
| G2/A/7 | X | | | | | | | | | |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| G2/A/8 | X | | | | | | | | | |
| G2/A/9 | X | | | | | | | | | |
| G2/A/10 | | | X | X | X | | | | | |
| G2/A/11 | X | X | X | X | X | X | | X | | X |
| G2/A/12 | | | X | X | X | | | | | |
| G2/A/13 | | | | | | | | | | X |
| G2/A/14 | | | | | | | | | | X |
| G2/B/1 | X | X | X | X | X | X | | X | | X |
| G2/B/2 | X | X | X | X | X | X | | X | | X |
| G2/B/3 | X | X | X | X | X | X | | X | | X |
| G3/A | X | | | | | | | | | |
| G3/B | X | | | | | | | | | |
| G3/C | X | | | | | | | | | |
| G3/D | X | | | | | | | | | |
| G3/E | X | X | X | | | X | | | | X |
| G3/F | X | | | | | | | | | |
| G3/G | X | | | | X | | | | | |
| G4/A/1 | | | | | | | | | | X |
| G4/A/2 | | | | | | | | | | X |
| G4/A/3 | | | | | | | | | | X |
| G4/A/4 | | | | | | | | | | X |
| G4/A/5 | | | | | | | | | | X |
| G4/B/1 | | | | | | | | | | X |
| G4/B/2 | | | | | | | | | | X |
| G4/B/3 | | | | | | | | | | X |
| G5/A | X | X | X | X | X | X | | X | | X |
| G5/B | X | X | X | X | X | X | | X | | X |
| G5/C | X | X | X | X | X | X | | X | | X |
| G5/D | X | X | X | X | X | X | | X | | X |
| G5/E | X | X | X | X | X | X | | X | | X |
| G5/F | X | X | X | X | X | X | | X | | X |
| G5/G | X | X | X | X | X | X | | X | | X |

**Table 5.6.-1 Buena Park Loss Estimation Table**

| Hazard Type | Item-> | WST | RES | WTP | PS | PRS | EIT | SC | ADM | LS | WWTP | WELL | DIEMER | OC-88 PS | PRS-MET | PP | WWTP-SOCWA | WWTP-OCSD | LS-OCSD | PWL | WWL | Total Loss Value [1] $M |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Replacement Cost | $M -> | 13.0 | 30.0 | 10.0 | 2.0 | 0.2 | 0.3 | 0.6 | 3.0 | 0.4 | 5.0 | 3.5 | 250.0 | 35.0 | 12.0 | 12.0 | 30.0 | 250.0 | 10.0 | 1.0 | 0.5 | |
| | | | | | | | | | | | | | | | | | | | | | | |
| Earthquake | Number | 1 | 0 | 0 | 1 | 13 | 0 | 4 | 2 | 0 | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 139.7 | 0.0 | |
| Moderate | Exposure ($M) | $ 13.0 | $ - | $ - | $ 2.0 | $ 2.6 | $ - | $ 2.4 | $ 6.0 | $ - | $ - | $ 24.5 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 139.7 | $ - | $ 190.2 |
| | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 93.5 | 0.0 | |
| High | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 93.5 | $ - | $ 93.5 |
| | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | |
| Extreme | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| Flood | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2.9 | 0.0 | |
| 100-YR | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 2.9 | $ - | $ 2.9 |
| | Number | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 2 | 0 | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 199.0 | 243.2 | |
| 500-YR | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ 1.8 | $ 6.0 | $ - | $ - | $ 24.5 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 199.0 | $ 121.6 | $ 352.8 |
| Landslide | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0.0 | |
| | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 0.1 | $ - | $ 0.1 |
| Liquifaction | Number | 1 | 0 | 0 | 1 | 5 | 0 | 1 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 44.4 | 0.0 | |
| Moderate | Exposure ($M) | $ 13.0 | $ - | $ - | $ 2.0 | $ 1.0 | $ - | $ 0.6 | $ - | $ - | $ - | $ 7.0 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 44.4 | $ - | $ 68.0 |
| | Number | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 175.9 | 0.0 | |
| High | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ 1.2 | $ 6.0 | $ - | $ - | $ 21.0 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 175.9 | $ - | $ 204.1 |
| | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | |
| Very High | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| Wildlife/Structure Fire | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5.5 | 0.0 | |
| Low | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 3.5 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 5.5 | $ - | $ 9.0 |
| | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | |
| High | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | |
| Extreme | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| | | | | | | | | | | | | | | | | | | | | | Grand Total Loss [2] | **$ 920.7** |

**[1] Loss value is asset replacement value in 2006 dollars. Value shown is found as count of assets at risk from the particular hazard times high-end unit asset value.**
**[2] Grand Total Loss value shown may include the same assets counted multiple times for different hazards.**

## 5.7 EL TORO – OBJECTIVES, GOALS AND ACTIONS

The El Toro Water District (ETWD) reviewed a set of jurisdictional-level hazard maps including detailed critical facility information and localized potential hazard exposure/loss estimates to help identify the top hazards threatening their jurisdiction. See Section 4 for additional details.

ETWD's Loss Assessment Table is located at the end of this section.

### 5.7.1 Capability Assessment

The LPG identified current capabilities available for implementing hazard mitigation activities. The Capability Assessment (Assessment) portion of the jurisdictional mitigation plan identifies administrative, technical, legal and fiscal capabilities. This includes a summary of departments and their responsibilities associated to hazard mitigation planning as well as codes, ordinances, and plans already in place associated to hazard mitigation planning. The second part of the Assessment provides ETWD's fiscal capabilities that may be applicable to providing financial resources to implement identified mitigation action items.

### 5.7.2 Existing Institutions, Plans, Policies and Ordinances

The legal and regulatory capabilities of ETWD are shown in Table 5.7.3-1, which presents the existing ordinances and codes that affect the physical or built environment of ETWD. Examples of legal and/or regulatory capabilities can include: the District's building codes, zoning ordinances, subdivision ordinances, special purpose ordinances, growth management ordinances, site plan review, general plans, capital improvement plans, economic development plans, emergency response plans, and real estate disclosure plans.

### 5.7.3 Legal and Regulatory Capability

**Table 5.7.3-1**

**Legal and Regulatory Capability**

| Regulatory Tools (ordinances, codes, plans) | Local Authority (Yes/No) | State Authority (Yes/No) | Other Level Jurisdiction Authority (Yes/No) | Comments |
|---|---|---|---|---|
| A. Building code | Yes | No | Yes | ETWD, City of Lake Forest, City of Laguna Woods, City of Laguna Hills, City of Aliso Viejo, County |
| B. Zoning ordinance | Yes | No | No | Local Cities and County |
| C. Subdivision ordinance or regulations | NA | NA | NA | Local Cities and County |
| D. Special purpose ordinances (floodplain management, storm water management, | No | Yes | Yes | County, Local Cities, OCFA, Army Corp of Engineers, |

| Regulatory Tools (ordinances, codes, plans) | Local Authority (Yes/No) | State Authority (Yes/No) | Other Level Jurisdiction Authority (Yes/No) | Comments |
|---|---|---|---|---|
| hillside or steep slope ordinances, wildfire ordinances, hazard setback requirements) | | | | RWQCB & State Fish & Game |
| E. Growth management ordinances (also called "smart growth" or anti-sprawl programs) | No | No | Yes | Local Cities & County |
| F. Site plan review requirements | Yes | Yes | Yes | OCFA, Local Cities, County, DSOD, CRWQCB & DFG |
| G. General or comprehensive plan | Yes | No | No | ETWD Master Plan |
| H. A capital improvements plan | Yes | No | No | ETWD Master Plan |
| I. An economic development plan | Yes | No | Yes | Coordination with Cities |
| J. An emergency response plan | Yes | Yes | Yes | ETWD, SEMS, NIMS, EPA & WEROC |
| K. A post-disaster recovery plan | Yes | No | Yes | ETWD & NIMS – Funding |
| L. DAMS | Yes | Yes | Yes | DSOD & CRWQCB |
| M. VA & ERP | Yes | Yes | Yes | USEPA & OES |
| N. Title 17 & 22 | No | Yes | Yes | CA-DHS & County Health Care Agency |
| O. Wastewater | Yes | Yes | Yes | CRWQCB & County Health Care Agency |
| P. Air Quality | No | Yes | Yes | SCAQMD |
| Q. Safety | No | Yes | Yes | Cal OSHA |
| R. Waste Discharge Requirements | No | Yes | No | State Water Resources Control Board |

### 5.7.4 Administrative and Technical Capabilities

The following is a summary of existing departments in ETWD and their responsibilities related to hazard mitigation planning and implementation, as well as existing planning documents and regulations related to mitigation efforts within the community. The administrative and technical capabilities of ETWD, as shown in Table 5.7.4-1, provides an identification of the staff, personnel, and department resources available to implement the actions identified in the mitigation section of the Plan. Specific resources reviewed include those involving technical personnel such as planners/engineers with knowledge of land

development and land management practices, engineers trained in construction practices related to building and infrastructure, planners and engineers with an understanding of natural or manmade hazards, floodplain managers, surveyors, personnel with GIS skills and scientists familiar with hazards in the community.

Table 5.7.4-1

Administrative and Technical Capacity

| Staff/Personnel Resources | Yes/No | Department/Agency and Position |
|---|---|---|
| • Planner(s) or engineer(s) with knowledge of land development and land management practices | No | District coordinates with outside consultants |
| • Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure | Yes | District coordinates with outside consultants & in-house staff as directed by the Director of Operations and Engineering |
| • Planners or Engineer(s) with an understanding of natural and/or human-caused hazards | Yes | District coordinates with outside consultants & In-house staff as directed by the Director of Operations and Engineering |
| • Floodplain manager | No | County of Orange – RDMD |
| • Surveyors | No | District coordinates with outside consultants |
| • Staff with education or expertise to assess the community's vulnerability to hazards | Yes | For current facilities and potential Hazards specific to ETWD facilities |
| • Personnel skilled in GIS and/or HAZUS | No | District Coordinates with outside consultants |
| • Scientists familiar with the hazards of the community | No | District Coordinates with outside consultants |
| • Emergency Manager | Yes | General Manager & Director of Operations |
| • Grant writers | No | District Coordinates with outside consultants |
| • Lab Staff/ Specialist | Yes | WRP Labs, Senior Lab Tech, & Lab Tech |
| • Construction Inspector | Yes | Operations |

### 5.7.5 Fiscal Capability

Table 5.7.5-1 shows specific financial and budgetary tools available to ETWD such as community development block grants; capital improvements project funding; authority to levy taxes for specific purposes; fees for water, sewer, gas, or electric services; impact fees for homebuyers or developers for new development; ability to incur debt through general obligations bonds; and withholding spending in hazard-prone areas.

Table 5.7.5-1

Fiscal Capability

| Financial Resources | Accessible or Eligible to Use (Yes/No/Don't Know) |
|---|---|
| A. Community Development Block Grants (CDBG) | No |
| B. Capital improvements project funding | Part of Water Rate |
| C. Authority to levy taxes for specific purposes | Yes (subject to voters approval) |
| D. Fees for water, sewer service (Rate Structure) | Yes |
| E. Impact fees for homebuyers or developers for new developments/homes | Yes |
| F. Incur debt through general obligation bonds | Yes (subject to voters approval) |
| G. Incur debt through special tax and revenue bonds | Yes (subject to voters approval) |
| H. Incur debt through private activity bonds | Yes |
| I. Withhold spending in hazard-prone areas | No |
| J. Grants | Yes |

### 5.7.6 Local Mitigation Capability Assessment Goals

Table 5.7.6-1

Local Mitigation Capability Assessment

| Agency Name (Mission/Function) | Programs, Plans, Policies, Regulations, Funding, or Practices | Point of Contact Agency, Phone | Effect on Loss Reduction | | | Comments |
|---|---|---|---|---|---|---|
| | | | Support | Facilitate | Hinder | |
| ETWD | A Building Code<br>B. Zoning Code<br>C. Subdivision Ordinance | City of Lake Forest<br>Building Department<br>949-461-3400 | X | | | |
| | A. Building Code<br>B. Zoning Code<br>C. Subdivision Ordinance | City of Mission Viejo<br>Building Department<br>949-470-3000 | X | | | |
| | A. Building Code<br>B. Zoning Code<br>C. Subdivision Ordinance | City of Laguna Hills<br>Building Department<br>949-707-2600 | X | | | |
| | A. Building Code<br>B. Zoning Code<br>C. Subdivision Ordinance | City of Laguna Woods<br>Building Department<br>949-639-0500 | X | | | |
| | A. Building Code<br>B. Zoning Code<br>C. Subdivision Ordinance | City of Aliso Viejo<br>Building Department<br>949-425-2500 | X | | | |
| | A. Building Code<br>B. Zoning Code<br>C. Subdivision Ordinance | County of Orange<br>714-433-6000 | X | | | |
| | A. Building Code | ETWD<br>Director of Operations & Engineering<br>949-837-7050 | | X | | |
| ETWD | D-1 Special Purpose Ordinances | Local Cities | X | | | |
| | D-2 Special Purpose Ordinances | County of Orange<br>714-433-6000 | X | | | |
| | D-3 Special Purpose Ordinances | Orange County Fire Authority<br>714-573-6000 | X | | | |
| | D-4 Special Purpose Ordinances | Army Corps of Engineers<br>916-557-5100 | X | | | |
| ETWD | D-5 Special Purpose Ordinances | Department of Fish & Game<br>909-484-0459 | X | | | |

| Agency Name (Mission/Function) | Programs, Plans, Policies, Regulations, Funding, or Practices | Point of Contact Agency, Phone | Effect on Loss Reduction | | | Comments |
|---|---|---|---|---|---|---|
| | | | Support | Facilitate | Hinder | |
| | D-6 Special Purpose Ordinances | Regional Water Quality Control Board – Region 8 951-782-4130 | X | | | |
| | D-7 Special Purpose Ordinances | Regional Water Quality Control Board - Region 9. 858-467-2952 | X | | | |
| | E-1 Growth Management Ordinances | Local Cities | X | | | |
| | E-2 Growth Management Ordinances | County of Orange 714-433-6000 | X | | | |
| | F-1 Site Plan Review | County of Orange 714-433-6000 | X | | | |
| | F-2 Site Plan Review | Orange County Fire Authority 714-573-6000 | X | | | |
| | F-3 Site Plan Review | Local Cities | X | | | |
| | F-4 Site Plan Review | Division of Safety Of Dams 916-799-3055 | X | | | |
| | F-5 Site Plan Review | Regional Water Quality Control Board – Region 8 951-782-4130 | X | | | |
| | F-6 Site Plan Review | Regional Water Quality Control Board - Region 9. 858-467-2952 | X | | | |
| | F-7 Site Plan Review | Department of Fish & Game 909-484-0459 | X | | | |
| | G-1 General Comprehensive Plan | ETWD Director of Operations & Engineering 949-837-7050 | | X | | |
| | H-1 Capital Improvements Plan | ETWD Director of Operations & Engineering 949-837-7050 | | X | | |

| Agency Name (Mission/Function) | Programs, Plans, Policies, Regulations, Funding, or Practices | Point of Contact Agency, Phone | Effect on Loss Reduction | | | Comments |
|---|---|---|---|---|---|---|
| | | | Support | Facilitate | Hinder | |
| | I-1 Economic Development Plan | Local Cities | X | | | |
| | I-2 Economic Development Plan | ETWD General Manager or CFO<br>949-837-7050 | | X | | |
| ETWD | J-1 Emergency Response Plan | ETWD<br>Director of Operations & Engineering<br>949-837-7050 | | X | | |
| | J-2 Emergency Response Plan | SEMS<br>800-852-7550 | X | | | |
| | J-3 Emergency Response Plan | NIMS<br>301-447-1200 | X | | | |
| | J-4 Emergency Response Plan | WEROC<br>714 -593- 5010 | X | | | |
| | J-5 Emergency Response Plan | USEPA<br>714-712-2888 | X | | | |
| | K-1 Post Disaster Plan | NIMS<br>301-447-1200 | X | | | |
| | K-2 Post Disaster Plan | ETWD<br>Director of Operations & Engineering<br>949-837-7050 | | X | | |
| | No-1 DAMS | ETWD<br>Director of Operations & Engineering<br>949-837-7050 | | X | | |
| | No-2 DAMS | Division of Safety Of Dams<br>916-799-3055 | X | | | |
| | No-3 DAMS | Regional Water Quality Control Board – Region 8<br>951-782-4130 | X | | | |
| | No-3 DAMS | Regional Water Quality Control Board - Region 9.<br>858-467-2952 | X | | | |

| Agency Name (Mission/Function) | Programs, Plans, Policies, Regulations, Funding, or Practices | Point of Contact Agency, Phone | Effect on Loss Reduction | | | Comments |
|---|---|---|---|---|---|---|
| | | | Support | Facilitate | Hinder | |
| | O-1 VA & ERP | ETWD<br>Director of Operations & Engineering<br>949-837-7050 | X | | | |
| | O-2 VA & ERP | USEPA<br>714-712-2888 | X | | | |
| | O-3 VA & ERP | OES<br>800-852-7550 | X | | | |
| | P-1 Title 17 & 22 | California Dept of Health Services<br>714-558-4410 | X | | | |
| *ETWD* | P-2 Title 17 & 22 | County of Orange Health Care Agency<br>714-433-6000 | X | | | |
| | Q-1 Wastewater | ETWD<br>Director of Operations & Engineering<br>949-837-7050 | | X | | |
| | Q-2 Wastewater | County of Orange Health Care Agency<br>714-433-6000 | X | | | |
| | Q-3 Wastewater | Regional Water Quality Control Board – Region 8<br>951-782-4130 | X | | | |
| | Q-4 Wastewater | Regional Water Quality Control Board - Region 9.<br>858-467-2952 | X | | | |
| | R-1 Air Quality | South Coast Air Quality Management District<br>909-396-2900 | X | | | |
| | S-1 Safety | Cal OSHA<br>800-963-9424 | X | | | |
| | S-2 Safety | OSHA<br>800-321- 6742 | X | | | |

### *5.7.6.1 ETWD Goals*

Listed below are ETWD's specific hazard mitigation goals, objectives and related potential actions. For each goal, one or more objectives have been identified that provide strategies to attain the goal. Where appropriate, the District has identified a range of specific actions to achieve the objective and goal.

The goals and objectives were developed by considering the risk assessment findings, localized hazard identification and loss/exposure estimates, and an analysis of the jurisdiction's current capabilities assessment. These preliminary goals, objectives and actions were developed to represent a vision of long-term hazard reduction or enhancement of capabilities. To help in further development of these goals and objectives, the LPG compiled and reviewed current jurisdictional sources including the District's planning documents, codes, and ordinances. In addition, District representatives met with consultant staff and/or MWDOC to specifically discuss these hazard-related goals, objectives and actions as they related to the overall Plan. Once developed, District staff presented them to the ETWD Board for approval.

Public meetings were held throughout the County to present these preliminary goals, objectives and actions to citizens and to receive public input. A specific meeting was held with the ETWD Community Advisory Group to get their input. At these meetings, specific consideration was given to hazard identification/profiles and the vulnerability assessment results. The following sections present the hazard-related goals, objectives and actions as prepared by ETWD's LPG in conjunction with the Hazard Mitigation Working Group, locally elected officials, and local citizens.

**Implementation Strategy**

The El Toro Water District Strategy for implementation of the following goals consists of the following components:

- Capital Replacement and Refurbishment Program (CRRP) – Capital projects or equipment acquisitions will be included in the Districts current fiscal years CRRP or in the on-going five and ten year plans.

- Operations and Maintenance Budget – The ability to continue the critical O&M programs designed to preserve and extend the useful life of the water and wastewater infrastructure is maintained and accommodated in the annual O&M budget.

- Alternative Funding Sources – Whenever possible the District will pursue alternative funding in the form of grants or low interest loans in an effort to maximize the District's ability to protect, preserve and enhance the infrastructure.

- Staff will make use of outside consultant sources as appropriate to conceive, develop and implement projects

- ETWD coordinates with neighboring and regional agencies to explore any cooperative regional projects.

**Goal No. 1 Operations & Maintenance**

Design and implement an Operations and Maintenance Program that will preserve the integrity and reliability of the facilities and infrastructure.

A. Equipment Maintenance to Maintain Critical Equipment Reliability

1. Continue aggressive Preventive Maintenance Program
2. Scheduled replacement of equipment that reaches the end of its useful service life

B. Collection System Maintenance to Prevent Sewer Overflows

1. Continue regular sewer pipeline cleaning program
2. Continue regular sewer pipeline CCTV inspection program
3. Continue Fats, Oils and Grease Control Program

C. Emergency Preparation

1. Keep Emergency Response Plan up-to-date
2. Continue to maintain current emergency supplies at the Main Office and WRP sites

D. Infrastructure Maintenance

1. Maintain regular operations site visits / monitoring program at each facility
2. Conduct routine site inspections of structures and facilities
3. Follow-up to correct structural or other identified deficiencies
4. Provide routine maintenance around facilities to avoid the chance of fire threat by reducing the fuel source.

E. Water Quality

1. Continue operation and enforcement of backflow prevention program
2. Strictly enforce standard separation between water infrastructure and wastewater or recycled water facilities

F. Design Standards

1. Construct new facilities to comply with structural design criteria which will mitigate seismic structural impacts

**Goal No. 2 Minimize damages to facilities / infrastructure due to natural disasters**

A. Protect existing assets with the highest vulnerability and greatest service value to the effects of natural disasters.

1. Conduct a system specific vulnerability assessment to identify potential projects to mitigate the effects of natural disasters from an analysis of hazard exposure and facility criticality

B. Enhance reliability of District pumping facilities

1. Implement installation of upgraded Motor Control Center and Smart Motor Controllers at Cherry Booster Station
2. Implement Shenandoah Booster Station Improvement Project to upgrade the Motor Control Center, install Smart Motor Controllers and relocate electrical equipment out of the pump room
3. Perform Asset Management Study to identify critical facilities replacement schedules

C. Protect assets from a major Earthquake event.

1. Perform a seismic study analysis for all structures and facilities.

D. Improve Response to disaster related failures

1. Monitor distribution system pressures throughout the service area
2. Implement the proposed SCADA Distribution System Upgrade Project
3. Implement GIS System Project to help identify risks and goals relative to hazard mitigation as it pertains to ETWD infrastructure
4. Implement expansion of ETWD Emergency Operations Center

**Goal No. 3 Minimize disruption of service due to hazard induced outages**

A. Obtain additional sources of emergency water supply

1. Consider participation in South Orange County Reliability Projects
2. Consider construction of an inter-connection with Moulton Niguel Water District to provide emergency supply the Ultra High Zone

B. Preserve or enhance emergency storage

1. Continue to maintain storage capacity at the R-6 Reservoir
2. Consider cost effective options to enhance storage as options evolve or present themselves

C. Diversify Source of Potable Water Import Supply

1. Consider participation in Baker Regional Treatment Facility project
2. Maintain ability to effectively use existing capacity in Joint Regional Water Supply System

D. Provide Backup systems for critical facilities

1. Install stationary generator at P-3 Pump Station
2. Relocate Fuel Storage Tanks at WRP Above Ground
3. Implement Low Zone 1 Reconfiguration Project to provide connection from Gravity Zone to Reduced High Zone

**Goal No. 4 Eliminate or minimize wastewater spills**

**A.** Provide emergency wet well storage to extend response time to lift station failures

1. Construct emergency storage structures (where feasible) at sewage lift stations
2. Install additional wet well storage and emergency overflow storage at the Northline Lift Station as a component of the Northline Lift Station Improvement Project
3. Install additional wet well storage and emergency overflow storage at the Oso Lift Station as a component of the Oso Lift Station Improvement Project

B. Minimize Intrusion and Infiltration into sewer collection system

1. Implement I&I Study Flow Monitoring Project
2. Conduct analysis and subsequent projects to minimize Intrusion and Infiltration

C. Provide protection for sewer force mains

1. Parallel sewer force mains where feasible and appropriate
2. Place protective measures in creeks where crossing is determined to be vulnerable
3. Install jointless pipelines in creek crossings and slope easements where vulnerabilities are identified or during any remedial work or reconstruction
4. Replace existing sewer force mains if necessary
5. Continue to coordinate with SOCWA regarding the condition and potential replacement schedule for the Effluent Transmission Main

D. Preserve the integrity of the sewer collection system

1. Continue aggressive O&M program
2. Purchase additional sewer camera and tractor
3. Implement protective measures for the 4920 Lift Station influent siphon
4. Implement La Paz Lift Station Slope/Panel Stabilization project
5. Implement Bridger Road Sewer Rehabilitation Project

**Goal No. 5 Human Caused Hazards**

Reduce potential loss and injury to human life and to existing assets, facilities, and infrastructure due to human caused hazards

A. Enhance Security of ETWD Facilities

1. Implement Vulnerability Assessment recommendations in the form of the proposed ETWD Security Enhancement Project

B. Improve detection abilities

1. Modify SCADA system, when feasible, to look for additional parameters of operation that may indicate problem areas
2. Examine opportunities for on-line water quality sensing relative to potential human induced contamination, and implement if feasible

C. Increase the knowledge of employees and the public of extremely hazardous substance handling procedures and terrorism awareness.

1. Continue and expand safety training for all personnel who may come in contact with said materials
2. Conduct additional workshops for awareness of hazardous materials incidents for all employees

**Goal No. 6 Protect communities from potential earthquake induced dam inundation**

A. Maintain Stability of R-6 Reservoir Dam

1. Continue dam instrumentation monitoring programs
2. Continue to retain services of Genterra Consultants to monitor and advise ETWD Staff regarding the stability of the R-6 dam
3. Periodically update R-6 Reservoir Dam Inundation Study

B. Maintain Readiness Posture of ETWD Operations Staff

1. Conduct periodic emergency response exercises and training for staff
2. Participate and coordinate with Water Emergency Response Organization of Orange County (WEROC) and other member agencies in hazard preparedness.

**ETWD - Goals, Objectives and Actions**

**Cross-referenced with identified Hazards Within Orange County**

| Goal, Objective, and Action | Flood/Storm | Wildland/Urban Fire | Earthquake | Dam Failure/Water Tank Failure | Landslide / Mudslide | Tornado / High Winds | Tsunami | Extreme Heat/ Drought | Expansive Soils/Land Subsidence / Liquefaction | Man-Made Hazards/ Contamination |
|---|---|---|---|---|---|---|---|---|---|---|
| G1/A/1 | X | X | X | X | X | X | | X | X | X |
| G1/A/2 | X | X | X | X | X | X | | X | X | X |
| G1/B/1 | X | | X | | | | | | | X |
| G1/B/2 | X | | X | | | | | | | X |
| G1/B/3 | X | | X | | | | | | | X |
| G1/C/1 | X | X | X | X | X | X | | X | X | X |
| G1/C/2 | X | X | X | X | X | X | | X | X | X |
| G1/D/1 | X | X | X | X | X | X | | X | X | X |
| G1/D/2 | X | X | X | X | X | X | | X | X | X |
| G1/D/3 | | | X | | | | | | | |
| G1/D/4 | | X | | | | | | | | |
| G1/E/1 | | | | | | | | | | X |
| G1/E/2 | | | | | | | | | | X |
| G1/F/1 | | | X | | | | | | | |
| G2/A/1 | X | X | X | X | X | X | | X | X | X |
| G2/B/1 | X | X | | | | | | | | X |
| G2/B/2 | X | X | | | | | | | | X |
| G2/B/3 | X | X | | | | | | | | X |
| G2/C/1 | | | X | | | | | | | |
| G2/D/1 | X | X | X | X | X | X | | X | X | X |
| G2/D/2 | X | X | X | X | X | X | | X | X | X |
| G2/D/3 | X | X | X | X | X | X | | X | X | X |
| G2/D/4 | X | X | X | X | X | X | | X | X | X |
| G3/A/1 | | | X | | | | | X | X | X |
| G3/A/2 | | | X | | | | | X | | |
| G3/B/1 | | | X | | | | | X | | |
| G3/B/2 | | | X | | | | | X | | |
| G3/C/1 | | | X | X | X | | | X | X | X |
| G3/C/2 | | | X | X | X | | | X | X | X |
| G3/D/1 | | X | X | | | X | | | | X |
| G3/D/2 | | | | | | | | | | X |
| G3/D/3 | X | | X | | | | | | X | |
| G4/A/1 | X | | | | | | | | | |
| G4/A/2 | X | | | | | | | | | |
| G4/A/3 | X | | | | | | | | | |
| G4/B/1 | | | | | | | | | | X |
| G4/B/2 | | | | | | | | | | X |
| G4/C/1 | X | | X | | | | | | | |
| G4/C/2 | X | | | | | | | | | |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| G4/C/3 | X | | | | X | | | | X | |
| G4/C/4 | X | | X | | | | | | | |
| G4/C/5 | X | | X | | | | | | | |
| G4/D/1 | X | | X | | X | | | | X | |
| G4/D/2 | X | | X | | X | | | | X | |
| G4/D/3 | X | | | | | | | | | |
| G4/D/4 | | | | | X | | | | X | |
| G4/D/5 | X | | | | X | | | | X | |
| G5/A/1 | | | | | | | | | | X |
| G5/B/1 | | | | | | | | | | X |
| G5/B/2 | | | | | | | | | | X |
| G5/C/1 | | | | | | | | | | X |
| G5/C/2 | | | | | | | | | | X |
| G6/A/1 | | | X | X | X | | | | X | X |
| G6/A/2 | | | X | X | X | | | | X | X |
| G6/A/3 | | | X | X | X | | | | X | X |
| G6/B/1 | X | X | X | X | X | X | | X | X | X |
| G6/B/2 | X | X | X | X | X | X | | X | X | X |

**Table 5.7-1 El Toro Loss Estimation Table**

| Hazard Type | Item-> | WST | RES | WTP | PS | PRS | EIT | SC | ADM | LS | WWTP | WELL | DIEMER | OC-88 PS | PRS-MET | PP | WWTP-SOCWA | WWTP-OCSD | LS-OCSD | PWL | WWL | Total Loss Value [1] $M |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Replacement Cost | $M -> | 13.0 | 30.0 | 10.0 | 2.0 | 0.2 | 0.3 | 0.6 | 3.0 | 0.4 | 5.0 | 3.5 | 250.0 | 35.0 | 12.0 | 12.0 | 30.0 | 250.0 | 10.0 | 1.0 | 0.5 | |
| Earthquake | Number | 1 | 1 | 2 | 5 | 2 | 6 | 3 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8.6 | 0.0 | |
| Moderate | Exposure ($M) | $ 13.0 | $ 30.0 | $ 20.0 | $ 10.0 | $ 0.4 | $ 1.8 | $ 1.8 | $ - | $ 0.8 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 8.6 | $ - | $ 86.4 |
| | Number | 4 | 1 | 0 | 5 | 1 | 7 | 1 | 4 | 9 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9.7 | 0.0 | |
| High | Exposure ($M) | $ 52.0 | $ 30.0 | $ - | $ 10.0 | $ 0.2 | $ 2.1 | $ 0.6 | $ 12.0 | $ 3.6 | $ 5.0 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 9.7 | $ - | $ 125.2 |
| | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | |
| Extreme | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| Flood | Number | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.8 | 0.0 | |
| 100-YR | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ 0.3 | $ - | $ - | $ 1.2 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 0.8 | $ - | $ 2.3 |
| | Number | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0.0 | |
| 500-YR | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ 0.3 | $ - | $ - | $ 0.8 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 0.2 | $ - | $ 1.3 |
| Landslide | Number | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.9 | 0.0 | |
| | Exposure ($M) | $ - | $ 30.0 | $ - | $ 2.0 | $ 0.2 | $ - | $ - | $ - | $ 0.8 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 0.9 | $ - | $ 33.9 |
| Liquifaction | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | |
| Moderate | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | |
| High | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | |
| Very High | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| Wildlife/Structure Fire | Number | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0.0 | |
| Low | Exposure ($M) | $ 26.0 | $ - | $ - | $ 2.0 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 0.3 | $ - | $ 28.3 |
| | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | |
| High | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | |
| Extreme | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| | | | | | | | | | | | | | | | | | | | | | Grand Total | **$ 277.5** |

**[1] Loss value is asset replacement value in 2006 dollars. Value shown is found as count of assets at risk from the particular hazard times high-end unit asset value.**
**[2] Grand Total Loss value shown may include the same assets counted multiple times for different hazards.**

## 5.8 GARDEN GROVE – OBJECTIVES, GOALS AND ACTIONS

The City of Garden Grove (Garden Grove) reviewed a set of jurisdictional-level hazard maps including detailed critical facility information and localized potential hazard exposure/loss estimates to help identify the top hazards threatening their jurisdiction. See Section 4 for additional details.

Garden Grove Loss Assessment Table is located at the end of this section.

### 5.8.1 Capability Assessment

The LPG identified current capabilities available for implementing hazard mitigation activities. The Capability Assessment (Assessment) portion of the jurisdictional mitigation plan identifies administrative, technical, legal and fiscal capabilities. This includes a summary of departments and their responsibilities associated to hazard mitigation planning as well as codes, ordinances, and plans already in place associated to hazard mitigation planning. The second part of the Assessment provides Garden Grove's fiscal capabilities that may be applicable to providing financial resources to implement identified mitigation action items.

### 5.8.2 Existing Institutions, Plans, Policies and Ordinances

The legal and regulatory capabilities of Garden Grove are shown in Table 5.8.3-1, which presents the existing ordinances and codes that affect the physical or built environment of Garden Grove. Examples of legal and/or regulatory capabilities can include: the City's building codes, zoning ordinances, subdivision ordinances, special purpose ordinances, growth management ordinances, site plan review, general plans, capital improvement plans, economic development plans, emergency response plans, and real estate disclosure plans.

### 5.8.3 Legal and Regulatory Capability

**Table 5.8.3-1**
**Legal and Regulatory Capability**

| Regulatory Tools (ordinances, codes, plans) | Local Authority (Yes/No) | State Authority (Yes/No) | Other Level Jurisdiction Authority (Yes/No) | Comments |
|---|---|---|---|---|
| A. Building code | Yes | Yes | No | Local cities<br>GG FIRE<br>A.Q.M.D.<br>State Health Dept. Some Exceptions Apply |
| B. Zoning ordinance | Yes | Yes | No | LOCAL |
| C. Subdivision ordinance or regulations | Yes | Yes | No | Local cities<br>County of Orange |

| Regulatory Tools (ordinances, codes, plans) | Local Authority (Yes/No) | State Authority (Yes/No) | Other Level Jurisdiction Authority (Yes/No) | Comments |
|---|---|---|---|---|
| D. Special purpose ordinances (floodplain management, storm water management, hillside or steep slope ordinances, wildfire ordinances, hazard setback requirements) | Yes | Yes | No | County of Orange Regional Water Quality Control Board (RWQCB) |
| E. Growth management ordinances (also called "smart growth" or anti-sprawl programs) | Yes | Yes | No | Local cities<br>County of Orange |
| F. Site plan review requirements | Yes | Yes | No | Local cities<br>County of Orange<br>OCFA<br>Permits |
| G. General or comprehensive plan | Yes | Yes | No | Master Plan |
| H. A capital improvements plan | Yes | Yes | No | City staff |
| I. An economic development plan | Yes | No | No | Local cities |
| J. An emergency response plan | Yes | Yes | Yes | SEMS<br>NIMS<br>WEROC |
| K. A post-disaster recovery plan | Yes | Yes | Yes | NIMS |
| L. A post-disaster recovery ordinance | Yes | Yes | Yes | Local cities<br>County of Orange<br>State of California<br>F.E.M.A |
| M. Real estate disclosure requirements | Yes | Yes | No | |
| N. Metrolink & Caltrans | Yes | Yes | No | |
| O. NCCP | Yes | Yes | Yes | |
| P. CA DHS (Security Issues) | Yes | Yes | Yes | Vulnerability Assessment |
| Q. Waste Discharge Requirements | No | Yes | No | State Water Resources Control Board |

### 5.8.4 Administrative and Technical Capacity

The following is a summary of existing departments in Garden Grove and their responsibilities related to hazard mitigation planning and implementation, as well as existing planning documents and regulations related to mitigation efforts within the community. The administrative and technical capabilities of Garden Grove, as shown in Table 5.8.4-1, provides an identification of the staff, personnel, and

department resources available to implement the actions identified in the mitigation section of the Plan. Specific resources reviewed include those involving technical personnel such as planners/engineers with knowledge of land development and land management practices, engineers trained in construction practices related to building and infrastructure, planners and engineers with an understanding of natural or manmade hazards, floodplain managers, surveyors, personnel with GIS skills and scientists familiar with hazards in the community.

**Table 5.8.4-1**
**Administrative and Technical Capacity**

| Staff/Personnel Resources | Yes/No | Department/Agency and Position |
|---|---|---|
| A. Planner(s) or engineer(s) with knowledge of land development and land management practices | Yes | Economic Development Department |
| B. Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure | Yes | District coordinates with outside consultants<br>In-house and Consultants<br>Engineering Department |
| C. Planners or Engineer(s) with an understanding of natural and/or human-caused hazards | Yes | coordinates with outside consultants |
| D. Floodplain manager | No | County of Orange |
| E. Surveyors | No | Outside consultant |
| F. Staff with education or expertise to assess the community's vulnerability to hazards | No | County of Orange |
| G. Personnel skilled in GIS and/or HAZUS | No | Outside Consultant |
| H. Scientists familiar with the hazards of the community | No | County |
| I. Emergency manager | Yes | GG FIRE |
| J. Grant writers | No | |
| K. Lab Specialist | No | Contractual lab |

### 5.8.5 Fiscal Capability

Table 5.8.5-1 shows specific financial and budgetary tools available to Garden Grove such as community development block grants; capital improvements project funding; authority to levy taxes for specific purposes; fees for water, sewer, gas, or electric services; impact fees for homebuyers or developers for new development; ability to incur debt through general obligations bonds; and withholding spending in hazard-prone areas.

**Table 5.8.5-1**
**Fiscal Capability**

| Financial Resources | Accessible or Eligible to Use (Yes/No/Don't Know) |
|---|---|
| A. Community Development Block Grants (CDBG) | Yes |
| B. Capital improvements project funding | Yes |
| C. Authority to levy taxes for specific purposes | No |
| D. Fees for water, sewer, gas, or electric service | Yes |
| E. Impact fees for homebuyers or developers for new developments/homes | Yes |
| F. Incur debt through general obligation bonds | Yes |
| G. Incur debt through special tax and revenue bonds | Yes |
| H. Incur debt through private activity bonds | No |
| I. Withhold spending in hazard-prone areas | Yes |
| J. Grants | Yes |

### 5.8.6 Local Mitigation Capability Assessment Goals

Listed below are Garden Grove's specific hazard mitigation goals, objectives and related potential actions. For each goal, one or more objectives have been identified that provide strategies to attain the goal. Where appropriate, the City has identified a range of specific actions to achieve the objective and goal.

The goals and objectives were developed by considering the risk assessment findings, localized hazard identification and loss/exposure estimates, and an analysis of the jurisdiction's current capabilities assessment. These preliminary goals, objectives and actions were developed to represent a vision of long-term hazard reduction or enhancement of capabilities. To help in further development of these goals and objectives, the LPG compiled and reviewed current jurisdictional sources including the City's planning documents, codes, and ordinances. In addition, City representatives met with consultant staff and/or MWDOC to specifically discuss these hazard-related goals, objectives and actions as they related to the overall Plan. The Garden Grove LPG members were Zack Barrett, Robert Bermudez, Brent Hayes, Les Ruitenschild, and Don Tunison. Once developed, City staff presented them to the Garden Grove City Council for their approval.

Public meetings were held throughout the County to present these preliminary goals, objectives and actions to citizens and to receive public input. At these meetings, specific consideration was given to hazard identification/profiles and the vulnerability assessment results. The following sections present the

hazard-related goals, objectives and actions as prepared by Garden Grove's LPG in conjunction with the Hazard Mitigation Working Group, locally elected officials, and local citizens.

### 5.8.7 City of Garden Grove Goals

The City of Garden Grove has developed the following five goals and objectives for their Hazard Mitigation Plan.

1. **Minimize damages to facilities / infrastructure due to natural disasters**

    A. Protect existing assets from the effects of natural disasters.

        1. Implement Vulnerability Risk Assessment recommendations.
        2. Keep Emergency Operations Plan up-to-date
        3. Identify all major fuel pipelines, rail transportation corridors, manufacturing facilities, and their relative vulnerability relative to hazardous material releases.

    B. Support existing efforts to mitigate natural disaster hazards

        1. Continue to use current building and infrastructure codes, standards and guidelines
        2. Continue to follow current plans and guidelines.

    C. Protect potable water from contamination

        1. Strictly enforce standard separation between water infrastructure and other utilities
        2. Implement Vulnerability Risk Assessment recommendations
        3. Improve security at facilities
        4. Maintain daily operations site visit monitoring program to each facility
        5. Upgrade SCADA system to existing sites as needed

2. **Minimize disruption of service due to hazard induced outages**

    A. Provide backup system for critical facilities

        1. Maintain interties between supply sources
        2. Maintain emergency interties with neighboring water purveyors
        3. Protect facilities within flood plain areas
        4. Continue with daily site check
        5. Improve response time
        6. Keep Emergency Response Plans up-to-date

7. Update system maps to reflect current condition
8. Maintain stand-by crew for emergency repair

**3. Eliminate or minimize wastewater spills**

1. Provide emergency storage structure for all sewage lift facilities
2. Protect facilities within flood plain areas
3. Construct an emergency storage structure (where needed) at sewage lift stations
4. Standardize and upgrade older lift station electrical and instrumentation systems
5. Install permanent emergency power at all older lift stations
6. Place protective measures in rivers and creeks
7. Install jointless pipelines in all creek crossings and slope easements
8. Parallel sewer force mains
9. Replace existing force mains if necessary
10. Protect facilities within flood plain areas
11. Maintain stand-by crew for emergency repair

**4. Reduce potential loss and injury to human life and to existing assets, facilities, and infrastructure due to human caused hazards**

A. Develop a comprehensive approach to reduce damage and loss due to human caused hazards

1. Continue and expand cooperation with all outside agencies regarding human caused hazards.
2. Continue and expand education for administrative and field personnel on possible human caused hazards.
3. Survey and improve site fencing and other forms of hardening facility deterrence
4. Improve response time to alarm and emergency events
5. Modify SCADA system, when feasible, to look for additional parameters of operation that may indicate problem areas

B. Increase the knowledge of City employees and the public of extremely hazardous substance handling procedures and terrorism awareness.

1. Continue and expand safety training for all City personnel who may come in contact with said materials

2. Conduct workshops for awareness of hazardous materials incidents for all employees
3. Examine opportunities for on-line water quality sensing relative to potential human induced contamination, and implement if feasible

**5. Promote hazard mitigation and promote public understanding.**

1. Participate and coordinate with Water Emergency Response Organization of Orange County (WEROC) and other member agencies in hazard preparedness.
2. Insure sufficient equipment, materials, and communications hardware to respond and recover from natural hazards.
3. Develop mutual aid response teams, training, and exercises for natural hazards with local member agencies.
4. Hold public meetings prior to adoption of this plan.
5. Promote a partnership between the local, county, state governments to identify, prioritize, and implement mitigation actions.
6. Use the public media to cover mitigation activities.
7. Publish newsletters for the public and business leaders with information regarding hazardous mitigation of natural and man-made hazards.
8. Develop full cooperation with all outside agencies regarding human caused hazards.

**GARDEN GROVE - Goals, Objectives and Actions**
**Cross-referenced with identified Hazards Within Orange County**

| Goal, Objective, and Action | Flood/Storm | Wildland/Urban Fire | Earthquake | Dam Failure/Water Tank Failure | Landslide / Mudslide | Tornado / High Winds | Tsunami | Extreme Heat/ Drought | Expansive Soils/Land Subsidence / Liquefaction | Man-Made Hazards/ Contamination |
|---|---|---|---|---|---|---|---|---|---|---|
| G1/A/1 | | | | | | | | | | X |
| G1/A/2 | X | X | X | X | | X | | X | X | X |
| G1/A/3 | X | X | X | X | | X | | X | X | X |
| G1/B/1 | X | X | X | X | | X | | X | X | X |
| G1/B/2 | X | X | X | X | | X | | X | X | X |
| G1/C/1 | | | | | | | | | | X |
| G1/C/2 | | | | | | | | | | X |
| G1/C/3 | | | | | | | | | | X |
| G1/C/4 | | | | | | | | | | X |
| G1/C/5 | X | X | X | X | | X | | X | X | X |
| G2/A/1 | X | X | X | X | | X | | X | X | X |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| G2/A/2 | X | X | X | X | | X | | X | X | X |
| G2/A/3 | X | | | | | | | | | |
| G2/A/4 | X | X | X | X | | X | | X | X | X |
| G2/A/5 | X | X | X | X | | X | | X | X | X |
| G2/A/6 | X | X | X | X | | X | | X | X | X |
| G2/A/7 | X | X | X | X | | X | | X | X | X |
| G2/A/8 | X | X | X | X | | X | | X | X | X |
| G3/1 | X | | | | | | | | | |
| G3/2 | X | | | | | | | | | |
| G3/3 | X | | | | | | | | | |
| G3/4 | X | X | X | X | | X | | X | X | X |
| G3/5 | X | X | X | X | | X | | X | X | |
| G3/6 | X | | | | | | | | | |
| G3/7 | X | | | | | | | | X | |
| G3/8 | X | | X | | | | | | | |
| G3/9 | X | | X | | | | | | | |
| G3/10 | X | | | | | | | | | |
| G3/11 | X | X | X | X | | X | | X | X | X |
| G4/A/1 | | | | | | | | | | X |
| G4/A/2 | | | | | | | | | | X |
| G4/A/3 | | | | | | | | | | X |
| G4/A/4 | | | | | | | | | | XX |
| G4/A/5 | | | | | | | | | | X |
| G4/B/1 | | | | | | | | | | X |
| G4/B/2 | | | | | | | | | | X |
| G4/B/3 | | | | | | | | | | X |
| G5/1 | X | X | X | X | | X | | X | X | X |
| G5/2 | X | X | X | X | | X | | X | X | X |
| G5/3 | X | X | X | X | | X | | X | X | X |
| G5/4 | X | X | X | X | | X | | X | X | X |
| G5/5 | X | X | X | X | | X | | X | X | X |
| G5/6 | X | X | X | X | | X | | X | X | X |
| G5/7 | X | X | X | X | | X | | X | X | X |
| G5/8 | | | | | | | | | | X |

**Table 5.8-1 Garden Grove Loss Estimation Table**

| Hazard Type | Item-> | WST | RES | WTP | PS | PRS | EIT | SC | ADM | LS | WWTP | WELL | DIEMER | OC-88 PS | PRS-MET | PP | WWTP-SOCWA | WWTP-OCSD | LS-OCSD | PWL | WWL | Total Loss Value [1] $M |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Replacement Cost | $M -> | 13.0 | 30.0 | 10.0 | 2.0 | 0.2 | 0.3 | 0.6 | 3.0 | 0.4 | 5.0 | 3.5 | 250.0 | 35.0 | 12.0 | 12.0 | 30.0 | 250.0 | 10.0 | 1.0 | 0.5 | |
| Earthquake | Number | 8 | 0 | 0 | 5 | 2 | 8 | 4 | 2 | 0 | 0 | 12 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 57.0 | 273.0 | |
| Moderate | Exposure ($M) | $ 104.0 | $ - | $ - | $ 10.0 | $ 0.4 | $ 2.4 | $ 2.4 | $ 6.0 | $ - | $ - | $ 42.0 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 57.0 | $ 136.5 | $ 360.6 |
| | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.3 | 34.9 | |
| High | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 1.2 | $ - | $ 3.5 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 1.3 | $ 17.4 | $ 23.4 |
| | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | |
| Very High | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| Flood | Number | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 14.1 | 64.7 | |
| 100 yr | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ 0.3 | $ 0.6 | $ 3.0 | $ 0.4 | $ - | $ 10.5 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 14.1 | $ 32.3 | $ 61.2 |
| | Number | 8 | 0 | 0 | 5 | 2 | 7 | 3 | 1 | 2 | 0 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 44.2 | 0.0 | |
| 500 yr | Exposure ($M) | $ 104.0 | $ - | $ - | $ 10.0 | $ 0.4 | $ 2.1 | $ 1.8 | $ 3.0 | $ 0.8 | $ - | $ 35.0 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 44.2 | $ - | $ 201.3 |
| Landslide | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | |
| | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| Liquifaction | Number | 5 | 0 | 0 | 2 | 0 | 1 | 2 | 1 | 2 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 23.7 | 129.3 | |
| Moderate | Exposure ($M) | $ 65.0 | $ - | $ - | $ 4.0 | $ - | $ 0.3 | $ 1.2 | $ 3.0 | $ 0.8 | $ - | $ 17.5 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 23.7 | $ 64.6 | $ 180.2 |
| | Number | 1 | 0 | 0 | 1 | 2 | 2 | 0 | 1 | 1 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 17.6 | 84.7 | |
| High | Exposure ($M) | $ 13.0 | $ - | $ - | $ 2.0 | $ 0.4 | $ 0.6 | $ - | $ 3.0 | $ 0.4 | $ - | $ 10.5 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 17.6 | $ 42.4 | $ 89.8 |
| | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | |
| Very High | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| Wildlife/Structure Fire | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.9 | 3.8 | |
| Low | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 3.5 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 0.9 | $ 1.9 | $ 6.3 |
| | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | |
| High | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | |
| Extreme | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| | | | | | | | | | | | | | | | | | | | | | Grand Total | **$ 922.8** |

**[1] Loss value is asset replacement value in 2006 dollars. Value shown is found as count of assets at risk from the particular hazard times high-end unit asset value.**
**[2] Grand Total Loss value shown may include the same assets counted multiple times for different hazards.**

## 5.9 LAGUNA BEACH – OBJECTIVES, GOALS AND ACTIONS

Laguna Beach County Water District (Laguna Beach) reviewed a set of jurisdictional-level hazard maps including detailed critical facility information and localized potential hazard exposure/loss estimates to help identify the top hazards threatening their jurisdiction. See Section 4 for additional details.

Laguna Beach Loss Assessment Table is located at the end of this section.

### 5.9.1 Capability Assessment

Laguna Beach is currently developing their capabilities.

The LPG identified current capabilities available for implementing hazard mitigation activities. The Capability Assessment (Assessment) portion of the jurisdictional mitigation plan identifies administrative, technical, legal and fiscal capabilities. This includes a summary of departments and their responsibilities associated to hazard mitigation planning as well as codes, ordinances, and plans already in place associated to hazard mitigation planning. The second part of the Assessment provides Laguna Beach's fiscal capabilities that may be applicable to providing financial resources to implement identified mitigation action items.

### 5.9.2 Existing Institutions, Plans, Policies and Ordinances

The legal and regulatory capabilities of Laguna Beach are shown in Table 5.9.3-1, which presents the existing ordinances and codes that affect the physical or built environment of Laguna Beach. Examples of legal and/or regulatory capabilities can include: building codes, zoning ordinances, subdivision ordinances, special purpose ordinances, growth management ordinances, site plan review, general plans, capital improvement plans, economic development plans, emergency response plans, and real estate disclosure plans.

### 5.9.3 Legal and Regulatory Capability

**Table 5.9.3-1**

**Legal and Regulatory Capability**

| Legal and Regulatory Capability | | | | |
|---|---|---|---|---|
| Regulatory Tools (ordinances, codes, plans) | Local Authority (Yes/No) | Does State Prohibit? (Yes/No) | Higher Level Jurisdiction Authority (Yes/No) | Comments |
| C. Building code | Yes | No | No | Back flow prevention |
| D. Zoning ordinance | Yes | No | No | .City of Laguna Beach |
| E. Subdivision ordinance or regulations | Yes | No | No | City of Laguna Beach |

| Legal and Regulatory Capability | | | | |
|---|---|---|---|---|
| Regulatory Tools (ordinances, codes, plans) | Local Authority (Yes/No) | Does State Prohibit? (Yes/No) | Higher Level Jurisdiction Authority (Yes/No) | Comments |
| F. Special purpose ordinances (floodplain management, stormwater management, hillside or steep slope ordinances, wildfire ordinances, hazard setback requirements) | No | No | Yes | The County of Orange has flood and fire control responsibilities in the unincorporated areas. The City of Laguna Beach has storm water and fire control responsibilities within the city corporate limits. |
| G. Growth management ordinances (also called "smart growth" or anti-sprawl programs) | No | No | No | |
| H. Site plan review requirements | Yes | No | No | |
| I. General or comprehensive plan | No | No | No | |
| J. A capital improvements plan | Yes | No | No | |
| K. An economic development plan | No | No | No | |
| L. An emergency response plan | Yes | No | Yes | SEMS/NIMS |
| M. A post-disaster recovery plan | Yes | No | Yes | |
| A. A post-disaster recovery ordinance | No | No | No | |
| B. Real estate disclosure requirements | No | No | Yes | |

## 5.9.4 Administrative and Technical Capacity

The following is a summary of existing departments in Laguna Beach and their responsibilities related to hazard mitigation planning and implementation, as well as existing planning documents and regulations related to mitigation efforts within the community. The administrative and technical capabilities of Laguna Beach, as shown in Table 5.9.4-1, provides an identification of the staff, personnel, and department resources available to implement the actions identified in the mitigation section of the Plan. Specific resources reviewed include those involving technical personnel such as planners/engineers with knowledge of land development and land management practices, engineers trained in construction practices related to building and infrastructure, planners and engineers with an understanding of natural or manmade hazards, floodplain managers, surveyors, personnel with GIS skills and scientists familiar with hazards in the community.

**Table 5.9.4-1**

**Administrative and Technical Capacity**

| Staff/Personnel Resources | Yes/No | Department/Agency and Position |
|---|---|---|
| C. Planner(s) or engineer(s) with knowledge of land development and land management practices | NO | The City of Laguna Beach is responsible for land management with in the corporate limits. |
| D. Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure | YES | The Laguna Beach County Water District and the City of Laguna Beach have engineers trained in construction practices. |
| E. Planners or Engineer(s) with an understanding of natural and/or human-caused hazards | NO | |
| F. Floodplain manager | NO | The County of Orange is responsible for flood plain management. |
| G. Surveyors | NO | |
| H. Staff with education or expertise to assess the community's vulnerability to hazards | YES | Laguna Beach County Water District Engineering Department |
| I. Personnel skilled in GIS and/or HAZUS | NO | |
| J. Scientists familiar with the hazards of the community | NO | |
| A. Emergency manager | YES | The Laguna Beach County Water District General Manager |
| A) Grant writers | YES | The Laguna Beach County Water District Engineering Department |

### 5.9.5 Fiscal Capability

Table 5.9.5-1 shows specific financial and budgetary tools available to Laguna Beach such as community development block grants; capital improvements project funding; authority to levy taxes for specific purposes; fees for water, sewer, gas, or electric services; impact fees for homebuyers or developers for new development; ability to incur debt through general obligations bonds; and withholding spending in hazard-prone areas.

**Table 5.9.5-1**

**Fiscal Capability**

| Financial Resources | Accessible or Eligible to Use (Yes/No/Don't Know) |
|---|---|
| C. Community Development Block Grants (CDBG) | NO |
| D. Capital improvements project funding | YES |
| E. Authority to levy taxes for specific purposes | NO |
| F. Fees for water, sewer, gas, or electric service | YES |
| G. Impact fees for homebuyers or developers for new developments/homes | YES |
| H. Incur debt through general obligation bonds | YES |
| I. Incur debt through special tax and revenue bonds | NO |
| A. Incur debt through private activity bonds | NO |
| B. Withhold spending in hazard-prone areas | NO |

### 5.9.6 Local Mitigation Capability Assessment Goals

Listed below are Laguna Beach's specific hazard mitigation goals, objectives and related potential actions. For each goal, one or more objectives have been identified that provide strategies to attain the goal. Where appropriate, Laguna Beach has identified a range of specific actions to achieve the objective and goal.

The goals and objectives were developed by considering the risk assessment findings, localized hazard identification and loss/exposure estimates, and an analysis of the jurisdiction's current capabilities assessment. These preliminary goals, objectives and actions were developed to represent a vision of long-term hazard reduction or enhancement of capabilities. To help in further development of these goals and objectives, the LPG compiled and reviewed current jurisdictional sources including the Laguna Beach planning documents, codes, and ordinances. In addition, LBCWD representatives met with consultant

staff and/or MWDOC to specifically discuss these hazard-related goals, objectives and actions as they related to the overall Plan. Once developed, LBCWD staff presented them to the LBCWD Board of Directors for their approval.

Public meetings were held throughout the County to present these preliminary goals, objectives and actions to citizens and to receive public input. At these meetings, specific consideration was given to hazard identification/profiles and the vulnerability assessment results. The following sections present the hazard-related goals, objectives and actions as prepared by Laguna Beach's LPG in conjunction with the Hazard Mitigation Working Group, locally elected officials, and local citizens.

**Table 5.9.6-1**

**Local Mitigation Capability Assessment**

| Agency Name (Mission/Function) | Programs, Plans, Policies, Regulations, Funding, or Practices | Point of Contact, Address, Phone | Effect on Loss Reduction | | | Comments |
|---|---|---|---|---|---|---|
| | | | Support | Facilitate | Hinder | |
| San Diego Regional Water Quality Board *(RWQCB) | 1. Water Quality | Joanne Lim (858) 637-5583 | YES | YES | NO | |
| City of Laguna Beach | 1. Public Works and Engineering with in the corporate limits of the city | Steve May (949) 497-0351 | YES | YES | NO | Responsible for storm water and waste water |
| | 2. Construction of public works projects with in the city corporate limits | Bob Koch (949) 497- 0340 | YES | YES | NO | Inspection and project coordination |
| Laguna Beach County Water District | 1.Water distribution | Renae Hinchey (949) 493-1041 District Manager of the Laguna Beach County Water District | YES | YES | NO | |
| | 2. Water Distribution and maintenance | James R. Nestor, District Engineer and Director of Operations | YES | YES | NO | |

| Agency Name (Mission/Function) | Programs, Plans, Policies, Regulations, Funding, or Practices | Point of Contact, Address, Phone | Effect on Loss Reduction | | | Comments |
|---|---|---|---|---|---|---|
| | | | Support | Facilitate | Hinder | |
| County of Orange | Orange County Health Care Agency. | 2009 Edinger Ave. Santa Ana, Ca. 92705 | YES | YES | NO | |
| State of California, Department of Health Services | Department of Health Services Division of Drinking Water and Environmental Management | 20 Civic Center Plaza , Santa Ana, Ca. 92701 | YES | YES | NO | |
| California Coastal Commission South Coast District | | Carl Schwing 200 Oceangate, 10th Floor Long Beach, Ca 90802 | YES | YES | NO | |

### *5.9.6.1 LBCWD Goals*

**GOAL 1: Reduce the District's Vulnerability to Disruption.**

A. Provide and maintain security at all reservoir and pump station sites.

**1.** Inspect each reservoir and pump station site on a daily basis.

**2.** Monitor any suspicious activity at or near reservoirs and pump station sites.

3. Keep all fences in good repair and all entries equipped with locks.

4. Maintain staggered daily surveillance at all major facilities.

5. Do not promote or permit recreational use of District facilities.

6. Continually monitor the SCADA system at each district facility.

7. Set up policing procedures with City and County law enforcement.

8. Evaluate and consider participation in alternatives investigation.

**B.** Consider options to access alternative supplies from the OCWD groundwater basin and/or other projects to improve reliability.

**GOAL 2: Reduce Water Service Outages and Maintain Reliability During Disastrous Events.**

A. Reduce water service outages from distribution and storage facilities

1. Keep combustible materials away from distribution and storage facilities.
2. Physically inspect all distribution and storage facilities daily.
3. Seismically retrofit existing steel reservoirs that are 20 years and older.

B. Maintain reliable water operations during earthquake, flood or fire storm.

1. Seismically evaluate buried or partially buried concrete reservoirs and vaults.
2. Establish protocol for SCADA system losses.
3. Establish a priority evaluation for all water facilities.

**LBCWD - Goals, Objectives and Actions**
**Cross-referenced with identified Hazards Within Orange County**

| Goal, Objective, and Action | Flood/Storm | Wildland/Urban Fire | Earthquake | Dam Failure/Water Tank Failure | Landslide / Mudslide | Tornado / High Winds | Tsunami | Extreme Heat/ Drought | Expansive Soils/Land Subsidence / Liquefaction | Man-Made Hazards/ Contamination |
|---|---|---|---|---|---|---|---|---|---|---|
| G1/A/1 | | | | | | | | | | X |
| G1/A/2 | | | | | | | | | | X |
| G1/A/3 | | | | | | | | | | X |
| G1/A/4 | | | | | | | | | | X |
| G1/A/5 | | | | | | | | | | X |
| G1/A/6 | | | | | | | | | | X |
| G1/A/7 | | | | | | | | | | X |
| G1/A/8 | | | | | | | | | | X |
| G1/B | X | X | X | X | X | X | X | X | X | X |
| G2/A/1 | | X | | | | | | | | X |
| G2/A/2 | | | | | | | | | | X |
| G2/A/3 | | | X | | | | X | | X | |
| G2/B/1 | | | X | | | | | | | |
| G2/B/2 | X | X | X | X | X | X | X | X | X | X |
| G2/B/3 | X | X | X | X | X | X | X | X | X | X |

**Table 5.9-1 Laguna Beach Loss Estimation Table**

| Hazard Type | Item-> | WST | RES | WTP | PS | PRS | EIT | SC | ADM | LS | WWTP | WELL | DIEMER | OC-88 PS | PRS-MET | PP | WWTP-SOCWA | WWTP-OCSD | LS-OCSD | PWL | WWL | Total Loss Value [1] $M |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Replacement Cost | $M -> | 13.0 | 30.0 | 10.0 | 2.0 | 0.2 | 0.3 | 0.6 | 3.0 | 0.4 | 5.0 | 3.5 | 250.0 | 35.0 | 12.0 | 12.0 | 30.0 | 250.0 | 10.0 | 1.0 | 0.5 | |
| Earthquake | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | |
| Moderate | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| | Number | 21 | 0 | 0 | 12 | 4 | 4 | 3 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 16.7 | 0.0 | |
| High | Exposure ($M) | $ 273.0 | $ - | $ - | $ 24.0 | $ 0.8 | $ 1.2 | $ 1.8 | $ 6.0 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 16.7 | $ - | $ 323.5 |
| | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | |
| Extreme | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| Flood | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 0.0 | |
| 100 yr | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 0.4 | $ - | $ 0.4 |
| | Number | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0.0 | |
| 500 yr | Exposure ($M) | $ 13.0 | $ - | $ - | $ 2.0 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 0.1 | $ - | $ 15.1 |
| Landslide | Number | 9 | 0 | 0 | 4 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4.5 | 0.0 | |
| | Exposure ($M) | $ 117.0 | $ - | $ - | $ 8.0 | $ 0.2 | $ 0.3 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 4.5 | $ - | $ 130.0 |
| Liquifaction | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | |
| Moderate | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| High | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | |
| | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| Very High | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | |
| | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| Wildlife/Structure Fire | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0.0 | |
| Low | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 0.3 | $ - | $ 0.3 |
| | Number | 1 | 0 | 0 | 4 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.3 | 0.0 | |
| High | Exposure ($M) | $ 13.0 | $ - | $ - | $ 8.0 | $ - | $ - | $ 0.6 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 1.3 | $ - | $ 22.9 |
| | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | |
| Extreme | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 0.0 | $ - | $ 0.0 |
| | | | | | | | | | | | | | | | | | | | | | Grand Total | **$ 492.3** |

**[1] Loss value is asset replacement value in 2006 dollars. Value shown is found as count of assets at risk from the particular hazard times high-end unit asset value.**
**[2] Grand Total Loss value shown may include the same assets counted multiple times for different hazards.**

## 5.10 LA HABRA – OBJECTIVE, GOALS AND ACTIONS

The City of La Habra (La Habra) reviewed a set of jurisdictional-level hazard maps including detailed critical facility information and localized potential hazard exposure/loss estimates to help identify the top hazards threatening their jurisdiction. See Section 4 for additional details.

La Habra Loss Assessment Table is located at the end of this section.

### 5.10.1 Capability Assessment

The LPG identified current capabilities available for implementing hazard mitigation activities. The Capability Assessment (Assessment) portion of the jurisdictional mitigation plan identifies administrative, technical, legal and fiscal capabilities. This includes a summary of departments and their responsibilities associated to hazard mitigation planning as well as codes, ordinances, and plans already in place associated to hazard mitigation planning. The second part of the Assessment provides La Habra's fiscal capabilities that may be applicable to providing financial resources to implement identified mitigation action items.

### 5.10.2 Existing Institutions, Plans, Policies and Ordinances

The legal and regulatory capabilities of La Habra are shown in Table 5.10.2-1, which presents the existing ordinances and codes that affect the physical or built environment of La Habra. Examples of legal and/or regulatory capabilities can include: the City's building codes, zoning ordinances, subdivision ordinances, special purpose ordinances, growth management ordinances, site plan review, general plans, capital improvement plans, economic development plans, emergency response plans, and real estate disclosure plans.

**Table 5.10.2-1**
**Legal and Regulatory Capability**

| Regulatory Tools (ordinances, codes, plans) | Local Authority (Yes/No) | State Authority (Yes/No) | Other Level Jurisdiction Authority (Yes/No) | Comments |
|---|---|---|---|---|
| A. Building code | Yes | No | No | Planning, Code Enforcement |
| B. Zoning ordinance | Yes | No | No | Planning |
| C. Subdivision ordinance or regulations | Yes | No | No | Planning |
| D. Special purpose ordinances (floodplain management, storm water management, hillside or steep slope ordinances, wildfire ordinances, hazard setback requirements) | Yes | Yes | Yes | County of Orange<br>Army Corps of Engineers<br>RWQCB,USFWS/CDRG |
| E. Growth management ordinances (also called "smart growth" or anti-sprawl programs) | Yes | No | No | Planning |

**Table 5.10.2-1 (continued)**
**Legal and Regulatory Capability**

| Regulatory Tools (ordinances, codes, plans) | Local Authority (Yes/No) | State Authority (Yes/No) | Other Level Jurisdiction Authority (Yes/No) | Comments |
|---|---|---|---|---|
| F. Site plan review requirements | Yes | No | No | Planning |
| G. General or comprehensive plan | Yes | No | No | City General Plan |
| H. A capital improvements plan | Yes | No | No | Water Master Plan |
| I. An economic development plan | Yes | No | No | Community Development |
| J. An emergency response plan | Yes | No | No | SEMS, WEROC,NIMS |
| K. A post-disaster recovery plan | Yes | No | No | NIMS |
| L. A post-disaster recovery ordinance | Yes | No | No | |
| M. Real estate disclosure requirements | Yes | No | No | State Board of Realtors |
| N. Caltrans | No | Yes | No | |
| O. CA DHS (Security Issues) | Yes | No | No | Vulnerability Assessment |
| P. Title M & 22 (potable) | Yes | Yes | Yes | USEPA |
| Q. Waste Discharge Requirements | No | Yes | No | State Water Resources Control Board |

## 5.10.3 Administrative and Technical Capacity

The following is a summary of existing departments in La Habra and their responsibilities related to hazard mitigation planning and implementation, as well as existing planning documents and regulations related to mitigation efforts within the community. The administrative and technical capabilities of La Habra, as shown in Table 5.10.3-1, provides an identification of the staff, personnel, and department resources available to implement the actions identified in the mitigation section of the Plan. Specific resources reviewed include those involving technical personnel such as planners/engineers with knowledge of land development and land management practices, engineers trained in construction practices related to building and infrastructure, planners and engineers with an understanding of natural or manmade hazards, floodplain managers, surveyors, personnel with GIS skills and scientists familiar with hazards in the community.

**Table 5.10.3-1**
**Administrative and Technical Capacity**

| Staff/Personnel Resources | Yes/No | Department/Agency and Position |
|---|---|---|
| A. Planner(s) or engineer(s) with knowledge of land development and land management practices | Yes | Public Works (Engineers)<br>Planning (Planners) |
| B. Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure | Yes | Building Officials/Public Works<br>( Engineers)& Contractors |
| C. Planners or Engineer(s) with an understanding of natural and/or human-caused hazards | Yes | Public Works (Engineers)<br>Planning (Planners) |
| D. Floodplain manager | No | County of Orange |
| E. Surveyors | Yes | Public Works Traffic Engineers (Technicians) |
| F. Staff with education or expertise to assess the community's vulnerability to hazards | No | WEROC / County of Orange |
| G. Personnel skilled in GIS and/or HAZUS | Yes | Center for Demographic Research, CSUF |
| H. Scientists familiar with the hazards of the community | No | County of Orange, Cal Tech, local Universities |
| I. Emergency manager | Yes | Police / Public Works / Water Manager<br>Senior Water Worker |
| J. Grant writers | Yes | Public Works / Administrative Analyst |
| K. Lab Specialist | No | Clinical Labs, Contracted |

## 5.10.4 Fiscal Capability

Table 5.10.4-1 shows specific financial and budgetary tools available to La Habra such as community development block grants; capital improvements project funding; authority to levy taxes for specific purposes; fees for water, sewer, gas, or electric services; impact fees for homebuyers or developers for new development; ability to incur debt through general obligations bonds; and withholding spending in hazard-prone areas.

**Table 5.10.4-1**
**Fiscal Capability**

| Financial Resources | Accessible or Eligible to Use (Yes/No/Don't Know) |
|---|---|
| Community Development Block Grants (CDBG) | No |
| Capital improvements project funding | Yes |
| Authority to levy taxes for specific purposes | No |
| Fees for water, sewer, gas, or electric service | Yes |
| Impact fees for homebuyers or developers for new developments/homes | Yes |
| Incur debt through general obligation bonds | Yes |
| Incur debt through special tax and revenue bonds | Yes |
| Incur debt through private activity bonds | Yes |
| Withhold spending in hazard-prone areas | Yes |
| Grants | Yes |

### 5.10.5 Local Mitigation Capability Assessment Goals

Listed below are La Habra's specific hazard mitigation goals, objectives and related potential actions. For each goal, one or more objectives have been identified that provide strategies to attain the goal. Where appropriate, the City has identified a range of specific actions to achieve the objective and goal.

The goals and objectives were developed by considering the risk assessment findings, localized hazard identification and loss/exposure estimates, and an analysis of the jurisdiction's current capabilities assessment. These preliminary goals, objectives and actions were developed to represent a vision of long-term hazard reduction or enhancement of capabilities. To help in further development of these goals and objectives, the LPG compiled and reviewed current jurisdictional sources including the City's planning documents, codes, and ordinances. In addition, City representatives met with consultant staff and/or MWDOC to specifically discuss these hazard-related goals, objectives and actions as they related to the overall Plan. Once developed, City staff presented them to the La Habra City Council for their approval.

Public meetings were held throughout the County to present these preliminary goals, objectives and actions to citizens and to receive public input. At these meetings, specific consideration was given to hazard identification/profiles and the vulnerability assessment results. The following sections present the hazard-related goals, objectives and actions as prepared by La Habra's LPG in conjunction with the Hazard Mitigation Working Group, locally elected officials, and local citizens.

**Table 5.10.5-1**
**Local Mitigation Capability Assessment**

| Agency Name (Mission/Function) | Programs, Plans, Policies, Regulations, Funding, or Practices | Title Address Phone Contact | Effect on Loss Reduction* | | | Comments |
|---|---|---|---|---|---|---|
| | | | Support | Facilitate | Hinder | |
| CITY OF LA HABRA WATER DIVISION<br>1. The mission of the La Habra Water Division is; to provide safe, high quality drinking water and also to ensure 100 percent fire protection and adequate water pressure to the residents of La Habra; to provide these water delivery services at the lowest possible cost in a safe working environment for all City Water Division employees. | 1. Water Division Best Management Practices | Water/Sewer Manager<br>621 West Lambert Road<br>La Habra, CA 90631<br>(562) 905-9792 | X | X | | |
| | 2. Vulnerability Assessment | Water/Sewer Manager<br>621 West Lambert Road<br>La Habra, CA 90631<br>(562) 905-9792 | X | X | | |
| | 3.Water Emergency Response Plan / WEROC SEMS, NIMS | Water/Sewer Manager<br>621 West Lambert Road<br>La Habra, CA 90631<br>(562) 905-9792 | X | X | | |
| | 4.Urban Water Management Plan | Water/Sewer Manager<br>621 West Lambert Road<br>La Habra, CA 90631<br>(562) 905-9792 | X | X | | |
| | 5. Water Master Plan | Water/Sewer Manager<br>621 West Lambert Road<br>La Habra, CA 90631<br>(562) 905-9792 | X | X | | |

**Table 5.10. 5-1 (continued)**
**Local Mitigation Capability Assessment**

| Agency Name (Mission/Function) | Programs, Plans, Policies, Regulations, Funding, or Practices | Title Address Phone Contact | Effect on Loss Reduction* | | | Comments |
|---|---|---|---|---|---|---|
| | | | Support | Facilitate | Hinder | |
| CITY OF LA HABRA COMMUNITY DEVELOPMENT | 1. City General Plan | Planning Manager<br>201 East La Habra Blvd.<br>La Habra, CA 90631<br>(562) 905-9700 | X | X | | |
| CITY OF LA HABRA POLICE | 2. City Emergency Management Plan | Police Department<br>150 North Euclid Street<br>La Habra, CA 90631<br>(562) 905-9750 | X | X | | |
| | | | | | | |
| County Fire | 1. Inventory Program of Hazardous Waste | Assistant Chief<br>Fire Station #1<br>850 West La Habra Blvd<br>La Habra, CA 90631<br>(562) 691-4692 | X | X | | |
| | 2. Fire Code Inspections | Assistant Chief<br>Fire Station #1<br>850 West La Habra Blvd<br>La Habra, CA 90631<br>(562) 691-4692 | X | X | | |
| US Army Corps of Engineers | 1. Reservoir Regulation<br>Prado Dam | Director<br>Los Angeles District<br>915 Wilshire Blvd, Ste 980<br>Los Angeles, CA 90017<br>(213) 452-3908 | X | X | | |

**Table 5.10.5-1 (continued)**
**Local Mitigation Capability Assessment**

| Agency Name (Mission/Function) | Programs, Plans, Policies, Regulations, Funding, or Practices | Title Address Phone Contact | Effect on Loss Reduction* | | | Comments |
|---|---|---|---|---|---|---|
| | | | Support | Facilitate | Hinder | |
| US Fish & Wildlife Service | 1. Enhance legitimate use & enjoyment of migratory birds & other wildlife | 370 Amapola Ave. Ste 114<br>Torrance, CA 90501<br>(310) 328-1516 | X | X | | |
| U.S .Environmental Protection Agency/ Office of Drinking Water | 1. Water Quality; regulate and update drinking water quality standards. | Division of Drinking Water & Environmental Management California DHS<br>P.O. Box 942732-MS216 Sacramento, CA 94234-4320<br>(916) 323-6111 | X | X | | |

## 5.10.6 City of La Habra Goals

The City of La Habra has developed two goals for their Hazard Mitigation Plan.

**Goal 1** **Minimize damages to facilities/infrastructure due to natural disasters**

**Goal 2** **Reduce potential loss and injury to human life and to existing assets, facilities, and infrastructure due to human caused hazards**

## 5.10.7 Objectives and Actions

**Goal 1: Minimize damages to facilities/infrastructure due to natural disasters**

A. Protect existing assets with the highest vulnerability to the effects of natural disasters.
   1. Continue inspections to ensure retrofitting is in place.
   2. Secure above ground assets in all buildings, at well sites, booster stations, pressure reducing valves, emergency interties, and main water supplies.

B. Coordinate and support existing efforts to mitigate natural disaster hazards
   1. Continue to use current building and infrastructure codes, standards and guidelines
   2. Continue to follow current plans and guidelines

3. Evaluate options for increasing pumping from the La Habra Groundwater Basin to further diversify reliability to the City.

**Goal 2: Reduce potential loss and injury to human life and to existing assets, facilities, and infrastructure due to human caused hazards**

A. Develop a comprehensive approach to reduce damage and loss due to human caused hazards

1. Develop and expand cooperation with all outside agencies regarding human caused hazards.
2. Continue and expand education for administrative personnel on possible human caused hazards.

B. Increase the knowledge of government employees and the public of extremely hazardous substance handling procedures and terrorism awareness.

1. Continue and expand OSHA training for all employees who may come in contact with said materials
2. Conduct public workshops for awareness of hazardous materials incidents for government employees

**La Habra - Goals, Objectives and Actions**
**Cross-referenced with identified Hazards Within Orange County**

| Goal, Objective, and Action | Flood/Storm | Wildland/Urban Fire | Earthquake | Dam Failure/Water Tank Failure | Landslide / Mudslide | Tornado / High Winds | Tsunami | Extreme Heat/ Drought | Expansive Soils/Land Subsidence / Liquefaction | Man-Made Hazards/ Contamination |
|---|---|---|---|---|---|---|---|---|---|---|
| G1/A/1 | | | X | | | | | | X | |
| G1/A/2 | | | | | | | | | | X |
| G1/B/1 | X | X | X | X | X | X | | X | X | X |
| G1/B/2 | X | X | X | X | X | X | | X | X | X |
| G1/B/3 | X | X | X | X | X | X | | X | X | X |
| G2/A/1 | | | | | | | | | | X |
| G2/A/2 | | | | | | | | | | X |
| G2/B/1 | | | | | | | | | | X |
| G2/B/2 | | | | | | | | | | X |

**Table 5.10-1 La Habra Loss Estimation Table**

| Hazard Type | Item-> | WST | RES | WTP | PS | PRS | EIT | SC | ADM | LS | WWTP | WELL | DIEMER | OC-88 PS | PRS-MET | PP | WWTP-SOCWA | WWTP-OCSD | LS-OCSD | PWL | WWL | Total Loss Value [1] $M |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Replacement Cost | $M -> | 13.0 | 30.0 | 10.0 | 2.0 | 0.2 | 0.3 | 0.6 | 3.0 | 0.4 | 5.0 | 3.5 | 250.0 | 35.0 | 12.0 | 12.0 | 30.0 | 250.0 | 10.0 | 1.0 | 0.5 | |
| Earthquake | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | |
| Moderate | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| | Number | 3 | 0 | 0 | 3 | 24 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6.4 | 0.0 | |
| High | Exposure ($M) | $ 39.0 | $ - | $ - | $ 6.0 | $ 4.8 | $ 0.3 | $ - | $ 3.0 | $ - | $ - | $ 3.5 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 6.4 | $ - | $ 63.0 |
| | Number | 2 | 0 | 0 | 3 | 33 | 3 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 13.2 | 0.0 | |
| Extreme | Exposure ($M) | $ 26.0 | $ - | $ - | $ 6.0 | $ 6.6 | $ 0.9 | $ 2.4 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 13.2 | $ - | $ 55.1 |
| Flood | Number | 0 | 0 | 0 | 0 | 3 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0.0 | |
| 100 yr | Exposure ($M) | $ - | $ - | $ - | $ - | $ 0.6 | $ - | $ 0.6 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 0.3 | $ - | $ 1.5 |
| 500 yr | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.7 | 0.0 | |
| High | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 0.7 | $ - | $ 0.7 |
| Landslide | Number | 0 | 0 | 0 | 1 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 0.0 | |
| | Exposure ($M) | $ - | $ - | $ - | $ 2.0 | $ 0.6 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 0.4 | $ - | $ 3.0 |
| Liquifaction | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | |
| Moderate | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | |
| High | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| Very High | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | |
| | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| Wildlife/Structure Fire | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0.0 | |
| Low | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 0.3 | $ - | $ 0.3 |
| | Number | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | |
| High | Exposure ($M) | $ - | $ - | $ - | $ - | $ 0.2 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 0.2 |
| | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | |
| Extreme | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| | | | | | | | | | | | | | | | | | | | | | Grand Total | **$ 123.9** |

**[1] Loss value is asset replacement value in 2006 dollars. Value shown is found as count of assets at risk from the particular hazard times high-end unit asset value.**
**[2] Grand Total Loss value shown may include the same assets counted multiple times for different hazards.**

## 5.11 MESA – OBJECTIVE, GOALS AND ACTIONS

The Mesa Consolidated Water District (Mesa) reviewed a set of jurisdictional-level hazard maps including detailed critical facility information and localized potential hazard exposure/loss estimates to help identify the top hazards threatening their jurisdiction. See Section 4 for additional details.

Mesa Loss Assessment Table is located at the end of this section.

### 5.11.1 Capability Assessment

The LPG identified current capabilities available for implementing hazard mitigation activities. The Capability Assessment (Assessment) portion of the jurisdictional mitigation plan identifies administrative, technical, legal and fiscal capabilities. This includes a summary of departments and their responsibilities associated to hazard mitigation planning as well as codes, ordinances, and plans already in place associated to hazard mitigation planning. The second part of the Assessment provides Mesa's fiscal capabilities that may be applicable to providing financial resources to implement identified mitigation action items.

### 5.11.2 Existing Institutions, Plans, Policies and Ordinances

The legal and regulatory capabilities of Mesa are shown in Table 5.11.2-1, which presents the existing ordinances and codes that affect the physical or built environment of Mesa. Examples of legal and/or regulatory capabilities can include: the District's building codes, zoning ordinances, subdivision ordinances, special purpose ordinances, growth management ordinances, site plan review, general plans, capital improvement plans, economic development plans, emergency response plans, and real estate disclosure plans.

**Table 5.11.2-1**
**Legal and Regulatory Capability**

| Regulatory Tools (ordinances, codes, plans) | Local Authority (Yes/No) | State Authority (Yes/No) | Other Level Jurisdiction Authority (Yes/No) | Comments |
|---|---|---|---|---|
| A. Building code | Yes | No | Yes | Local Cities<br>OCFA<br>AQMD<br>HCA < State/County |
| B. Zoning ordinance | Yes | No | Yes | Local Cities<br>County of Orange<br>Coastal Commission |
| C. Subdivision ordinance or regulations | Yes | No | Yes | Local Cities<br>County of Orange |

**Table 5.11.2-1 (continued)**
**Legal and Regulatory Capability**

| Regulatory Tools (ordinances, codes, plans) | Local Authority (Yes/No) | State Authority (Yes/No) | Other Level Jurisdiction Authority (Yes/No) | Comments |
|---|---|---|---|---|
| D. Special purpose ordinances (floodplain management, storm water management, hillside or steep slope ordinances, wildfire ordinances, hazard setback requirements) | No | No | Yes | County of Orange<br>Army Corps of Engineers<br>USFWS/CDFG<br>Coastal Commission<br>Regional Water Quality Control Board (RWQCB)<br>SAWPA<br>OCFA<br>CDF/Forest Service |
| E. Growth management ordinances (also called "smart growth" or anti-sprawl programs) | Yes | No | Yes | Local Cities<br>County of Orange<br>OCFA |
| F. Site plan review requirements | Yes | No | Yes | Local Cities<br>County of Orange<br>OCFA |
| G. General or comprehensive plan | Yes | No | No | MCWD |
| H. A capital improvements plan | Yes | No | Yes | MCWD<br>RWQCB<br>LAFCO |
| I. An economic development plan | Yes | No | Yes | Local Cities<br>MCWD |
| J. An emergency response plan | Yes | No | Yes | NIMS<br>SEMS<br>WEROC |
| K. A post-disaster recovery plan | Yes | No | Yes | NIMS |
| L. A post-disaster recovery law | Yes | No | Yes | Local cities<br>AQMD<br>CA DHS |
| M. Real estate disclosure requirements | No | No | Yes | School District<br>County Tax<br>Realtor |

### 5.11.3 Administrative and Technical Capacity

The following is a summary of existing departments in Mesa and their responsibilities related to hazard mitigation planning and implementation, as well as existing planning documents and regulations related to mitigation efforts within the community. The administrative and technical capabilities of Mesa, as shown in Table 5.11.3-1, provides an identification of the staff, personnel, and department resources available to implement the actions identified in the mitigation section of the Plan. Specific resources reviewed include those involving technical personnel such as planners/engineers with knowledge of land development and land management practices, engineers trained in construction practices related to building and infrastructure, planners and engineers with an understanding of natural or manmade hazards, floodplain managers, surveyors, personnel with GIS skills and scientists familiar with hazards in the community.

**Table 5.11.3-1**
**Administrative and Technical Capacity**

| Staff/Personnel Resources | Yes/No | Department/Agency and Position |
|---|---|---|
| Planner(s) or engineer(s) with knowledge of land development and land management practices | No | District coordinates with outside consultants |
| Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure | Yes | In house and with outside consultants |
| Planners or Engineer(s) with an understanding of natural and/or human-caused hazards | Yes | In house and with outside consultants |
| Floodplain manager | No | County of Orange |
| Surveyors | No | District coordinates with outside consultants |
| Staff with education or expertise to assess the community's vulnerability to hazards | Yes | In house and with outside consultants |
| Personnel skilled in GIS and/or HAZUS | Yes | In house and with outside consultants |
| Scientists familiar with the hazards of the community | No | District coordinates with outside consultants |
| Emergency manager | Yes | Risk Management Coordinator<br>WEROC |
| Grant writers | Yes | District Engineer<br>Office of the General Manager |
| Other – Lab Specialist | No | District coordinates with outside consultants |
| Other – Water Quality | Yes | Water Quality Coordinator |

### 5.11.4 Fiscal Capability

Table 5.11.4-1 shows specific financial and budgetary tools available to Mesa such as community development block grants; capital improvements project funding; authority to levy taxes for specific purposes; fees for water, sewer, gas, or electric services; impact fees for homebuyers or developers for new development; ability to incur debt through general obligations bonds; and withholding spending in hazard-prone areas.

**Table 5.11.4-1**
**Fiscal Capability**

| Financial Resources | Accessible or Eligible to Use (Yes/No/Don't Know) |
|---|---|
| Community Development Block Grants (CDBG) | No |
| Capital improvements project funding | Yes |
| Authority to levy taxes for specific purposes | Yes (with voter approval) |
| Fees for water service | Yes |
| Impact fees for homebuyers or developers for new developments/homes | Yes |
| Incur debt through general obligation bonds | Yes |
| Incur debt through special tax and revenue bonds | Yes |
| Incur debt through private activity bonds | Yes |
| Withhold spending in hazard-prone areas | Yes |
| Grants | Yes |

### 5.11.5 Local Mitigation Capability Assessment Goals

Listed below are Mesa's specific hazard mitigation goals, objectives and related potential actions. For each goal, one or more objectives have been identified that provide strategies to attain the goal. Where appropriate, the District has identified a range of specific actions to achieve the objective and goal.

The goals and objectives were developed by considering the risk assessment findings, localized hazard identification and loss/exposure estimates, and an analysis of the jurisdiction's current capabilities assessment. These preliminary goals, objectives and actions were developed to represent a vision of long-term hazard reduction or enhancement of capabilities. To help in further development of these goals and

objectives, the LPG compiled and reviewed current jurisdictional sources including the District's planning documents, codes, and ordinances. In addition, District representatives met with consultant staff and/or MWDOC to specifically discuss these hazard-related goals, objectives and actions as they related to the overall Plan. Once developed, District staff presented them to the Mesa Board of Directors for their approval.

Public meetings were held throughout the County to present these preliminary goals, objectives and actions to citizens and to receive public input. At these meetings, specific consideration was given to hazard identification/profiles and the vulnerability assessment results. The following sections present the hazard-related goals, objectives and actions as prepared by Mesa's LPG in conjunction with the Hazard Mitigation Working Group, locally elected officials, and local citizens.

### *5.11.5.1 Mesa Consolidated WD Goals*

**GOAL 1: Reduce District's Vulnerability to Disruption**

A. Improve site security
   1. Update facility entry security
B. Improve response time
   1. Install wireless communication throughout the District
   2. Keep Emergency Operations Plan up-to-date

*IMPLEMENTATION STRATEGY:*

District constructs site improvements as respective facilities are scheduled for replacement or refurbishment. Projects are implemented as funding is approved as part of annual budget process or available through financial assistance programs.

**GOAL 2: Minimize Water Service Loss and Ensure Reliable Supply During Disaster Events**

A. Prevent water loss from reservoirs
   1. Conduct seismic survey of reservoir structures – retrofit as required
   2. Conduct seismic survey of other key Mesa facilities – retrofit as required
B. Increase available water supplies
   1. Evaluate options for existing wells and potential replacement wells
   2. Install generator at new well site

*IMPLEMENTATION STRATEGY:*

Contract for engineering studies for site-specific recommendations for structural stiffening. Contract for engineering studies on feasibility and site(s) of new well(s).

**GOAL 3 Protect Imported Water Reliability**

A. Improve security of MET sources

1. Relocate section of OC-44 near San Diego Creek to reduce vulnerability to storm damage

B. Maintain local interties

1. Maintain relationships with IRWD, City of Huntington Beach, City of Newport Beach and City of Santa Ana.

*IMPLEMENTATION STRATEGY:*

District staff will coordinate with neighboring water districts, MWDOC, and MET to prioritize and implement projects on a regional basis. Continue to coordinate with neighboring districts for interties.

**MESA - Goals, Objectives and Actions**
**Cross-referenced with identified Hazards Within Orange County**

| Goal, Objective, and Action | Flood/Storm | Wildland/Urban Fire | Earthquake | Dam Failure/Water Tank Failure | Landslide / Mudslide | Tornado / High Winds | Tsunami | Extreme Heat/ Drought | Expansive Soils/Land Subsidence / Liquefaction | Man-Made Hazards/ Contamination |
|---|---|---|---|---|---|---|---|---|---|---|
| G1/A/1 | | | | | | | | | | X |
| G1/B/1 | X | X | X | X | | X | X | | | X |
| G1/B/2 | X | X | X | X | | X | X | | | X |
| G2/A/1 | | | X | | | | X | | | |
| G2/A/2 | | | X | | | | X | | | |
| G2/B/1 | | | X | X | | | | | | X |
| G2/B/2 | | X | X | | | X | | | | X |
| G3/A/1 | X | | | | | | X | | | |
| G3/B/1 | X | X | X | X | | X | X | | | X |

**Table 5.11-1 Mesa Loss Estimation Table**

| Hazard Type | Item-> | WST | RES | WTP | PS | PRS | EIT | SC | ADM | LS | WWTP | WELL | DIEMER | OC-88 PS | PRS-MET | PP | WWTP-SOCWA | WWTP-OCSD | LS-OCSD | PWL | WWL | Total Loss Value [1] $M |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Replacement Cost | $M -> | 13.0 | 30.0 | 10.0 | 2.0 | 0.2 | 0.3 | 0.6 | 3.0 | 0.4 | 5.0 | 3.5 | 250.0 | 35.0 | 12.0 | 12.0 | 30.0 | 250.0 | 10.0 | 1.0 | 0.5 | |
| | | | | | | | | | | | | | | | | | | | | | | |
| Earthquake | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | |
| Moderate | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| | Number | 3 | 0 | 1 | 3 | 3 | 15 | 3 | 2 | 0 | 0 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 32.8 | 0.0 | |
| High | Exposure ($M) | $ 39.0 | $ - | $ 10.0 | $ 6.0 | $ 0.6 | $ 4.5 | $ 1.8 | $ 6.0 | $ - | $ - | $ 35.0 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 32.8 | $ - | $ 135.7 |
| | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | |
| Extreme | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| Flood | Number | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8.8 | 0.0 | |
| 100 yr | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ 1.2 | $ - | $ - | $ - | $ - | $ 28.0 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 8.8 | $ - | $ 38.0 |
| | Number | 1 | 0 | 1 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2.2 | 0.0 | |
| 500 yr | Exposure ($M) | $ 13.0 | $ - | $ 10.0 | $ 2.0 | $ - | $ 0.6 | $ - | $ - | $ - | $ - | $ 7.0 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 2.2 | $ - | $ 34.8 |
| Landslide | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0.0 | |
| | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 0.1 | $ - | $ 0.1 |
| Liquifaction | Number | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | |
| Moderate | Exposure ($M) | $ 13.0 | $ - | $ 10.0 | $ 2.0 | $ - | $ - | $ - | $ - | $ - | $ - | $ 17.5 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 42.5 |
| | Number | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8.3 | 0.0 | |
| High | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ 1.5 | $ - | $ - | $ - | $ - | $ 17.5 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 8.3 | $ - | $ 27.3 |
| Very High | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | |
| | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| Wildlife/Structure Fire | Number | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2.8 | 0.0 | |
| Low | Exposure ($M) | $ - | $ - | $ - | $ - | $ 0.2 | $ - | $ - | $ - | $ - | $ - | $ 3.5 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 2.8 | $ - | $ 6.5 |
| | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0.0 | |
| High | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 0.1 | $ - | $ 0.1 |
| | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | |
| Extreme | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| | | | | | | | | | | | | | | | | | | | | | Grand Total | **$ 285.1** |

**[1] Loss value is asset replacement value in 2006 dollars. Value shown is found as count of assets at risk from the particular hazard times high-end unit asset value.**
**[2] Grand Total Loss value shown may include the same assets counted multiple times for different hazards.**

## 5.12 MOULTON NIGUEL – OBJECTIVE, GOALS AND ACTIONS

The Moulton Niguel Water District (Moulton Niguel) reviewed a set of jurisdictional-level hazard maps including detailed critical facility information and localized potential hazard exposure/loss estimates to help identify the top hazards threatening their jurisdiction. See Section 4 for additional details.

Moulton Niguel Loss Assessment Table is located at the end of this section.

### 5.12.1 Capability Assessment

The LPG identified current capabilities available for implementing hazard mitigation activities. The Capability Assessment (Assessment) portion of the jurisdictional mitigation plan identifies administrative, technical, legal and fiscal capabilities. This includes a summary of departments and their responsibilities associated to hazard mitigation planning as well as codes, ordinances, and plans already in place associated to hazard mitigation planning. The second part of the Assessment provides Moulton Niguel's fiscal capabilities that may be applicable to providing financial resources to implement identified mitigation action items.

### 5.12.2 Existing Institutions, Plans, Policies and Ordinances

The legal and regulatory capabilities of Moulton Niguel are shown in Table 5.12.3-1, which presents the existing ordinances and codes that affect the physical or built environment of Moulton Niguel. Examples of legal and/or regulatory capabilities can include: the District's building codes, zoning ordinances, subdivision ordinances, special purpose ordinances, growth management ordinances, site plan review, general plans, capital improvement plans, economic development plans, emergency response plans, and real estate disclosure plans.

### 5.12.3 Legal and Regulatory Capability

**Table 5.12.3-1**
**Legal and Regulatory Capability**

| Regulatory Tools (ordinances, codes, plans) | Local Authority (Yes/No) | State Authority (Yes/No) | Other Level Jurisdiction Authority (Yes/No) | Comments |
|---|---|---|---|---|
| A. Building code | No | No | Yes | Cities of Aliso Viejo, Laguna Hills, Laguna Niguel, Mission Viejo, Dana Point, O.C.F.A., AQMD |
| B. Zoning ordinance | No | No | Yes | Coastal Commission |
| C. Subdivision ordinance or regulations | No | No | Yes | Local cities<br>County of Orange |

**Table 5.12.3-1 (continued)**
**Legal and Regulatory Capability**

| Regulatory Tools (ordinances, codes, plans) | Local Authority (Yes/No) | State Authority (Yes/No) | Other Level Jurisdiction Authority (Yes/No) | Comments |
|---|---|---|---|---|
| D. Special purpose ordinances (floodplain management, storm water management, hillside or steep slope ordinances, wildfire ordinances, hazard setback requirements) | No | Yes | Yes | County of Orange<br>Army Corps. of Engineers<br>Fish & Game - Fed. & State<br>RWQCB |
| E. Growth management ordinances (also called "smart growth" or anti-sprawl programs) | No | No | Yes | Local cities, County of Orange |
| F. Site plan review requirements | Yes | No | Yes | Local cities, O.C.F.A.<br>County of Orange, O.C.T.A.,<br>Cal Trans |
| G. General or comprehensive plan | Yes | No | No | MNWD Master Plan |
| H. A capital improvements plan | Yes | No | No | MNWD |
| I. An economic development plan | No | No | Yes | Local cities |
| J. An emergency response plan | Yes | Yes | Yes | SEMS, NIMS, WEROC, ERP |
| K. A post-disaster recovery plan | No | No | Yes | NIMS |
| L. A post-disaster recovery ordinance | No | No | No | |
| M. Real estate disclosure requirements | No | No | No | |
| N. Waste Discharge Requirements | No | Yes | No | State Water Resources Control Board |

### 5.12.4 Administrative and Technical Capacity

The following is a summary of existing departments in Moulton Niguel and their responsibilities related to hazard mitigation planning and implementation, as well as existing planning documents and regulations related to mitigation efforts within the community. The administrative and technical capabilities of Moulton Niguel, as shown in Table 5.12.4-1, provides an identification of the staff, personnel, and department resources available to implement the actions identified in the mitigation section of the Plan. Specific resources reviewed include those involving technical personnel such as planners/engineers with knowledge of land development and land management practices, engineers trained in construction practices related to building and infrastructure, planners and engineers with an understanding of natural or manmade hazards, floodplain managers, surveyors, personnel with GIS skills and scientists familiar with hazards in the community.

**Table 5.12.4-1**
**Administrative and Technical Capacity**

| Staff/Personnel Resources | Yes/No | Department/Agency and Position |
|---|---|---|
| A) Planner(s) or engineer(s) with knowledge of land development and land management practices | Yes | District coordinates with outside consultants |
| B) Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure | Yes | District coordinates with outside consultants |
| C) Planners or Engineer(s) with an understanding of natural and/or human-caused hazards | Yes | District coordinates with outside consultants |
| D) Floodplain manager | Yes | County of Orange |
| E) Surveyors | Yes | Outside consultant |
| F) Staff with education or expertise to assess the community's vulnerability to hazards | Yes | County of Orange |
| G) Personnel skilled in GIS and/or HAZUS | Yes | Outside consultant |
| H) Scientists familiar with the hazards of the community | Yes | County of Orange |
| I) Emergency manager | Yes | Director of Operations |
| J) Grant writers | Yes | Director of Engineering |
| K) Lab Tech. | Yes | SOCWA |

### 5.12.5 Fiscal Capability

Table 5.12.5-1shows specific financial and budgetary tools available to Moulton Niguel such as community development block grants; capital improvements project funding; authority to levy taxes for specific purposes; fees for water, sewer, gas, or electric services; impact fees for homebuyers or developers for new development; ability to incur debt through general obligations bonds; and withholding spending in hazard-prone areas.

**Table 5.12.5-1**
**Fiscal Capability**

| Financial Resources | Accessible or Eligible to Use (Yes/No/Don't Know) |
|---|---|
| 1. Community Development Block Grants (CDBG) | No |
| 2. Capital improvements project funding | Yes |
| 3. Authority to levy taxes for specific purposes | Yes |
| 4. Fees for water, sewer, gas, or electric service | Yes |
| 5. Impact fees for homebuyers or developers for new developments/homes | Yes |
| 6. Incur debt through general obligation bonds | Yes |
| 7. Incur debt through special tax and revenue bonds | Yes |
| 8. Incur debt through private activity bonds | No |
| 9. Withhold spending in hazard-prone areas | No |
| 10. Grants | Yes |

### 5.12.6 Local Mitigation Capability Assessment

**Table 5.12.6-1**
**Local Mitigation Capability Assessment**

| Agency Name (Mission/Function) | Programs, Plans, Policies, Regulations, Funding, or Practices | Point of Contact Name, Address, Phone, Email | Effect on Loss Reduction* | | | Comments |
|---|---|---|---|---|---|---|
| | | | Support | Facilitate | Hinder | |
| MNWD | 1. Building Code | City of Laguna Niguel Building Department | X | | | |
| | 2. Building Code | City of Laguna Niguel Building Department | X | | | |
| | 3. Building Code | City of Mission Viejo Building Department | X | | | |
| | 4 Building Code. | City of Aliso Viejo Building Department | X | | | |
| | 5. Building Code | City of Laguna Hills Building Department | X | | | |
| | 6. Building Code | City of Dana Point Building Department | X | | | |
| | 7. Building Code | Orange County Fire Authority | X | | | |
| | 8. Building Code | AQMD | X | | | |
| | 9. Zoning Ordinance | Coastal Commission | X | | | |
| MNWD | 1. Subdivision Ordinance | Local Cities | X | | | |
| | 2. Subdivision Ordinance | County of Orange | X | | | |
| | 3. Flood Plain Management | County of Orange | X | | | |
| | 4. Flood Plain Management | Army Corps of Engineers | X | | | |

**Table 5.12.6-1 (continued)**
**Local Mitigation Capability Assessment**

| Agency Name (Mission/Function) | Programs, Plans, Policies, Regulations, Funding, or Practices | Point of Contact Name, Address, Phone, Email | Effect on Loss Reduction* | | | Comments |
|---|---|---|---|---|---|---|
| | | | Support | Facilitate | Hinder | |
| MNWD | 5. Flood Plain Management | Fish & Game-Federal | X | | | |
| | 6. Flood Plain Management | Fish & Game-State | X | | | |
| | 7. Flood Plain Management | Regional Water Quality Control Board | X | | | |
| | 8. Growth Management | Local Cities | X | | | |
| | 9. Growth Management | County of Orange | X | | | |
| | 10. Site Plan Requirements | Local Cities | X | | | |
| | 11. Site Plan Requirements | County of Orange | X | | | |
| | 12. Site Plan Requirements | OCTA | X | | | |
| | 13. Site Plan Requirements | Cal Trans | X | | | |
| | 14. Site Plan Requirements | Orange County Fire Authority | X | | | |
| | 15. General Plan | MNWD Director of Engineering | | X | | |
| | 16. Capital Improvement Plan | MNWD Director of Engineering | | X | | |
| | 17.Economic Development Plan | Local Cities | X | | | |

**Table 5.12.6-1 (continued)**
**Local Mitigation Capability Assessment**

| Agency Name (Mission/Function) | Programs, Plans, Policies, Regulations, Funding, or Practices | Point of Contact Name, Address, Phone, Email | Effect on Loss Reduction* | | | Comments |
|---|---|---|---|---|---|---|
| | | | Support | Facilitate | Hinder | |
| MNWD | 18. Emergency Response Plan | SEMS | | X | | |
| | 19. Emergency Response Plan | NIMS | | X | | |
| | 20. Emergency Response Plan | WEROC | X | | | |
| | 21. Post Disaster Plan | NIMS | X | | | |
| | 22. Grants | MNWD Director of Finance | | X | | |

## 5.12.7 Local Mitigation Capability Assessment Goals

Listed below are Moulton Niguel's specific hazard mitigation goals, objectives and related potential actions. For each goal, one or more objectives have been identified that provide strategies to attain the goal. Where appropriate, the District has identified a range of specific actions to achieve the objective and goal.

The goals and objectives were developed by considering the risk assessment findings, localized hazard identification and loss/exposure estimates, and an analysis of the jurisdiction's current capabilities assessment. These preliminary goals, objectives and actions were developed to represent a vision of long-term hazard reduction or enhancement of capabilities. To help in further development of these goals and objectives, the LPG compiled and reviewed current jurisdictional sources including the District's planning documents, codes, and ordinances. In addition, District representatives met with consultant staff and/or MWDOC to specifically discuss these hazard-related goals, objectives and actions as they related to the overall Plan. The LPG members were Frani Bailey, Larry Ballew, Phil Lawler, Ray McDowell, Tom Stephenson. Once developed, District staff presented them to the Moulton Niguel Board of Directors for their approval.

Public meetings were held throughout the County to present these preliminary goals, objectives and actions to citizens and to receive public input. At these meetings, specific consideration was given to hazard identification/profiles and the vulnerability assessment results. The following sections present the hazard-related goals, objectives and actions as prepared by Moulton Niguel's LPG in conjunction with the Hazard Mitigation Working Group, locally elected officials, and local citizens.

#### *5.12.7.1 Moulton Niguel WD Goals*

The Moulton Niguel Water District has developed the following five goals for their Hazard Mitigation Plan.

Goal 1: Reduce District's Vulnerability to Disruption

Goal 2: Minimize Water Loss (Ensure Reliable Supply) During Disaster Events

Goal 3: Protect Imported Water Reliability

Goal 4: Protect The Public Water Supply from Contamination Caused by Backflow or Back-siphonage in the Event of an Earthquake

Goal 5: No Sewer Spills

### 5.12.8 Objectives and Actions

**Goal 1: Reduce District's Vulnerability to Disruption**

A. Improve site security
   1. Implement Vulnerability Risk Assessment recommendations
   2. Survey and improve site fencing
   3. Harden facilities
   4. Install wireless communication throughout the District

B. Improve response time
   1. Install surveillance equipment and related facilities
   2. Modify SCADA system
   3. Keep Emergency Operations Plan up-to-date

*IMPLEMENTATION STRATEGY:*

District constructs site improvements as respective facilities are scheduled for replacement or refurbishment. Projects are implemented as funding is approved as part of annual budget process or available through financial assistance programs.

**Goal 2: Minimize Water Loss (Ensure Reliable Supply) During Disaster Events**

A. Reduce reservoir water losses
   1. Install seismic valves at critical reservoir sites

2. Install flexible couplings at reservoir sites
3. Stiffen reservoir structures for seismic activity
4. Implement URS study recommendations

B. Increase available water supplies

1. Loop water sources where possible
2. Intertie supply sources where possible
3. Construct interties with neighboring water purveyors

*IMPLEMENTATION STRATEGY:*

Contract for engineering studies for site-specific recommendations for structural stiffening and flexible coupling installation. Acquire funding to install seismic valves. Continue to coordinate with neighboring districts for interties.

**Goal 3: Protect Imported Water Reliability**

A. Obtain an emergency source of imported water.

1. Connect IRWD's well field system to Joint Transmission Main
2. Connect IRWD's well field system to Allen-McColloch Pipeline
3. Improve interconnections with ETWD and SMWD

B. Increase Emergency Potable Water Storage

1. Obtain capacity in Upper Chiquita Reservoir System
2. Obtain capacity in East Ortega Reservoir System
3. Obtain additional capacity in ETWD's R6 Reservoir

*IMPLEMENTATION STRATEGY:*

District staff will coordinate with neighboring water districts, MWDOC and MET to prioritize and implement projects on a regional basis.

**Goal 4: Protect the Public Water Supply from Contamination Caused by Backflow or Back-siphonage in the Event of an Earthquake**

A. Upgrade all potential hazardous potable water services with the required backflow prevention device to prevent backpressure or back-siphonage that could contaminate the public water supply.

1. The District is continually monitoring the public water supply and requiring the installation of backflow prevention devices on all hazardous potable services. All fire systems shall be upgraded to a Double Check Detector Assembly if the site is being

refurbished. There are approximately 240 single check fire systems in our District with an upgrade cost of about $4.8 million.

B. Require all single check fire systems in the District to be upgraded to a Double Check Detector Assembly. Single check fire systems cannot be tested to determine if they are working properly. The Double Check Detector Assembly can be tested and requires an annual test to determine if it is functioning properly. The water quality in fire systems has been proven not safe for human consumption. The District conducted random tests on fire system water quality and found maximum contaminant levels for potable water including iron, lead, cadmium, manganese, and total coliform.

*IMPLEMENTATION STRATEGY:*

The Cross Connection Control Department will investigate and determine the degree of hazard at all potential hazardous sites. These investigations are ongoing and each site will be evaluated to determine the correct backflow prevention device required for the site.

**Goal 5: No Sewer Spills**

A. Provide backup system for critical facilities
    1. Containment structure for additional response time
    2. Parallel sewer force mains
    3. Replace existing force mains (20”, 24” Tecite pipe) from Regional Lift Station

B. Protect facilities within flood plain area.
    1. Place protective measures in rivers and creeks
    2. Install jointless pipelines in all creek crossings and slope easements

*IMPLEMENTATION STRATEGY:*

District staff would coordinate with outside consultant to prioritize existing facilities that would be lost or damaged from flooding or earthquakes.

**MNWD - Goals, Objectives and Actions**

**Cross-referenced with identified Hazards Within Orange County**

| Goal, Objective, and Action | Flood/Storm | Wildland/Urban Fire | Earthquake | Dam Failure/Water Tank Failure | Landslide / Mudslide | Tornado / High Winds | Tsunami | Extreme Heat/ Drought | Expansive Soils/Land Subsidence / Liquefaction | Man-Made Hazards/ Contamination |
|---|---|---|---|---|---|---|---|---|---|---|
| G1/A/1 | | | | | | | | | | X |
| G1/A/2 | | | | | | | | | | X |
| G1/A/3 | | | | | | | | | | X |
| G1/A/4 | | | | | | | | | | X |
| G1/B/1 | X | X | X | X | X | X | X | X | X | X |
| G1/B/2 | X | X | X | X | X | X | X | X | X | X |
| G1/B/3 | X | X | X | X | X | X | X | X | X | X |
| G2/A/1 | | | X | X | | | X | | X | |
| G2/A/2 | | | X | X | | | X | | X | |
| G2/A/3 | | | X | X | | | X | | X | |
| G2/A/4 | | | X | X | | | X | | X | |
| G2/B/1 | | X | | | | | | | | |
| G2/B/2 | X | X | X | X | X | X | X | X | X | X |
| G2/B/3 | X | X | X | X | X | X | X | X | X | X |
| G3/A/1 | X | X | X | X | X | X | X | X | X | X |
| G3/A/2 | X | X | X | X | X | X | X | X | X | X |
| G3/A/3 | X | X | X | X | X | X | X | X | X | X |
| G3/B/1 | X | X | X | X | X | X | X | X | X | X |
| G3/B/2 | X | X | X | X | X | X | X | X | X | X |
| G3/B/3 | X | X | X | X | X | X | X | X | X | X |
| G4/A/1 | | | | | | | | | | X |
| G4/B | | | | | | | | | | X |
| G5/A/1 | X | | X | | | | X | | | |
| G5/A/2 | X | | X | | | | X | | | |
| G5/A/3 | X | | X | | | | X | | | |
| G5/B/1 | X | | | | | | | | | |
| G5/B/2 | X | | | | X | | | | X | |

**Table 5.12-1 Moulton Niguel Loss Estimation Table**

| Hazard Type | Item-> | WST | RES | WTP | PS | PRS | EIT | SC | ADM | LS | WWTP | WELL | DIEMER | OC-88 PS | PRS-MET | PP | WWTP-SOCWA | WWTP-OCSD | LS-OCSD | PWL | WWL | Total Loss Value [1] $M |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Replacement Cost | $M -> | 13.0 | 30.0 | 10.0 | 2.0 | 0.2 | 0.3 | 0.6 | 3.0 | 0.4 | 5.0 | 3.5 | 250.0 | 35.0 | 12.0 | 12.0 | 30.0 | 250.0 | 10.0 | 1.0 | 0.5 | |
| | | | | | | | | | | | | | | | | | | | | | | |
| Earthquake | Number | 11 | 1 | 0 | 10 | 0 | 7 | 5 | 0 | 4 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 30.6 | 0.0 | |
| Moderate | Exposure ($M) | $ 143.0 | $ 30.0 | $ - | $ 20.0 | $ - | $ 2.1 | $ 3.0 | $ - | $ 1.6 | $ 5.0 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 30.6 | $ - | $ 235.3 |
| | Number | 18 | 1 | 0 | 16 | 0 | 6 | 4 | 2 | 13 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 60.9 | 0.0 | |
| High | Exposure ($M) | $ 234.0 | $ 30.0 | $ - | $ 32.0 | $ - | $ 1.8 | $ 2.4 | $ 6.0 | $ 5.2 | $ 10.0 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 60.9 | $ - | $ 382.3 |
| | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | |
| Extreme | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| Flood | Number | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3.5 | 0.0 | |
| 100 yr | Exposure ($M) | $ - | $ 30.0 | $ - | $ - | $ - | $ 0.3 | $ - | $ - | $ - | $ 5.0 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 3.5 | $ - | $ 38.8 |
| | Number | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2.2 | 0.0 | |
| 500 yr | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ 0.6 | $ - | $ 0.4 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 2.2 | $ - | $ 3.2 |
| Landslide | Number | 18 | 1 | 0 | 12 | 0 | 1 | 1 | 0 | 4 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 25.2 | 0.0 | |
| | Exposure ($M) | $ 234.0 | $ 30.0 | $ - | $ 24.0 | $ - | $ 0.3 | $ 0.6 | $ - | $ 1.6 | $ 5.0 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 25.2 | $ - | $ 320.7 |
| Liquifaction | Number | 1 | 1 | 0 | 2 | 0 | 0 | 2 | 1 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | |
| Moderate | Exposure ($M) | $ 13.0 | $ 30.0 | $ - | $ 4.0 | $ - | $ - | $ 1.2 | $ 3.0 | $ 0.8 | $ 5.0 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 57.0 |
| | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | |
| High | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| Very High | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | |
| | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| Wildlife/Structure Fire | Number | 2 | 0 | 0 | 1 | 0 | 1 | 2 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9.1 | 0.0 | |
| Low | Exposure ($M) | $ 26.0 | $ - | $ - | $ 2.0 | $ - | $ 0.3 | $ 1.2 | $ - | $ 1.2 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 9.1 | $ - | $ 39.8 |
| | Number | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.3 | 0.0 | |
| High | Exposure ($M) | $ 26.0 | $ - | $ - | $ 2.0 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 1.3 | $ - | $ 29.3 |
| | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0.0 | |
| Extreme | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 0.2 | $ - | $ 0.2 |
| | | | | | | | | | | | | | | | | | | | | | Grand Total | **$ 1,106.5** |

**[1] Loss value is asset replacement value in 2006 dollars. Value shown is found as count of assets at risk from the particular hazard times high-end unit asset value.**
**[2] Grand Total Loss value shown may include the same assets counted multiple times for different hazards.**

## 5.13 MWDOC – OBJECTIVE, GOALS AND ACTIONS

Municipal Water District of Orange County (MWDOC) reviewed a set of jurisdictional-level hazard maps including detailed critical facility information and localized potential hazard exposure/loss estimates to help identify the top hazards threatening their jurisdiction. Since MWDOC is a regional agency, its specific goals and objectives were included in Section 5.3. See Section 4 for additional details on the hazard risks.

The MWDOC Regional Loss Assessment Tables are located at the end of Section 5 (the tables really pertain to losses by MET or for regional jointly owned facilities).

### 5.13.1 Capability Assessment

The LPG identified current capabilities available for implementing hazard mitigation activities. The Capability Assessment (Assessment) portion of the jurisdictional mitigation plan identifies administrative, technical, legal and fiscal capabilities. This includes a summary of departments and their responsibilities associated to hazard mitigation planning as well as codes, ordinances, and plans already in place associated to hazard mitigation planning. The second part of the Assessment provides MWDOC's fiscal capabilities that may be applicable to providing financial resources to implement identified mitigation action items.

### 5.13.2 Existing Institutions, Plans, Policies and Ordinances

The legal and regulatory capabilities of MWDOC are shown in Table 5.13.3-1, which presents the existing ordinances and codes that affect the physical or built environment of MWDOC. Examples of legal and/or regulatory capabilities can include: the MWDOC's building codes, zoning ordinances, subdivision ordinances, special purpose ordinances, growth management ordinances, site plan review, general plans, capital improvement plans, economic development plans, emergency response plans, and real estate disclosure plans.

### 5.13.3 Legal and Regulatory Capability

**Table 5.13.3-1**
**Legal and Regulatory Capability**

| Regulatory Tools (ordinances, codes, plans) | Local Authority (Yes/No) | State Authority (Yes/No) | Other Level Jurisdiction Authority (Yes/No) | Comments |
|---|---|---|---|---|
| A. Building Code | Yes | | Yes | Office Building -City |
| B. Zoning Ordinance | No | No | No | |
| C. Subdivision ordinance or regulations | NA | NA | NA | |
| D. Special purpose ordinances (hillside or steep slope ordinances, fire ordinances, hazard setback requirements) | | Yes | Yes | Cities, OCFD, USFWS, CDFG |

**Table 5.13.3-1 (continued)**
**Legal and Regulatory Capability**

| Regulatory Tools (ordinances, codes, plans) | Local Authority (Yes/No) | State Authority (Yes/No) | Other Level Jurisdiction Authority (Yes/No) | Comments |
|---|---|---|---|---|
| E. Growth management ordinances (also called "smart growth" or anti-sprawl programs) | NA | NA | NA | |
| F. Site plan review requirements | Yes | No | Yes | OCFA, Cities |
| G. General or comprehensive plan Master Plan | Yes | No | No | Urban Water Management Plan; master plans of the MWDOC member agencies; MET Integrated Resources Plan. |
| H. A capital improvements plan | Yes | No | No | |
| I. An economic development plan | NA | NA | NA | |
| J. An emergency response plan | Yes | Yes | Yes | SEMS, NIMS, WEROC, OA, MET |
| K. A post-disaster recovery plan | Yes | Yes | Yes | NIMS |
| L. A post-disaster recovery ordinance | No | No | No | Cities, County, OES, FEMA |
| M. Real estate disclosure requirements | NA | NA | NA | |
| N. Material Handling | Yes | Yes | Yes | Cities |
| O. DAMS | | Yes | Yes | DODs & RWQCB |
| P. VA & ERP | | Yes | Yes | USEPA & OES |
| Q. Title 17 & 22 | | Yes | Yes | CA-DHS |
| R. Wastewater | | Yes | Yes | CRWQCB |
| S. Air Quality | | Yes | Yes | SCAQMD |
| T. Safety | | Yes | Yes | CalOsha |

### 5.13.4 Administrative and Technical Capacity

The following is a summary of existing departments in MWDOC and their responsibilities related to hazard mitigation planning and implementation, as well as existing planning documents and regulations related to mitigation efforts within the community. The administrative and technical capabilities of MWDOC, as shown in Table 5.13.4-1, provides an identification of the staff, personnel, and department resources available to implement the actions identified in the mitigation section of the Plan. Specific resources reviewed include those involving technical personnel such as planners/engineers with knowledge of land development and land management practices, engineers trained in construction practices related to building and infrastructure, planners and engineers with an understanding of natural or manmade hazards, floodplain managers, surveyors, personnel with GIS skills and scientists familiar with hazards in the community.

**Table 5.13.4-1**
**Administrative and Technical Capacity**

| Staff/Personnel Resources | Yes/No | Department/Agency and Position |
|---|---|---|
| A. Planner(s) or engineer(s) with knowledge of land development and land management practices | Yes | Professional staff plus coordination via outside consultants |
| B. Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure | Yes | Professional staff plus coordination via outside consultants |
| C. Planners or Engineer(s) with an understanding of natural and/or human-caused hazards | Yes | Professional staff plus coordination via outside consultants |
| D. Floodplain manager | Yes | County of Orange |
| E. Surveyors | Yes | Outside consultants |
| F. Staff with education or expertise to assess the community's vulnerability to hazards | Yes | Professional staff plus coordination via outside consultants; County of Orange |
| G. Personnel skilled in GIS and/or HAZUS | Yes | Outside consultants |
| H. Scientists familiar with the hazards of the community | Yes | Professional staff plus coordination via outside consultants; County of Orange |
| I. Emergency manager | Yes | Director of the Water Emergency Response Organization of Orange County (WEROC) |
| J. Grant writers | Yes | Professional staff plus coordination via outside consultants |
| K. Lab Tech. | Yes | Outside entities. |

### 5.13.5 Fiscal Capability

Table 5.13.5-1 shows specific financial and budgetary tools available to MWDOC such as community development block grants; capital improvements project funding; authority to levy taxes for specific purposes; fees for water, sewer, gas, or electric services; impact fees for homebuyers or developers for new development; ability to incur debt through general obligations bonds; and withholding spending in hazard-prone areas.

**Table 5.13.5-1**
**Fiscal Capability**

| Financial Resources | Accessible or Eligible to Use (Yes/No/Don't Know) |
|---|---|
| A. Community Development Block Grants (CDBG) | No |
| B. Capital improvements project funding | Yes |
| C. Authority to levy taxes for specific purposes | No |
| D. Fees for water, sewer, gas, or electric service | Yes |
| E. Impact fees for homebuyers or developers for new developments/homes | Yes |
| F. Incur debt through general obligation bonds | Yes |
| G. Incur debt through special tax and revenue bonds | Yes |
| H. Incur debt through private activity bonds | No |
| I. Withhold spending in hazard-prone areas | No |
| J. Grants | Yes |

### 5.13.6 Local Mitigation Capability Assessment Goals

Listed below are MWDOC's specific hazard mitigation goals, objectives and related potential actions. For each goal, one or more objectives have been identified that provide strategies to attain the goal. Where appropriate, MWDOC has identified a range of specific actions to achieve the objective and goal.

The goals and objectives were developed by considering the risk assessment findings, localized hazard identification and loss/exposure estimates, and an analysis of the jurisdiction's current capabilities assessment. These preliminary goals, objectives and actions were developed to represent a vision of long-term hazard reduction or enhancement of capabilities. To help in further development of these goals and objectives, the LPG compiled and reviewed current jurisdictional sources including MWDOC's planning documents, codes, and ordinances. In addition, MWDOC representatives met to specifically discuss these hazard-related goals, objectives and actions as they related to the overall Plan. The LPG members were Kelly Hubbard, Lee Jacobi, Karl Seckel, Michelle Tuchman, Heather Fong, and Keith Lyon. Once developed, MWDOC staff presented them to the MWDOC Board of Directors for their approval.

Public meetings were held throughout the County to present these preliminary goals, objectives and actions to citizens and to receive public input. At these meetings, specific consideration was given to hazard identification/profiles and the vulnerability assessment results. The following sections present the hazard-related goals, objectives and actions as prepared by MWDOC's LPG in conjunction with the Hazard Mitigation Working Group, locally elected officials, and local citizens.

**Table 5.13.6-1**
**Local Mitigation Capability Assessment**

| Agency Name (Mission/Function) | Programs, Plans, Policies, Regulations, Funding, or Practices | Title Address Phone Contact | Effect on Loss Reduction* | | | Comments |
|---|---|---|---|---|---|---|
| | | | Support | Facilitate | Hinder | |
| MWDOC | 1. Planning | Karl Seckel<br>Assistant General Manager | X | X | | |
| | 2. WEROC | Kelly Hubbard<br>WEROC Programs' Coordinator | X | X | | |
| | 3.Urban Water Management Plan | Matt Stone<br>Associate General Manager | X | X | | |

### 5.13.7 MWDOC Goals

Five major goals for MWDOC were listed in Section 5.3. The only assets specifically owned by MWDOC include its administrative office building and it has contents located in two Emergency Operations Centers, which it leases from other agencies.

MWDOC's main goals are to continuing staffing WEROC for the benefit of the water and wastewater entities in the County and to coordinate on regional planning efforts between MET and Orange County and to coordinate among the 28 member agencies it has in Orange County on planning and water resources activities.

### 5.13.8 Objectives and Actions

A number of Objectives and Actions were included in Section 5.3.

**Table 5.13-1 MWDOC Loss Estimation Table**

| Hazard Type | Item-> | WST | RES | WTP | PS | PRS | EIT | SC | ADM | LS | WWTP | WELL | DIEMER | OC-88 PS | PRS-MET | PP | WWTP-SOCWA | WWTP-OCSD | LS-OCSD | PWL | WWL | Total Loss Value [1] $M |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Replacement Cost | $M -> | 13.0 | 30.0 | 10.0 | 2.0 | 0.2 | 0.3 | 0.6 | 3.0 | 0.4 | 5.0 | 3.5 | 250.0 | 35.0 | 12.0 | 12.0 | 30.0 | 250.0 | 10.0 | 1.0 | 0.5 | |
| | | | | | | | | | | | | | | | | | | | | | | |
| Earthquake | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | |
| Moderate | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 3.0 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 3.0 |
| | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | |
| High | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 6.0 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 6.0 |
| | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | |
| Extreme | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| Flood | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | |
| 100 yr | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 3.0 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 3.0 |
| | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | |
| 500 yr | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| Landslide | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | |
| | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 3.0 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 3.0 |
| Liquifaction | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | |
| Moderate | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 3.0 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 3.0 |
| | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | |
| High | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 3.0 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 3.0 |
| Very High | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | |
| | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| Wildlife/Structure Fire | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | |
| Low | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | |
| High | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | |
| Extreme | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| | | | | | | | | | | | | | | | | | | | | | Grand Total | **$ 21.0** |

**[1] Loss value is asset replacement value in 2006 dollars. Value shown is found as count of assets at risk from the particular hazard times high-end unit asset value.**
**[2] Grand Total Loss value shown may include the same assets counted multiple times for different hazards.**

## 5.14 NEWPORT BEACH – OBJECTIVE, GOALS AND ACTIONS

The City of Newport Beach (Newport Beach) reviewed a set of jurisdictional-level hazard maps including detailed critical facility information and localized potential hazard exposure/loss estimates to help identify the top hazards threatening their jurisdiction. See Section 4 for additional details.

Newport Beach Loss Assessment Table is located at the end of this section.

### 5.14.1 Capability Assessment

The LPG identified current capabilities available for implementing hazard mitigation activities. The Capability Assessment (Assessment) portion of the jurisdictional mitigation plan identifies administrative, technical, legal and fiscal capabilities. This includes a summary of departments and their responsibilities associated to hazard mitigation planning as well as codes, ordinances, and plans already in place associated to hazard mitigation planning. The second part of the Assessment provides Newport Beach's fiscal capabilities that may be applicable to providing financial resources to implement identified mitigation action items.

### 5.14.2 Existing Institutions, Plans, Policies and Ordinances

The legal and regulatory capabilities of Newport Beach are shown in Table 5.14.3-1, which presents the existing ordinances and codes that affect the physical or built environment of Newport Beach. Examples of legal and/or regulatory capabilities can include: the City's building codes, zoning ordinances, subdivision ordinances, special purpose ordinances, growth management ordinances, site plan review, general plans, capital improvement plans, economic development plans, emergency response plans, and real estate disclosure plans.

### 5.14.3 Legal and Regulatory Capability

**Table 5.14.3-1**
**Legal and Regulatory Capability**

| Regulatory Tools (ordinances, codes, plans) | Local Authority (Yes/No) | State Authority (Yes/No) | Other Level Jurisdiction Authority (Yes/No) | Comments |
|---|---|---|---|---|
| A. Building code | Yes | Yes | Yes | City Building Dept.<br>City Code & WQ Enforcement<br>AQMD (Air Quality) |
| D. Zoning ordinance | Yes | No | No | City Planning Dept.<br>Coastal Commission |
| E. Subdivision ordinance or regulations | Yes | No | Yes | City Building & Planning Depts.<br>County of Orange |
| F. Special purpose ordinances (floodplain | Yes | Yes | Yes | RWQCB<br>County of Orange |

| Regulatory Tools (ordinances, codes, plans) | Local Authority (Yes/No) | State Authority (Yes/No) | Other Level Jurisdiction Authority (Yes/No) | Comments |
|---|---|---|---|---|
| management, stormwater management, hillside or steep slope ordinances, wildfire ordinances, hazard setback requirements) | | | | Army Corps of Engineers<br>Fish & Game – Fed & State<br>CDFG |
| G. Growth management ordinances (also called "smart growth" or anti-sprawl programs) | Yes | Yes | No | City's General Plan<br>County of Orange<br>LAFCO |
| H. Site plan review requirements | Yes | No | No | City Depts. |
| I. General or comprehensive plan | Yes | No | No | City's General Plan |
| J. A capital improvements plan | Yes | No | No | City's CIP for Water & Wastewater |
| K. An economic development plan | Yes | No | No | City's General Plan |
| L. An emergency response plan | Yes | No | Yes | NIMS, SEMS<br>WEROC<br>City EOC |
| M. A post-disaster recovery plan | Yes | No | Yes | NIMS |
| N. A post-disaster recovery ordinance | No | Yes | Yes | County of Orange<br>State of California |
| O. Real estate disclosure requirements | Yes | Yes | No | City Ordinance<br>State Real Estate Board<br>Tax Assessor |
| P. Security Issues | Yes | Yes | No | Vulnerability Assessment |
| Q. Title 22 | Yes | Yes | Yes | County Health Services<br>USEPA |
| R. Portable Generators | Yes | Yes | Yes | AQMD |
| S. Dam safety | No | Yes | Yes | Division of Dam Safety |
| T. Waste Discharge Requirements | Yes | Yes | Yes | SWRCB |
| U. NIMS | Yes | Yes | Yes | FEMA |
| V. Safety | Yes | Yes | No | Cal OSHA |
| U. Water Quality | Yes | Yes | Yes | CA DHS<br>USEPA |
| V. Waste Discharge Requirements | No | Yes | No | State Water Resources Control Board |

### 5.14.4 Administrative and Technical Capacity

The following is a summary of existing departments in Newport Beach and their responsibilities related to hazard mitigation planning and implementation, as well as existing planning documents and regulations related to mitigation efforts within the community. The administrative and technical capabilities of Newport Beach, as shown in Table 5.14.4-1, provides an identification of the staff, personnel, and department resources available to implement the actions identified in the mitigation section of the Plan. Specific resources reviewed include those involving technical personnel such as planners/engineers with knowledge of land development and land management practices, engineers trained in construction practices related to building and infrastructure, planners and engineers with an understanding of natural or manmade hazards, floodplain managers, surveyors, personnel with GIS skills and scientists familiar with hazards in the community.

**Table 5.14.4-1**
**Administrative and Technical Capacity**

| Staff/Personnel Resources | Yes/No | Department/Agency and Position |
|---|---|---|
| A. Planner(s) or engineer(s) with knowledge of land development and land management practices | Yes | City Public Works Dept. – Engineers<br>City Planning Dept. – Planners<br>City hires outside contractors as needed |
| B. Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure | Yes | City Building Dept. – Plan Checkers & Inspectors<br>City Public Works Dept. – Engineers & Inspectors |
| C. Planners or Engineer(s) with an understanding of natural and/or human-caused hazards | Yes | Contractors or State/Federal Employees |
| F. Floodplain manager | Yes | County of Orange |
| G. Surveyors | Yes | Public Works – Surveyor<br>City hires outside contractors as needed |
| H. Staff with education or expertise to assess the community's vulnerability to hazards | Yes | City Police, Fire, Public Works, Utilities & General Services Dept. staff<br>County of Orange<br>WEROC staff<br>City hires outside contractors as needed |
| I. Personnel skilled in GIS and/or HAZUS | Yes | City Public Works & MIS staff<br>Center for Demographic Research, CSUF<br>City hires outside contractors as needed |
| J. Scientists familiar with the hazards of the community | Yes | County of Orange<br>Cal Tech, other Colleges/Universities<br>State/Federal Employees |

| Staff/Personnel Resources | Yes/No | Department/Agency and Position |
|---|---|---|
| K. Emergency manager | Yes | City Manager/Primary NIMS Responder<br>Other designated staff dependent on type of emergency and availability<br>Fire or Police Chief – as necessary |
| L. Grant writers | Yes | Various City staff – Public Works, Planning, City Managers Office, Utilities Dept.<br>City hires outside contractors as needed |
| M. Lab Testing | No | OCWD<br>Clinical Labs of San Bernardino<br>Other licensed labs as deemed necessary |

### 5.14.5 Fiscal Capability

Table 5.14.5-1shows specific financial and budgetary tools available to Newport Beach such as community development block grants; capital improvements project funding; authority to levy taxes for specific purposes; fees for water, sewer, gas, or electric services; impact fees for homebuyers or developers for new development; ability to incur debt through general obligations bonds; and withholding spending in hazard-prone areas.

**Table 5.14.5-1**
**Fiscal Capability**

| Financial Resources | Accessible or Eligible to Use (Yes/No/Don't Know) |
|---|---|
| A) Community Development Block Grants (CDBG) | Yes |
| B) Capital improvements project funding | Yes |
| C) Authority to levy taxes for specific purposes | Yes (Prop 218 requires vote of people) |
| D) Fees for water, sewer, gas, or electric service | Yes, Water & Sewer |
| E) Impact fees for homebuyers or developers for new developments/homes | Yes, Connection & Permit Fees |
| F) Incur debt through general obligation bonds | No (takes vote of public) |
| G) Incur debt through special tax and revenue bonds | Revenue Bonds (supported by revenue stream) |
| H) Incur debt through private activity bonds | Yes (Infrastructure to benefit private companies must have greater public benefit) |
| I) Withhold spending in hazard-prone areas | Unknown |

## 5.14.6 Local Mitigation Capability Assessment

### 5.14.6.1 Local Mitigation Capability Assessment Goals

Listed below are Newport Beach's specific hazard mitigation goals, objectives and related potential actions. For each goal, one or more objectives have been identified that provide strategies to attain the goal. Where appropriate, the City has identified a range of specific actions to achieve the objective and goal.

The goals and objectives were developed by considering the risk assessment findings, localized hazard identification and loss/exposure estimates, and an analysis of the jurisdiction's current capabilities assessment. These preliminary goals, objectives and actions were developed to represent a vision of long-term hazard reduction or enhancement of capabilities. To help in further development of these goals and objectives, the LPG compiled and reviewed current jurisdictional sources including the City's planning documents, codes, and ordinances. In addition, City representatives met with consultant staff and/or MWDOC to specifically discuss these hazard-related goals, objectives and actions as they related to the overall Plan. The LPG members were Tim Deutsh, Terressa Moritz, and George Murdoch. Once developed, City staff presented them to the Newport Beach City Council for their approval.

Public meetings were held throughout the County to present these preliminary goals, objectives and actions to citizens and to receive public input. At these meetings, specific consideration was given to hazard identification/profiles and the vulnerability assessment results. The following sections present the hazard-related goals, objectives and actions as prepared by Newport Beach's LPG in conjunction with the Hazard Mitigation Working Group, locally elected officials, and local citizens.

**Table 5.14.6.1-1**
**Local Mitigation Capability Assessment**

| Agency Name (Mission/Function) | Programs, Plans, Policies, Regulations, Funding, or Practices | Point of Contact Name, Address, Phone, Email | Effect on Loss Reduction* | | | Comments |
|---|---|---|---|---|---|---|
| | | | Support | Facilitate | Hinder | |
| City of Newport Beach (Water)<br>3300 Newport Blvd.<br>Newport Beach, CA 92658 | 1. Master Plan | Mike Sinacori<br>Utilities Engineer<br>(949) 644-3311<br>msinacori@city.newport-beach.ca.us | X | X | | |
| | 2. CIP | Mike Sinacori<br>Utilities Engineer<br>(949) 644-3311<br>msinacori@city.newport-beach.ca.us | X | X | | |

| Agency Name (Mission/Function) | Programs, Plans, Policies, Regulations, Funding, or Practices | Point of Contact Name, Address, Phone, Email | Effect on Loss Reduction* | | | Comments |
|---|---|---|---|---|---|---|
| | | | Support | Facilitate | Hinder | |
| | 3. Urban Water Management Plan | Pete Antista<br>Utilities Director<br>(949) 644-3011<br>pantista@city.newport-beach.ca.us | X | X | | |
| | 4. Master Fee Resolution | Pete Antista<br>Utilities Director<br>(949) 644-3011<br>pantista@city.newport-beach.ca.us | X | X | | |
| | 5. Municipal Code | Pete Antista<br>Utilities Director<br>(949) 644-3011<br>pantista@city.newport-beach.ca.us | X | X | | |
| City of Newport Beach (Sewer)<br>3300 Newport Blvd.<br>Newport Beach, CA 92658 | 1. Master Plan | Mike Sinacori<br>Utilities Engineer<br>(949) 644-3311<br>msinacori@city.newport-beach.ca.us | X | X | | |
| | 2. CIP | Mike Sinacori<br>Utilities Engineer<br>(949) 644-3311<br>msinacori@city.newport-beach.ca.us | X | X | | |
| | 3. Waste Discharge Order | Ed Burt<br>Operations Manager<br>(949) 718-3402<br>eburt@city.newport-beach.ca.us | X | X | | RWQCB |
| | 4.Master Fee Resolution | Pete Antista<br>Utilities Director<br>(949) 644-3011<br>pantista@city.newport-beach.ca.us | X | X | | |
| | 5. Municipal Code | Pete Antista<br>Utilities Director<br>(949) 644-3011<br>pantista@city.newport-beach.ca.us | X | X | | |

### *5.14.6.2 City of Newport Beach Goals*

Newport Beach has developed the following seven goals for their Hazard Mitigation Plan.

Goal 1. Promote disaster-resistant development and construction of utilities facilities/infrastructure.

Goal 2. Promote public understanding, support and demand for effective hazard mitigation.

Goal 3. Build and support local capacity and commitment to continuously become less vulnerable to hazards (Vulnerability Assessment).

Goal 4. Improve coordination and communication with federal, state, and local governments.

Goal 5. Reduce the possibility of damage and losses to existing assets, particularly people and critical facilities/infrastructure due to dam failure

Goal 6. Reduce the possibility of damage and losses to existing assets, particularly people and critical facilities/infrastructure due to natural disasters (earthquakes, Severe Weather & High Tides, Tsunami's and Structural Fire/Wildfires).

Goal 7. Reduce the possibility of damage and losses to existing assets, particularly people and critical facilities/infrastructure due to human caused hazards.

**Goal 1: Promote disaster-resistant future development.**

A. Implement a program of continued hazard assessment.

   1. Implement hazard assessment in an area prior to utilities facilities/infrastructure.

**Goal 2: Promote public understanding, support and demand for hazard mitigation.**

A. Educate the public to increase awareness of hazards and opportunities for mitigation actions.

   1. Encourage public participation and input.

**Goal 3: Build and support local capacity and commitment to continuously become less vulnerable to hazards (Vulnerability assessment).**

A. Involve officials in the Mitigation Plan and Activities

   1. Provide ongoing information on the benefits of mitigation

B. Develop hazard mitigation plan and implement plan.

   1. Implement Vulnerability Risk Assessment recommendations

2. Coordinate and support existing efforts to mitigate hazards

C. Continue to create and update Mitigation Plans

1. Continued risk assessment as areas experience change, and mitigation of these risks

**Goal 4: Improve hazard mitigation coordination and communication with federal, state, and local governments.**

A. Improve the capability and efficiency of administering pre- and post-disaster mitigation.

1. Dedicate resources to mitigation
2. Continue to participate in mitigation scenarios (drills).

**Goal 5: Reduce the possibility of damage and losses to existing assets, particularly people and critical facilities/infrastructure due to <u>dam failure</u>.**

A. Coordinate with and support existing efforts to mitigate dam failure (California Department of Water Resources).

1. Annual DSOD Inspection
2. Make recommended upgrades/improvements
3. Review and/or update dam seismic study as needed

**Goal 6: Reduce the possibility of damage and losses to existing assets, particularly people and critical facilities/infrastructure due to natural disasters (Earthquakes, Severe Weather & High Tides, Tsunami's and Structural Fire/Wildfires).**

A. Develop a comprehensive approach to reducing the possibility of damage and loss.

1. Develop training protocols
2. Develop a program to implement back up utility systems, maintenance and testing protocols.

**Goal 7: Reduce the possibility of damage and losses to existing assets, particularly people, critical facilities/infrastructure, due to <u>human caused hazards</u>.**

A. Develop a comprehensive approach to reducing the possibility of damage and losses due to human-caused hazards.

1. Draft a full risk assessment of possible human caused hazards
2. Provide education for administrative personnel and other decision makers on the possibility of human caused hazards.

3. Identify the locations of hazardous materials that could negatively impact the operations and maintenance of all utilities facilities/infrastructure.

**Newport - Goals, Objectives and Actions**
**Cross-referenced with identified Hazards Within Orange County**

| Goal, Objective, and Action | Flood/Storm | Wildland/Urban Fire | Earthquake | Dam Failure/Water Tank Failure | Landslide / Mudslide | Tornado / High Winds | Tsunami | Extreme Heat/ Drought | Expansive Soils/Land Subsidence / Liquefaction | Man-Made Hazards/ Contamination |
|---|---|---|---|---|---|---|---|---|---|---|
| G1/A/1 | X | X | X | X | X | X | X | X | X | X |
| G2/A/1 | X | X | X | X | X | X | X | X | X | X |
| G3/A/1 | X | X | X | X | X | X | X | X | X | X |
| G3/B/1 | | | | | | | | | | X |
| G3/B/2 | X | X | X | X | X | X | X | X | X | X |
| G3/C/1 | X | X | X | X | X | X | X | X | X | X |
| G4/A/1 | X | X | X | X | X | X | X | X | X | X |
| G4/A/2 | X | X | X | X | X | X | X | X | X | X |
| G5/A/1 | | | X | X | | | | | X | |
| G5/A/2 | | | X | X | | | | | X | |
| G5/A/3 | | | X | | | | | | | |
| G6/A/1 | X | X | X | X | X | X | X | X | X | X |
| G6/A/2 | X | X | X | X | X | X | X | X | X | X |
| G7/A/1 | | | | | | | | | | X |
| G7/A/2 | | | | | | | | | | X |
| G7/A/3 | | | | | | | | | | X |

**Table 5.14-1 Newport Loss Estimation Table**

| Hazard Type | Item-> | WST | RES | WTP | PS | PRS | EIT | SC | ADM | LS | WWTP | WELL | DIEMER | OC-88 PS | PRS-MET | PP | WWTP-SOCWA | WWTP-OCSD | LS-OCSD | PWL | WWL | Total Loss Value [1] $M |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Replacement Cost | $M -> | 13.0 | 30.0 | 10.0 | 2.0 | 0.2 | 0.3 | 0.6 | 3.0 | 0.4 | 5.0 | 3.5 | 250.0 | 35.0 | 12.0 | 12.0 | 30.0 | 250.0 | 10.0 | 1.0 | 0.5 | |
| Earthquake | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | |
| Moderate | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| | Number | 2 | 1 | 0 | 5 | 43 | 13 | 6 | 1 | 16 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 61.6 | 37.3 | |
| High | Exposure ($M) | $ 26.0 | $ 30.0 | $ - | $ 10.0 | $ 8.6 | $ 3.9 | $ 3.6 | $ 3.0 | $ 6.4 | $ - | $ 7.0 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 61.6 | $ 18.6 | $ 178.7 |
| | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3.3 | 2.2 | |
| Extreme | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 1.2 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 3.3 | $ 1.1 | $ 5.6 |
| Flood | Number | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 9 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10.0 | 9.6 | |
| 100 yr | Exposure ($M) | $ - | $ 30.0 | $ - | $ - | $ 0.2 | $ - | $ - | $ - | $ 3.6 | $ - | $ 3.5 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 10.0 | $ 4.8 | $ 52.1 |
| | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5.8 | 4.5 | |
| 500 yr | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 3.5 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 5.8 | $ 2.2 | $ 11.6 |
| Landslide | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2.1 | 2.8 | |
| | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 0.8 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 2.1 | $ 1.4 | $ 4.3 |
| Liquifaction | Number | 0 | 0 | 0 | 0 | 2 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | |
| Moderate | Exposure ($M) | $ - | $ - | $ - | $ - | $ 0.4 | $ - | $ 1.2 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 1.6 |
| | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6.8 | 0.1 | |
| High | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 0.4 | $ - | $ 7.0 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 6.8 | $ 0.1 | $ 14.3 |
| Very High | Number | 0 | 0 | 0 | 0 | 8 | 1 | 0 | 0 | 11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | |
| | Exposure ($M) | $ - | $ - | $ - | $ - | $ 1.6 | $ 0.3 | $ - | $ - | $ 4.4 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 6.3 |
| Wildlife/Structure Fire | Number | 0 | 1 | 0 | 0 | 3 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3.3 | 5.9 | |
| Low | Exposure ($M) | $ - | $ 30.0 | $ - | $ - | $ 0.6 | $ - | $ - | $ - | $ 0.8 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 3.3 | $ 2.9 | $ 37.6 |
| | Number | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0.6 | |
| High | Exposure ($M) | $ - | $ - | $ - | $ - | $ 0.2 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 0.1 | $ 0.3 | $ 0.6 |
| | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | |
| Extreme | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| | | | | | | | | | | | | | | | | | | | | | Grand Total | **$ 312.7** |

**[1] Loss value is asset replacement value in 2006 dollars. Value shown is found as count of assets at risk from the particular hazard times high-end unit asset value.**
**[2] Grand Total Loss value shown may include the same assets counted multiple times for different hazards.**

## 5.15 OCSD – OBJECTIVES, GOALS AND ACTIONS

Orange County Sanitation District reviewed a set of jurisdictional-level hazard maps including detailed critical facility information and localized potential hazard exposure/loss estimates to help identify the top hazards threatening their jurisdiction. See Section 4 for additional details.

OCSD Loss Assessment Table is located at the end of this section.

### 5.15.1 Capability Assessment

OCSD is currently identifying their capabilities.

The LPG identified current capabilities available for implementing hazard mitigation activities. The Capability Assessment (Assessment) portion of the jurisdictional mitigation plan identifies administrative, technical, legal and fiscal capabilities. This includes a summary of departments and their responsibilities associated to hazard mitigation planning as well as codes, ordinances, and plans already in place associated to hazard mitigation planning. The second part of the Assessment provides OCSD's fiscal capabilities that may be applicable to providing financial resources to implement identified mitigation action items.

### 5.15.2 Existing Institutions, Plans, Policies and Ordinances

The legal and regulatory capabilities of OCSD are shown in Table 5.15.2-1, which presents the existing ordinances and codes that affect the physical or built environment of OCSD. Examples of legal and/or regulatory capabilities can include: the OCSD's building codes, zoning ordinances, subdivision ordinances, special purpose ordinances, growth management ordinances, site plan review, general plans, capital improvement plans, economic development plans, emergency response plans, and real estate disclosure plans.

**Table 5.15.2-1**
**Legal and Regulatory Capability**

| Regulatory Tools (ordinances, codes, plans) | Local Authority (Yes/No) | State Authority (Yes/No) | Other Level Jurisdiction Authority (Yes/No) | Comments |
|---|---|---|---|---|
| A. Building code | No | Yes | Yes | Local cities<br>O.C.F.A<br>A.Q.M.D.<br>Some Exceptions Apply<br>HCA < State/County |
| B. Zoning ordinance | No | No | Yes | Coastal Commission |

**Table 5.15.2-1**
**Legal and Regulatory Capability**

| Regulatory Tools (ordinances, codes, plans) | Local Authority (Yes/No) | State Authority (Yes/No) | Other Level Jurisdiction Authority (Yes/No) | Comments |
|---|---|---|---|---|
| C. Subdivision ordinance or regulations | No | No | Yes | Local cities<br>County of Orange |
| D. Special purpose ordinances (floodplain management, storm water management, hillside or steep slope ordinances, wildfire ordinances, hazard setback requirements) | No | Yes | Yes | County of Orange-<br>Army Corps of Engineers<br>USFWS/CDFG<br>Regional Water Quality Control Board<br>SAWPA<br>OCFA<br>CDF/ Forest Service |
| E. Growth management ordinances (also called "smart growth" or anti-sprawl programs) | No | No | No | Local cities<br>County of Orange<br>OCFA |
| F. Site plan review requirements | Yes | No | No | Local cities<br>County of Orange<br>OCFA<br>Permits |
| G. General or comprehensive plan | No | No | No | |
| H. A capital improvements plan | Yes | No | No | RWQCB<br>Habitat Protection<br>LAFCO |
| I. An economic development plan | No | No | No | |
| J. An emergency response plan | Yes | Yes | Yes | SEMS<br>NIMS<br>WEROC |
| K. A post-disaster recovery plan | No | No | Yes | NIMS |
| L. A post-disaster recovery law | No | No | No | |
| M. Real estate disclosure requirements | No | No | No | |
| N. Waste Discharge Requirement | No | Yes | No | State Water Resource Control Board |

### 5.15.3 Administrative and Technical Capacity

The following is a summary of existing departments in OCSD and their responsibilities related to hazard mitigation planning and implementation, as well as existing planning documents and regulations related to mitigation efforts within the community. The administrative and technical capabilities of OCSD, as

shown in Table 5.15.3-1, provides an identification of the staff, personnel, and department resources available to implement the actions identified in the mitigation section of the Plan. Specific resources reviewed include those involving technical personnel such as planners/engineers with knowledge of land development and land management practices, engineers trained in construction practices related to building and infrastructure, planners and engineers with an understanding of natural or manmade hazards, floodplain managers, surveyors, personnel with GIS skills and scientists familiar with hazards in the community.

**Table 5.15.3-2**
**Administrative and Technical Capacity**

| Staff/Personnel Resources | Yes/No | Department/Agency and Position |
|---|---|---|
| A. Planner(s) or engineer(s) with knowledge of land development and land management practices | Yes | District coordinates with outside consultants |
| B. Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure | Yes | District coordinates with outside consultants<br>In-house and Consultants<br>Engineering Department |
| C. Planners or Engineer(s) with an understanding of natural and/or human-caused hazards | Yes | District coordinates with outside consultants<br>Consultant with VA & ERP |
| D. Floodplain manager | Yes | County of Orange |
| E. Surveyors | Yes | Outside consultant |
| F. Staff with education or expertise to assess the community's vulnerability to hazards | Yes | County of Orange- WEROC |
| G. Personnel skilled in GIS and/or HAZUS | Yes | Outside Consultant |
| H. Scientists familiar with the hazards of the community | Yes | County<br>Colleges/University<br>Regional<br>Caltech<br>USGS |
| I. Emergency manager | Yes | Director of Operations<br>Risk/Safety Department |
| J. Grant writers | No | |
| K. Other- Lab Staff/ Specialist | Yes | Internal |

### 5.15.4 Fiscal Capability

Table 5.15.4-1 shows specific financial and budgetary tools available to OCSD such as community development block grants; capital improvements project funding; authority to levy taxes for specific purposes; fees for water, sewer, gas, or electric services; impact fees for homebuyers or developers for new development; ability to incur debt through general obligations bonds; and withholding spending in hazard-prone areas.

**Table 5.15.4-3**
**Fiscal Capability**

| Financial Resources | Accessible or Eligible to Use (Yes/No/Don't Know) |
|---|---|
| A. Community Development Block Grants (CDBG) | No |
| B. Capital improvements project funding | Yes |
| C. Authority to levy taxes for specific purposes | Yes |
| D. Fees for water, sewer, gas, or electric service | Yes |
| E. Impact fees for homebuyers or developers for new developments/homes | No |
| F. Incur debt through general obligation bonds | No |
| G. Incur debt through special tax and revenue bonds | No |
| H. Incur debt through private activity bonds | No |
| I. Withhold spending in hazard-prone areas | No |
| J. Grants | Yes |

### 5.15.5 Local Mitigation Capability Assessment Goals

Listed below are OCSD's specific hazard mitigation goals, objectives and related potential actions. For each goal, one or more objectives have been identified that provide strategies to attain the goal. Where appropriate, the OCSD has identified a range of specific actions to achieve the objective and goal.

The goals and objectives were developed by considering the risk assessment findings, localized hazard identification and loss/exposure estimates, and an analysis of the jurisdiction's current capabilities assessment. These preliminary goals, objectives and actions were developed to represent a vision of long-term hazard reduction or enhancement of capabilities. To help in further development of these goals and objectives, the LPG compiled and reviewed current jurisdictional sources including the OCSD's planning documents, codes, and ordinances. In addition, OCSD representatives met with consultant staff and/or MWDOC to specifically discuss these hazard-related goals, objectives and actions as they related to the overall Plan. The LPG members were Jim Matte and George Rivera. Once developed, OCSD staff presented them to the OCSD Board of Directors for their approval.

Public meetings were held throughout the County to present these preliminary goals, objectives and actions to citizens and to receive public input. At these meetings, specific consideration was given to hazard identification/profiles and the vulnerability assessment results. The following sections present the

hazard-related goals, objectives and actions as prepared by OCSD's LPG in conjunction with the Hazard Mitigation Working Group, locally elected officials, and local citizens.

### 5.15.6 OCSD MITIGATION GOALS AND OBJECTIVES

OCSD reviewed a set of jurisdictional-level hazard maps including detailed critical facility information and localized potential hazard exposure/loss estimates to help identify the top hazards threatening their jurisdiction. Since OCSD is a regional agency providing the underlying support for a number of the agencies, the overall goals and objectives for the wastewater functions were included in the regional Section 5.4. See Section 4 for additional details on the hazards.

The OCSD Loss Assessment Table follows.

**Table 5.15-1 OCSD Loss Estimation Table**

| Hazard Type | Item-> | WST | RES | WTP | PS | PRS | EIT | SC | ADM | LS | WWTP | WELL | DIEMER | OC-88 PS | PRS-MET | PP | WWTP-SOCWA | WWTP-OCSD | LS-OCSD | PWL | WWL | Total Loss Value [1] $M |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Replacement Cost | $M -> | 13.0 | 30.0 | 10.0 | 2.0 | 0.2 | 0.3 | 0.6 | 3.0 | 0.4 | 5.0 | 3.5 | 250.0 | 35.0 | 12.0 | 12.0 | 30.0 | 250.0 | 10.0 | 1.0 | 0.5 | |
| Earthquake | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0.0 | 287.3 | |
| Moderate | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 10.0 | $ - | $ 143.7 | $ 153.7 |
| | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 19 | 0.0 | 251.9 | |
| High | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 3.0 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 500.0 | $ 190.0 | $ - | $ 125.9 | $ 818.9 |
| | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0.0 | 9.7 | |
| Extreme | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 30.0 | $ - | $ 4.9 | $ 34.9 |
| Flood | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 10 | 0.0 | 10.9 | |
| 100 yr | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 3.0 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 500.0 | $ 100.0 | $ - | $ 5.4 | $ 608.4 |
| | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 0.0 | 196.2 | |
| 500 yr | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 60.0 | $ - | $ 98.1 | $ 158.1 |
| Landslide | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 6.0 | |
| | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 3.0 | $ 3.0 |
| Liquifaction | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 0.0 | 141.3 | |
| Moderate | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 70.0 | $ - | $ 70.6 | $ 140.6 |
| | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 5 | 0.0 | 213.1 | |
| High | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 3.0 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 500.0 | $ 50.0 | $ - | $ 106.6 | $ 659.6 |
| Very High | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0.0 | 13.0 | |
| | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 40.0 | $ - | $ 6.5 | $ 46.5 |
| Wildlife/Structure Fire | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0.0 | 24.6 | |
| Low | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 30.0 | $ - | $ 12.3 | $ 42.3 |
| | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 1.3 | |
| High | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 0.7 | $ 0.7 |
| | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | |
| Extreme | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| | | | | | | | | | | | | | | | | | | | | | Grand Total | **$ 2,666.6** |

**[1] Loss value is asset replacement value in 2006 dollars. Value shown is found as count of assets at risk from the particular hazard times high-end unit asset value.**
**[2] Grand Total Loss value shown may include the same assets counted multiple times for different hazards.**

## 5.16 OCWD – OBJECTIVE, GOALS AND ACTIONS

OCWD reviewed a set of jurisdictional-level hazard maps including detailed critical facility information and localized potential hazard exposure/loss estimates to help identify the top hazards threatening their jurisdiction. See Section 4 for additional details.

OCWD Loss Assessment Table is located at the end of this section.

### 5.16.1 Capability Assessment

The LPG identified current capabilities available for implementing hazard mitigation activities. The Capability Assessment (Assessment) portion of the jurisdictional mitigation plan identifies administrative, technical, legal and fiscal capabilities. This includes a summary of departments and their responsibilities associated to hazard mitigation planning as well as codes, ordinances, and plans already in place associated to hazard mitigation planning. The second part of the Assessment provides OCWD's fiscal capabilities that may be applicable to providing financial resources to implement identified mitigation action items.

### 5.16.2 Existing Institutions, Plans, Policies and Ordinances

The legal and regulatory capabilities of OCWD are shown in Table 5.16.2-1, which presents the existing ordinances and codes that affect the physical or built environment of OCWD. Examples of legal and/or regulatory capabilities can include: the District's building codes, zoning ordinances, subdivision ordinances, special purpose ordinances, growth management ordinances, site plan review, general plans, capital improvement plans, economic development plans, emergency response plans, and real estate disclosure plans.

**Table 5.16.2-1**

| Legal and Regulatory Capability | | | | |
|---|---|---|---|---|
| Regulatory Tools (ordinances, codes, plans) | Local Authority (Yes/No) | State Authority (Yes/No) | Other Level Jurisdiction Authority (Yes/No) | Comments |
| A. Building code | No | Yes | Yes | |
| B. Zoning ordinance | No | No | Yes | . |
| C. Subdivision ordinance or regulations | No | No | Yes | |
| D. Special purpose ordinances (floodplain management, stormwater management, hillside or steep slope ordinances, wildfire ordinances, hazard setback requirements) | No | Yes | Yes | |
| E. Growth management ordinances (also called "smart growth" or anti-sprawl programs) | No | No | No | |
| F. Site plan review requirements | No | No | Yes | |

| Legal and Regulatory Capability | | | | |
|---|---|---|---|---|
| Regulatory Tools (ordinances, codes, plans) | Local Authority (Yes/No) | State Authority (Yes/No) | Other Level Jurisdiction Authority (Yes/No) | Comments |
| G. General or comprehensive plan | No | No | Yes | |
| H. A capital improvements plan | Yes | No | Yes | |
| I. An economic development plan | No | No | Yes | |
| J. An emergency response plan | Yes | Yes | Yes | |
| K. A post-disaster recovery plan | No | Yes | Yes | |
| L. A post-disaster recovery ordinance | No | Yes | Yes | |
| M. Real estate disclosure requirements | No | Yes | Yes | |
| N. Waste Discharge Requirements | No | Yes | No | State Water Resources Control Board |

### 5.16.3 Administrative and Technical Capacity

The following is a summary of existing departments in OCWD and their responsibilities related to hazard mitigation planning and implementation, as well as existing planning documents and regulations related to mitigation efforts within the community. The administrative and technical capabilities of OCWD, as shown in Table 5.16.3-1, provides an identification of the staff, personnel, and department resources available to implement the actions identified in the mitigation section of the Plan. Specific resources reviewed include those involving technical personnel such as planners/engineers with knowledge of land development and land management practices, engineers trained in construction practices related to building and infrastructure, planners and engineers with an understanding of natural or manmade hazards, floodplain managers, surveyors, personnel with GIS skills and scientists familiar with hazards in the community.

**Table 5.16.3-1**

| Administrative and Technical Capacity | | |
|---|---|---|
| Staff/Personnel Resources | Yes/No | Department/Agency and Position |
| 1. A. Planner(s) or engineer(s) with knowledge of land development and land management practices | No | |
| 2. Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure | Yes | OCWD- Engineering Department |
| 3. Planners or Engineer(s) with an understanding of natural and/or human-caused hazards | No | |
| 4. Floodplain manager | No | |
| 5. Surveyors | No | |
| 6. Staff with education or expertise to assess the community's vulnerability to hazards | No | |
| 7. Personnel skilled in GIS and/or HAZUS | Yes | OCWD- Hydrogeology Department |
| 8. Scientists familiar with the hazards of the community | No | |
| 9. Emergency manager | Yes | OCWD - Risk/Safety Department |
| 10. Grant writers | Yes | OCWD - Planning Department |
| 11. Other | Yes | OCWD - Water Quality Lab |

### 5.16.4 Fiscal Capability

Table 5.16.4-1 shows specific financial and budgetary tools available to OCWD such as community development block grants; capital improvements project funding; authority to levy taxes for specific purposes; fees for water, sewer, gas, or electric services; impact fees for homebuyers or developers for new development; ability to incur debt through general obligations bonds; and withholding spending in hazard-prone areas.

**Table 5.16.4-1**

| Fiscal Capability | |
|---|---|
| Financial Resources | Accessible or Eligible to Use (Yes/No/Don't Know) |
| • Community Development Block Grants (CDBG) | No |
| • Capital improvements project funding | Yes |
| • Authority to levy taxes for specific purposes | No |
| • Fees for water, sewer, gas, or electric service | Yes |
| • Impact fees for homebuyers or developers for new developments/homes | No |
| • Incur debt through general obligation bonds | Yes |
| • Incur debt through special tax and revenue bonds | Yes |
| • Incur debt through private activity bonds | Yes |
| • Withhold spending in hazard-prone areas | No |

### 5.16.5 Local Mitigation Capability Assessment Goals

Listed below are OCWD's specific hazard mitigation goals, objectives and related potential actions. For each goal, one or more objectives have been identified that provide strategies to attain the goal. Where appropriate, the OCWD has identified a range of specific actions to achieve the objective and goal.

The goals and objectives were developed by considering the risk assessment findings, localized hazard identification and loss/exposure estimates, and an analysis of the jurisdiction's current capabilities assessment. These preliminary goals, objectives and actions were developed to represent a vision of long-term hazard reduction or enhancement of capabilities. To help in further development of these goals and

objectives, the LPG compiled and reviewed current jurisdictional sources including the OCWD's planning documents, codes, and ordinances. In addition, OCWD representatives met with consultant staff and/or MWDOC to specifically discuss these hazard-related goals, objectives and actions as they related to the overall Plan. The LPG members were Boyd Lypka, Chuck Steinburg, and Lo Tan. Once developed, OCWD staff presented them to the OCWD Board of Directors for their approval.

Public meetings were held throughout the County to present these preliminary goals, objectives and actions to citizens and to receive public input. At these meetings, specific consideration was given to hazard identification/profiles and the vulnerability assessment results. The following sections present the hazard-related goals, objectives and actions as prepared by OCWD's LPG in conjunction with the Hazard Mitigation Working Group, locally elected officials, and local citizens.

### 5.16.6 Orange County Water District Goals

**Goal 1: Deter unauthorized access to key facilities at Prado Dam.**

A. Improve site security
   1. Action 1 – Install fencing/gates in selected areas
   2. Action 2 - Construct a permanent operations structure

**Goal 2: Reduce potential loss to existing infrastructure**

A. Increase protection of facilities within flood plain area
   1. Action 1 – Reinforce the levees of the wetlands and diversion structures

**Goal 3: Deter unauthorized access to key facilities ay Field Headquarters in Anaheim**.

A. Improve site security
   1. Install security cameras
   2. Install automated entrance gates

**Goal 4: Maintain continuous operations of key facilities**

A. Provide backup system for critical facilities
   1. Acquire mobile emergency power generator system
B. Protect reservoirs from overflow
   1. Install larger capacity culvert with control valves

**OCWD - Goals, Objectives and Actions**

**Cross-referenced with identified Hazards Within Orange County**

| Goal, Objective, and Action | Flood/Storm | Wildland/Urban Fire | Earthquake | Dam Failure/Water Tank Failure | Landslide / Mudslide | Tornado / High Winds | Tsunami | Extreme Heat/ Drought | Expansive Soils/Land Subsidence / Liquefaction | Man-Made Hazards/ Contamination |
|---|---|---|---|---|---|---|---|---|---|---|
| G1/A/1 | | | | | | | | | | X |
| G1/A/2 | | | | | | | | | | X |
| G2/A/1 | X | | X | X | | | | | X | X |
| G3/A/1 | | | | | | | | | | X |
| G3/A/2 | | | | | | | | | | X |
| G4/A/1 | X | X | X | X | | X | X | | X | X |
| G4/B/1 | X | | | | | | | | | |

**Table 5.16-1 OCWD Loss Estimation Table**

| Hazard Type | Item-> | WST | RES | WTP | PS | PRS | EIT | SC | ADM | LS | WWTP | WELL | DIEMER | OC-88 PS | PRS-MET | PP | WWTP-SOCWA | WWTP-OCSD | LS-OCSD | PWL | WWL | Total Loss Value [1] $M |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Replacement Cost | $M -> | 13.0 | 30.0 | 10.0 | 2.0 | 0.2 | 0.3 | 0.6 | 3.0 | 0.4 | 5.0 | 3.5 | 250.0 | 35.0 | 12.0 | 12.0 | 30.0 | 250.0 | 10.0 | 1.0 | 0.5 | |
| | | | | | | | | | | | | | | | | | | | | | | |
| Earthquake | Number | 0 | 4 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 11.6 | |
| Moderate | Exposure ($M) | $ - | $ 120.0 | $ - | $ 2.0 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 5.8 | $ 127.8 |
| | Number | 1 | 14 | 1 | 1 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 66.8 | |
| High | Exposure ($M) | $ 13.0 | $ 420.0 | $ 10.0 | $ 2.0 | $ - | $ - | $ - | $ 6.0 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 33.4 | $ 484.4 |
| | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | |
| Extreme | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| Flood | Number | 1 | 11 | 1 | 1 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 47.9 | |
| 100 yr | Exposure ($M) | $ 13.0 | $ 330.0 | $ 10.0 | $ 2.0 | $ - | $ - | $ - | $ 6.0 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 23.9 | $ 384.9 |
| | Number | 0 | 0 | 6 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 11.1 | |
| 500 yr | Exposure ($M) | $ - | $ - | $ 60.0 | $ 2.0 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 5.5 | $ 67.5 |
| Landslide | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.2 | |
| | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 0.1 | $ 0.1 |
| Liquifaction | Number | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 5.0 | |
| Moderate | Exposure ($M) | $ - | $ 60.0 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 2.5 | $ 62.5 |
| | Number | 1 | 14 | 1 | 2 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 41.5 | |
| High | Exposure ($M) | $ 13.0 | $ 420.0 | $ 10.0 | $ 4.0 | $ - | $ - | $ - | $ 6.0 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 20.7 | $ 473.7 |
| Very High | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 1.5 | |
| | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 0.8 | $ 0.8 |
| Wildlife/Structure Fire | Number | 0 | 17 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 15.0 | |
| Low | Exposure ($M) | $ - | $ 510.0 | $ - | $ 2.0 | $ - | $ - | $ - | $ 3.0 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 7.5 | $ 522.5 |
| | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.1 | |
| High | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 0.1 | $ 0.1 |
| | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | |
| Extreme | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| | | | | | | | | | | | | | | | | | | | | | Grand Total | **$ 2,124.3** |

**[1] Loss value is asset replacement value in 2006 dollars. Value shown is found as count of assets at risk from the particular hazard times high-end unit asset value.**
**[2] Grand Total Loss value shown may include the same assets counted multiple times for different hazards.**

## 5.17 CITY OF ORANGE – OBJECTIVE, GOALS AND ACTIONS

The City of Orange (Orange) reviewed a set of jurisdictional-level hazard maps including detailed critical facility information and localized potential hazard exposure/loss estimates to help identify the top hazards threatening their jurisdiction. See Section 4 for additional details.

Orange Loss Assessment Table is located at the end of this section.

### 5.17.1 Capability Assessment

The LPG identified current capabilities available for implementing hazard mitigation activities. The Capability Assessment (Assessment) portion of the jurisdictional mitigation plan identifies administrative, technical, legal and fiscal capabilities. This includes a summary of departments and their responsibilities associated to hazard mitigation planning as well as codes, ordinances, and plans already in place associated to hazard mitigation planning. The second part of the Assessment provides Orange's fiscal capabilities that may be applicable to providing financial resources to implement identified mitigation action items.

### 5.17.2 Existing Institutions, Plans, Policies and Ordinances

The legal and regulatory capabilities of Orange are shown in Table 5.17.2-1, which presents the existing ordinances and codes that affect the physical or built environment of Orange. Examples of legal and/or regulatory capabilities can include: the City's building codes, zoning ordinances, subdivision ordinances, special purpose ordinances, growth management ordinances, site plan review, general plans, capital improvement plans, economic development plans, emergency response plans, and real estate disclosure plans.

**Table 5.17.2-1**
**Legal and Regulatory Capability**

| Regulatory Tools (ordinances, codes, plans) | Local Authority (Yes/No) | Does State have Authority? (Yes/No) | Other Level Jurisdiction Authority (Yes/No) | Comments |
|---|---|---|---|---|
| A. Building code | Yes | No | Yes | OCFA, AQMD |
| B. Zoning ordinance | Yes | No | No | |
| C. Subdivision ordinance or regulations | Yes | No | No | |
| D. Special purpose ordinances (floodplain management, stormwater management, hillside or steep slope ordinances, wildfire ordinances, hazard setback requirements) | Yes | No | Yes | Regional Water Quality Control Board (RWQCB), USFWS, CDFG |

**Table 5.17.2-1 (continued)**
**Legal and Regulatory Capability**

| Regulatory Tools (ordinances, codes, plans) | Local Authority (Yes/No) | Does State have Authority? (Yes/No) | Other Level Jurisdiction Authority (Yes/No) | Comments |
|---|---|---|---|---|
| E. Growth management ordinances (also called "smart growth" or anti-sprawl programs) | Yes | No | No | |
| F. Site plan review requirements | Yes | No | No | |
| G. General or comprehensive plan | Yes | No | No | |
| H. A capital improvements plan | Yes | No | No | |
| I. An economic development plan | Yes | No | No | |
| J. An emergency response plan | Yes | No | Yes | WEROC, SEMS |
| K. A post-disaster recovery plan | Yes | No | Yes | NIMS |
| L. A post-disaster recovery ordinance | No | Yes | Yes | F.E.M.A., State of CA |
| M. Real estate disclosure requirements | Yes | Yes | No | State Realtor Board |
| N. Security Issues | Yes | Yes | No | CA DHS via Vulnerability Assessment |
| O. Safety | Yes | Yes | No | Cal OSHA |
| P. Water Quality | Yes | Yes | Yes | CA DHS, US EPA |

### 5.17.3 Administrative and Technical Capacity

The following is a summary of existing departments in Orange and their responsibilities related to hazard mitigation planning and implementation, as well as existing planning documents and regulations related to mitigation efforts within the community. The administrative and technical capabilities of Orange, as shown in Table 5.17.3-1, provides an identification of the staff, personnel, and department resources available to implement the actions identified in the mitigation section of the Plan. Specific resources reviewed include those involving technical personnel such as planners/engineers with knowledge of land development and land management practices, engineers trained in construction practices related to building and infrastructure, planners and engineers with an understanding of natural or manmade hazards, floodplain managers, surveyors, personnel with GIS skills and scientists familiar with hazards in the community.

**Table 5.17.3-1**
**Administrative and Technical Capacity**

| Staff/Personnel Resources | Yes/No | Department/Agency and Position |
|---|---|---|
| A. Planner(s) or engineer(s) with knowledge of land development and land management practices | Yes | Public Works/City Engineer |
| B. Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure | Yes | Public Works/City Engineer |
| C. Planners or Engineer(s) with an understanding of natural and/or human-caused hazards | Yes | Public Works/City Engineer |
| D. Floodplain manager | Yes | Orange County Flood Control District |
| E. Surveyors | No | |
| F. Staff with education or expertise to assess the community's vulnerability to hazards | No | |
| G. Personnel skilled in GIS and/or HAZUS | Yes | Public Works / GIS Coordinator |
| H. Scientists familiar with the hazards of the community | No | |
| I. Emergency manager | Yes | City Manager Office |
| J. Grant writers | Yes | City Manager Office |
| K. Other – Water Quality Lab | Yes | Water Division / Water Quality Inspectors |

## 5.17.4 Fiscal Capability

Table 5.17.4-1 shows specific financial and budgetary tools available to Orange such as community development block grants; capital improvements project funding; authority to levy taxes for specific purposes; fees for water, sewer, gas, or electric services; impact fees for homebuyers or developers for new development; ability to incur debt through general obligations bonds; and withholding spending in hazard-prone areas.

**Table 5.17.4-1**
**Fiscal Capability**

| Financial Resources | Accessible or Eligible to Use (Yes/No/Don't Know) |
|---|---|
| A. Community Development Block Grants (CDBG) | Yes |
| B. Capital improvements project funding | Yes |
| C. Authority to levy taxes for specific purposes | Yes |
| D. Fees for water, sewer, gas, or electric service | Yes |
| E. Impact fees for homebuyers or developers for new developments/homes | Yes |
| F. Incur debt through general obligation bonds | Yes |
| G. Incur debt through special tax and revenue bonds | Yes |
| H. Incur debt through private activity bonds | Yes |
| I. Withhold spending in hazard-prone areas | Don't know |

## 5.17.5 Local Mitigation Capability Assessment

Listed below are Orange's specific hazard mitigation goals, objectives and related potential actions. For each goal, one or more objectives have been identified that provide strategies to attain the goal. Where appropriate, the City has identified a range of specific actions to achieve the objective and goal.

The goals and objectives were developed by considering the risk assessment findings, localized hazard identification and loss/exposure estimates, and an analysis of the jurisdiction's current capabilities assessment. These preliminary goals, objectives and actions were developed to represent a vision of long-term hazard reduction or enhancement of capabilities. To help in further development of these goals and objectives, the LPG compiled and reviewed current jurisdictional sources including the City's planning documents, codes, and ordinances. In addition, City representatives met with consultant staff and/or MWDOC to specifically discuss these hazard-related goals, objectives and actions as they related to the overall Plan. The LPG members were Joe De Francesco and Son Tran. Once developed, City staff presented them to the Orange City Council for their approval.

Public meetings were held throughout the County to present these preliminary goals, objectives and actions to citizens and to receive public input. At these meetings, specific consideration was given to hazard identification/profiles and the vulnerability assessment results. The following sections present the hazard-related goals, objectives and actions as prepared by Orange's LPG in conjunction with the Hazard Mitigation Working Group, locally elected officials, and local citizens.

**Table 5.17.5-1**
**Local Mitigation Capability Assessment**

| Agency Name (Mission/Function) | Programs, Plans, Policies, Regulations, Funding, or Practices | Point of Contact Name, Address, Phone, Email | Effect on Loss Reduction* | | | Comments |
|---|---|---|---|---|---|---|
| | | | Support | Facilitate | Hinder | |
| Water Division | 1. Water Master Plan | Water Manager | X | | | Provide overall view of the water system |
| | 2. Asset Management Plan | Water Manager | X | | | Budget planning |

## 5.17.6 City of Orange Goals

Orange has developed the following Goals for their Hazard Mitigation Plan.

**Goal 1: Ensure a cost effective, safe, and dependable potable water supply for domestic uses and fire protection**

A. Provide and preserve infrastructure, facilities, and programs

1. Create a maintenance program for all important facilities
2. Prepare the Water Master plan, and review deficiencies in the system and hazard area.
3. Prepare the Asset Management plan, which includes and takes into consideration Economic and financial impacts to Orange

B. Reduce the possibility of losses and damage to existing property due to natural hazards

1. Have a regular schedule for inspections
2. Continuous monitoring of hazard sensitive areas
3. Propose improvement and retrofit for seismic protection

C. Respond quickly and effectively to hazard disasters

1. Maintain the 24 hours emergency hotline to allow timely reporting of a disaster
2. Prepare an emergency/contingency plan to quickly mitigate the problems

**Goal 2: Minimize water loss due to natural disasters**

A. Reduce water loss as much as possible

1. Improve structural and connection of reservoirs and pump stations
2. Exercise all system valves on a regular basis as outlined by the valve exercise program
3. Design facilities with flexible connections

B. Increase water supply sources

1. Connect with neighboring cities through inter-tie locations for emergency supply
2. Provide back up power for all well sites and pump stations
3. Increase storage capacity
4. Promote coordination with surrounding water agencies

**Goal 3: Provide continuous potable water during natural hazards**

A. Improve site security

1. Continuing with daily site checks.
2. Improve site fencing per Vulnerability Assessment Studies recommendation
3. Install camera and wireless communication at all facilities

B. Improve response time

1. Keep Emergency Response Plans up-to-date
2. Update system maps to reflect current condition
3. Maintain stand-by crew for emergency repair
4. Provide NIMS and SEMS training for all employees per EPA guidelines
5. Participate and coordinate with WEROC and other member agencies in hazard preparedness

C. Protect potable water from contamination

1. Continue with backflow prevention program
2. Monitor low-pressure areas in the water system
3. Strictly enforce standard separation between water infrastructure and other utilities

**Goal 4: Minimize damage to facilities and infrastructure**

A. Protect existing assets from natural disasters

1. Inspect all facilities to ensure proper maintenance
2. Perform retrofitting for facilities in disaster prone areas

3. Secure above ground assets at all facilities
4. Keep up with the maintenance schedule

B. Improve/replace facilities within disaster prone area

1. Establish plans to prioritize and identify facilities that need improvement
2. Follow current standards, guidelines, and codes
3. Avoid building in high-risk areas

**Orange - Goals, Objectives and Actions**
**Cross-referenced with identified Hazards Within Orange County**

| Goal, Objective, and Action | Flood/Storm | Wildland/Urban Fire | Earthquake | Dam Failure/Water Tank Failure | Landslide / Mudslide | Tornado / High Winds | Tsunami | Extreme Heat/ Drought | Expansive Soils/Land Subsidence / Liquefaction | Man-Made Hazards/ Contamination |
|---|---|---|---|---|---|---|---|---|---|---|
| G1/A/1 | X | X | X | X | X | X | | X | X | X |
| G1/A/2 | X | X | X | X | X | X | | X | X | X |
| G1/A/3 | X | X | X | X | X | X | | X | X | X |
| G1/B/1 | X | X | X | X | X | X | | X | X | X |
| G1/B/2 | X | X | X | X | X | X | | X | X | X |
| G1/B/3 | | | X | X | | | | | X | |
| G1/C/1 | X | X | X | X | X | X | | X | X | X |
| G1/C/2 | X | X | X | X | X | X | | X | X | X |
| G2/A/1 | | | X | X | | | | | X | |
| G2/A/2 | | | X | X | | | | | X | |
| G2/A/3 | | | X | X | | | | | X | |
| G2/B/1 | X | X | X | X | X | X | | X | X | X |
| G2/B/2 | X | X | X | X | X | X | | X | X | X |
| G2/B/3 | X | X | X | X | X | X | | X | X | X |
| G2/B/4 | X | X | X | X | X | X | | X | X | X |
| G3/A/1 | | | | | | | | | | X |
| G3/A/2 | | | | | | | | | | X |
| G3/A/3 | | | | | | | | | | X |
| G3/B/1 | X | X | X | X | X | X | | X | X | X |
| G3/B/2 | X | X | X | X | X | X | | X | X | X |
| G3/B/3 | X | X | X | X | X | X | | X | X | X |
| G3/B/4 | X | X | X | X | X | X | | X | X | X |
| G3/B/5 | X | X | X | X | X | X | | X | X | X |
| G3/C/1 | | | | | | | | | | X |
| G3/C/2 | | X | | | | | | | | X |
| G3/C/3 | X | X | X | X | X | X | | X | X | X |
| G4/A/1 | X | X | X | X | X | X | | X | X | X |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| G4/A/2 | | | X | X | | | | | X | |
| G4/A/3 | | | | | | | | | | X |
| G4/A/4 | X | X | X | X | X | X | | X | X | X |
| G4/B/1 | X | X | X | X | X | X | | X | X | X |
| G4/B/2 | X | X | X | X | X | X | | X | X | X |
| G4/B/3 | X | X | X | X | X | X | | X | X | X |

**Table 5.17-1 Orange Loss Estimation Table**

| Hazard Type | Item-> | WST | RES | WTP | PS | PRS | EIT | SC | ADM | LS | WWTP | WELL | DIEMER | OC-88 PS | PRS-MET | PP | WWTP-SOCWA | WWTP-OCSD | LS-OCSD | PWL | WWL | Total Loss Value [1] $M |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Replacement Cost | $M -> | 13.0 | 30.0 | 10.0 | 2.0 | 0.2 | 0.3 | 0.6 | 3.0 | 0.4 | 5.0 | 3.5 | 250.0 | 35.0 | 12.0 | 12.0 | 30.0 | 250.0 | 10.0 | 1.0 | 0.5 | |
| | | | | | | | | | | | | | | | | | | | | | | |
| Earthquake | Number | 6 | 0 | 0 | 8 | 3 | 7 | 4 | 3 | 0 | 0 | 15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 310.0 | 0.0 | |
| Moderate | Exposure ($M) | $ 78.0 | $ - | $ - | $ 16.0 | $ 0.6 | $ 2.1 | $ 2.4 | $ 9.0 | $ - | $ - | $ 52.5 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 310.0 | $ - | $ 470.6 |
| | Number | 12 | 0 | 0 | 10 | 9 | 10 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 158.6 | 0.0 | |
| High | Exposure ($M) | $ 156.0 | $ - | $ - | $ 20.0 | $ 1.8 | $ 3.0 | $ 3.0 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 158.6 | $ - | $ 342.4 |
| | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | |
| Extreme | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| Flood | Number | 1 | 0 | 0 | 1 | 0 | 1 | 2 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 29.3 | 0.0 | |
| 100 yr | Exposure ($M) | $ 13.0 | $ - | $ - | $ 2.0 | $ - | $ 0.3 | $ 1.2 | $ - | $ - | $ - | $ 7.0 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 29.3 | $ - | $ 52.8 |
| | Number | 1 | 0 | 0 | 1 | 1 | 5 | 0 | 0 | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 103.3 | 0.0 | |
| 500 yr | Exposure ($M) | $ 13.0 | $ - | $ - | $ 2.0 | $ 0.2 | $ 1.5 | $ - | $ - | $ - | $ - | $ 21.0 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 103.3 | $ - | $ 141.0 |
| Landslide | Number | 7 | 0 | 0 | 6 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 30.6 | 0.0 | |
| | Exposure ($M) | $ 91.0 | $ - | $ - | $ 12.0 | $ 0.4 | $ 0.6 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 30.6 | $ - | $ 134.6 |
| Liquifaction | Number | 4 | 0 | 0 | 5 | 2 | 3 | 2 | 3 | 0 | 0 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 216.1 | 0.0 | |
| Moderate | Exposure ($M) | $ 52.0 | $ - | $ - | $ 10.0 | $ 0.4 | $ 0.9 | $ 1.2 | $ 9.0 | $ - | $ - | $ 35.0 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 216.1 | $ - | $ 324.6 |
| | Number | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 20.8 | 0.0 | |
| High | Exposure ($M) | $ - | $ - | $ - | $ - | $ 0.2 | $ - | $ - | $ - | $ - | $ - | $ 10.5 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 20.8 | $ - | $ 31.5 |
| Very High | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | |
| | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| Wildlife/Structure Fire | Number | 2 | 0 | 0 | 4 | 2 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12.3 | 0.0 | |
| Low | Exposure ($M) | $ 26.0 | $ - | $ - | $ 8.0 | $ 0.4 | $ 0.3 | $ - | $ - | $ - | $ - | $ 3.5 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 12.3 | $ - | $ 50.5 |
| | Number | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3.1 | 0.0 | |
| High | Exposure ($M) | $ 26.0 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 3.1 | $ - | $ 29.1 |
| | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | |
| Extreme | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| | | | | | | | | | | | | | | | | | | | | | Grand Total | **$ 1,577.0** |

**[1] Loss value is asset replacement value in 2006 dollars. Value shown is found as count of assets at risk from the particular hazard times high-end unit asset value.**
**[2] Grand Total Loss value shown may include the same assets counted multiple times for different hazards.**

## 5.18 SANTA MARGARITA – OBJECTIVE, GOALS AND ACTIONS

The Santa Margarita Water District (SMWD) reviewed a set of jurisdictional-level hazard maps including detailed critical facility information and localized potential hazard exposure/loss estimates to help identify the top hazards threatening their jurisdiction. See Section 4 for additional details.

SMWD Loss Assessment Table is located at the end of this section.

### 5.18.1 Capability Assessment

The LPG identified current capabilities available for implementing hazard mitigation activities. The Capability Assessment (Assessment) portion of the jurisdictional mitigation plan identifies administrative, technical, legal and fiscal capabilities. This includes a summary of departments and their responsibilities associated to hazard mitigation planning as well as codes, ordinances, and plans already in place associated to hazard mitigation planning. The second part of the Assessment provides Santa Margarita's fiscal capabilities that may be applicable to providing financial resources to implement identified mitigation action items.

### 5.18.2 Legal and Regulatory Capability – Santa Margarita Water District (SMWD) Sewer System

#### 5.18.2.1 Existing Institutions, Plans, Policies and Ordinances

The legal and regulatory capabilities of SMWD are shown in Table 5.18.2.1-1, which presents the existing ordinances and codes that affect the physical or built environment of Santa Margarita. Examples of legal and/or regulatory capabilities can include: the District's building codes, zoning ordinances, subdivision ordinances, special purpose ordinances, growth management ordinances, site plan review, general plans, capital improvement plans, economic development plans, emergency response plans, and real estate disclosure plans.

**Table 5.18.2.1-1**
**Legal and Regulatory Capability**

| Regulatory Tools (ordinances, codes, plans) | Local Authority (Yes/No) | Does State Have Authority? (Yes/No) | Other Level Jurisdiction Authority (Yes/No) | Comments |
|---|---|---|---|---|
| A. Building code | No | Yes | No | Some Exceptions Apply |
| B. Zoning ordinance | No | No | No | |
| C. Subdivision ordinance or regulations | No | No | No | |

**Table 5.18.2.1-1 (continued)**
**Legal and Regulatory Capability**

| Regulatory Tools (ordinances, codes, plans) | Local Authority (Yes/No) | Does State Have Authority? (Yes/No) | Other Level Jurisdiction Authority (Yes/No) | Comments |
|---|---|---|---|---|
| D. Special purpose ordinances (floodplain management, storm water management, hillside or steep slope ordinances, wildfire ordinances, hazard setback requirements) | Yes | Yes | Yes | County of Orange Flood Control District/ Orange County Fire Authority / USACE / USFWS / CDFG (RESOURCE AGENCIES) |
| E. Growth management ordinances (also called "smart growth" or anti-sprawl programs) | No | No | No | |
| F. Site plan review requirements | Yes | No | No | OCFA PERMITS |
| G. General or comprehensive plan | No | Yes | Yes | |
| H. A capital improvements plan | Yes | No | No | |
| I. An economic development plan | No | No | No | |
| J. An emergency response plan | No | Yes | Yes | SEMS/NIMS |
| K. A post-disaster recovery plan | No | No | No | |
| L. A post-disaster recovery ordinance | No | No | No | |
| M. Real estate disclosure requirements | No | No | No | Advantageous For District Operations |
| N. Vulnerability Assessment | No | Yes | Yes | US EPA |
| O. Dams | | Yes | Yes | RWQCB/ DSOD |
| P. VA ERP | | Yes | Yes | USEPP/ OES |
| Q. Title 17 & 22 | | Yes | Yes | CA DHS |
| R. Waste Water | | Yes | Yes | RWQCB |
| S. Air Quality | | Yes | Yes | AQMD |
| T. Safety | | Yes | Yes | CA OSHA |
| U. Waste Discharge Requirements | No | Yes | No | State Water Resources Control Board |

## 5.18.3 Administrative and Technical Capacity

The following is a summary of existing departments in SMWD and their responsibilities related to hazard mitigation planning and implementation, as well as existing planning documents and regulations related to mitigation efforts within the community. The administrative and technical capabilities of SMWD, as shown in Table 5.18.3-1, provides an identification of the staff, personnel, and department resources available to implement the actions identified in the mitigation section of the Plan. Specific resources reviewed include those involving technical personnel such as planners/engineers with knowledge of land

development and land management practices, engineers trained in construction practices related to building and infrastructure, planners and engineers with an understanding of natural or manmade hazards, floodplain managers, surveyors, personnel with GIS skills and scientists familiar with hazards in the community.

**Table 5.18.3-1**
**Administrative and Technical Capacity**

| Staff/Personnel Resources | Yes/No | Department/Agency and Position |
|---|---|---|
| A. Planner(s) or engineer(s) with knowledge of land development and land management practices | Yes | SMWD ENGINEERING DEPT STAFF |
| B. Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure | Yes | INHOUSE & CONSULTANTS |
| C. Planners or Engineer(s) with an understanding of natural and/or human-caused hazards | No | |
| D. Floodplain manager | No | |
| E. Surveyors | Yes | CONSULTANTS |
| F. Staff with education or expertise to assess the community's vulnerability to hazards | Yes | ERP |
| G. Personnel skilled in GIS and/or HAZUS | No | |
| H. Scientists familiar with the hazards of the community | Yes | CONSULTANTS |
| I. Emergency manager | Yes | SMWD Operations Manager |
| J. Grant writers | No | |
| K. Other | Yes | Lab staff @ Chiquita WRP Lab |

## 5.18.4 Fiscal Capability

Table 5.18.4-1 shows specific financial and budgetary tools available to Santa Margarita such as community development block grants; capital improvements project funding; authority to levy taxes for specific purposes; fees for water, sewer, gas, or electric services; impact fees for homebuyers or developers for new development; ability to incur debt through general obligations bonds; and withholding spending in hazard-prone areas.

**Table 5.18.4-1**
**Fiscal Capability**

| Financial Resources | Accessible or Eligible to Use (Yes/No/Don't Know) |
|---|---|
| A. Community Development Block Grants (CDBG) | No |
| B. Capital improvements project funding | Yes |
| C. Authority to levy taxes for specific purposes | Yes |
| D. Fees for water, sewer, gas, or electric service | Yes |
| E. Impact fees for homebuyers or developers for new developments/homes | Yes |
| F. Incur debt through general obligation bonds | Yes |
| G. Incur debt through special tax and revenue bonds | Yes |
| H. Incur debt through private activity bonds | No |
| I. Withhold spending in hazard-prone areas | Don't Know |

## 5.18.5 Local Mitigation Capability Assessment Goals

Listed below are Santa Margarita's specific hazard mitigation goals, objectives and related potential actions. For each goal, one or more objectives have been identified that provide strategies to attain the goal. Where appropriate, the District has identified a range of specific actions to achieve the objective and goal.

The goals and objectives were developed by considering the risk assessment findings, localized hazard identification and loss/exposure estimates, and an analysis of the jurisdiction's current capabilities assessment. These preliminary goals, objectives and actions were developed to represent a vision of long-term hazard reduction or enhancement of capabilities. To help in further development of these goals and objectives, the LPG compiled and reviewed current jurisdictional sources including the District's planning documents, codes, and ordinances. In addition, District representatives met with consultant staff and/or MWDOC to specifically discuss these hazard-related goals, objectives and actions as they related to the overall Plan. The LPG members were Steve Francis, Ron Meyer, and Jaime Aguilar. Once developed, District staff presented them to the SMWD Board of Directors for their approval.

Public meetings were held throughout the County to present these preliminary goals, objectives and actions to citizens and to receive public input. At these meetings, specific consideration was given to hazard identification/profiles and the vulnerability assessment results. The following sections present the hazard-related goals, objectives and actions as prepared by Santa Margarita's LPG in conjunction with the Hazard Mitigation Working Group, locally elected officials, and local citizens.

**Table 5.18.5-1**

**Local Mitigation Capability Assessment**

| Agency Name (Mission/Function) | Programs, Plans, Policies, Regulations, Funding, or Practices | Point of Contact Name, Address, Phone, Email | Effect on Loss Reduction* | | | Comments |
|---|---|---|---|---|---|---|
| | | | Support | Facilitate | Hinder | |
| Santa Margarita Water District Sewer System | 1. Insurance | SMWD Finance Manager<br>26111 Antonio Pkwy<br>Las Flores CA 92688<br>(949) 459-6573 | Yes | Yes | | |
| | 2. Funding: Capital Improvement Program, Capital Replacement Reserve | SMWD Finance Manager / Chief Engineer<br>26111 Antonio Pkwy<br>Las Flores CA 92688<br>(949) 459-6589 | Yes | Yes | | |
| | 3. Vulnerability Assignment | SMWD Operations Field Superintendent<br>26111 Antonio Pkwy<br>Las Flores CA 92688<br>(949) 459-6589 | Yes | Yes | | |
| | 4. Emergency Operation Plans | Same as above in #3 | Yes | Yes | | |
| | 5. Emergency Power Equipment at sewage lift station facilities | Same as above in #3 | | | | |

## 5.18.6 SMWD Goals

**Goal 1: Reduce SMWD's Vulnerability to Disaster Related Service Disruptions**

A. Improve domestic water system site security

1. Implement Vulnerability Risk Assessment recommendations
2. Improve security at certain facilities and install surveillance equipment

3. Maintain operations daily/weekly site visit monitoring program to each facility

B. Protect existing domestic water assets and ensure public safety

1. Install and maintain equipment at essential facilities
2. Maintain existing flexible connections at steel tank reservoirs for seismic activity
3. Upgrade SCADA spread spectrum wireless system to existing sites as needed
4. Install emergency collection structures at each tank site to capture released water
5. Keep Emergency Operations Plan up-to-date

*IMPLEMENTATION STRATEGY:*

SMWD constructs site improvements as facilities are scheduled for upgrade or retrofitting. Projects are implemented as funding is available in the Capital Improvement Program update using remaining bond funds or from specific line items in the Capital Replacement Reserve account.

**Goal 2: Protect Imported Water Reliability**

A. Obtain an emergency source of imported water:

1: Interconnect with IRWD's water system for service to the ATM

2: Interconnect with IRWD's system for service to the AMP

3: Interconnect with MNWD JTM to supply the ETWD R6 reservoir

4. Improve and maintain other interconnections with TCWD and MNWD

B. Increase Emergency Domestic Water Storage

1.Construct the Upper Chiquita Emergency Storage Reservoir (500 AF)

2. Construct the East Ortega Emergency Storage Reservoir (2000+ AF)

3. Maintain emergency storage capacity in ETWD's R6 Reservoir

*IMPLEMENTATION STRATEGY:*

SMWD staff will coordinate with neighboring water districts, MWDOC, and MET to prioritize and implement projects on a regional basis.

**Goal 3: Protect the Public Water Supply from contamination caused by private system backflow in the event of an earthquake**

A. To maintain separation of all potential hazardous potable water services with the newer required backflow prevention device to prevent backpressure or back-siphonage that could contaminate the public water supply.

1. SMWD is continually monitoring the public water supply and requiring the installation of State Health Department approved backflow prevention devices on all hazardous potable services. All fires systems are upgraded to a Double-Check Detector Assembly if the site is being refurbished. Approximately 50 single-check fire systems exist in SMWD with a total upgrade cost of about $1.0 million.

B. To require all fire systems in SMWD to be upgraded to meet standards for backflow prevention (possibly using a Double-Check Detector Assembly) that can be tested annually to determine if they are working properly. The water quality in fire systems has been proven not safe for human consumption based on water quality tests that found maximum potable water contaminant levels such as iron, lead, cadmium, manganese, and total coliform.

*IMPLEMENTATION STRATEGY:*

The SMWD backflow prevention staff will investigate and determine the degree of hazard at all single-detector check locations. Each potential conversion site will be evaluated to determine the correct backflow prevention device.

**Goal 4: Eliminate or minimize wastewater spills**

A. Provide emergency storage structure for all sewage lift facilities

1. Construct an emergency storage structure (where needed) at sewage lift stations
2. Standardize and upgrade older lift station electrical and instrumentation systems
3. Install permanent emergency power generator at all older lift stations

**B.** Protect facilities within flood plain areas

1. Place protective measures in rivers and creeks
2. Install jointless pipelines in all creek crossings and slope easements

*IMPLEMENTATION STRATEGY:*

SMWD staff would coordinate with an outside consultant to prioritize existing facilities that would be lost or damaged from flooding or earthquakes.

**Goal 5: Protect Chiquita Water Reclamation Plant facilities**

A. Provide emergency storage capability at the Influent Lift Station

1. Add an emergency storage basin (3- 6 million gallons) for the Chiquita Water Reclamation Plant ILS

2. Install water cannons around the gas storage sphere

B. Provide facilities to minimize fire danger to sensitive equipment

*IMPLEMENTATION STRATEGY:*

SMWD staff would coordinate with an outside consultant to review existing facilities and design new improvements that would help mitigate damage from earthquake or fires.

**Goal 6: Protect communities from potential earthquake induced dam inundation**

A. Update recycled water reservoir dam failure inundation studies

1. Contract for an updated inundation study

B. Advise local agencies of flooding from potential dam failure

1. Provide copies of updated study to appropriate agencies

C. Construct a seepage water removal well at Portola Dam to eliminate soil liquefaction potential.

1. Request FEMA/OES mitigation funding to construct a seepage water removal well at Portola Dam

**IMPLEMENTATION STRATEGY:**

SMWD staff would coordinate with an outside consultant to review existing facilities and design new improvements that would help mitigate damage from an earthquake.

**SMWD - Goals, Objectives and Actions**

**Cross-referenced with identified Hazards Within Orange County**

| Goal, Objective, and Action | Flood/Storm | Wildland/Urban Fire | Earthquake | Dam Failure/Water Tank Failure | Landslide / Mudslide | Tornado / High Winds | Tsunami | Extreme Heat/ Drought | Expansive Soils/Land Subsidence / Liquefaction | Man-Made Hazards/ Contamination |
|---|---|---|---|---|---|---|---|---|---|---|
| G1/A/1 | | | | | | | | | | X |
| G1/A/2 | | | | | | | | | | X |
| G1/A/3 | X | X | X | X | X | X | | X | X | X |
| G1/B/1 | X | X | X | X | X | X | | X | X | X |
| G1/B/2 | | | X | X | | | | | X | |
| G1/B/3 | X | X | X | X | X | X | | X | X | X |
| G1/B/4 | | | X | X | | | | | | |
| G1/B/5 | X | X | X | X | X | X | | X | X | X |
| G2/A/1 | X | | X | | | | | X | | |
| G2/A/2 | X | | X | | | | | X | | |
| G2/A/3 | X | | X | | | | | X | | |
| G2/A/4 | X | | X | | | | | X | | |
| G2/B/1 | X | | X | | | | | X | | |
| G2/B/2 | X | | X | | | | | X | | |
| G2/B/3 | X | | X | | | | | X | | |
| G3/A/1 | | | X | | | | | | | X |
| G3/B | | | | | | | | | | X |
| G4/A/1 | X | | X | | | | | | | |
| G4/A/2 | X | | X | | | | | | | |
| G4/A/3 | X | | X | X | X | X | | | X | X |
| G4/B/1 | X | | | | X | | | | | |
| G4/B/2 | X | | | | X | | | | | |
| G5/A/1 | X | | X | | | | | | | |
| G5/A/2 | X | | X | | | | | | | X |
| G5/B | | X | | | | | | | | |
| G6/A/1 | | | | X | | | | | | |
| G6/B/1 | | | | X | | | | | | |
| G6/C/1 | | | | X | | | | | | |

**Table 5.18-1 Santa Margarita Loss Estimation Table**

| Hazard Type | Item-> | WST | RES | WTP | PS | PRS | EIT | SC | ADM | LS | WWTP | WELL | DIEMER | OC-88 PS | PRS-MET | PP | WWTP-SOCWA | WWTP-OCSD | LS-OCSD | PWL | WWL | Total Loss Value [1] $M |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Replacement Cost | $M -> | 13.0 | 30.0 | 10.0 | 2.0 | 0.2 | 0.3 | 0.6 | 3.0 | 0.4 | 5.0 | 3.5 | 250.0 | 35.0 | 12.0 | 12.0 | 30.0 | 250.0 | 10.0 | 1.0 | 0.5 | |
| | | | | | | | | | | | | | | | | | | | | | | |
| Earthquake | Number | 38 | 2 | 0 | 32 | 33 | 21 | 6 | 1 | 22 | 3 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 103.7 | 12.8 | |
| Moderate | Exposure ($M) | $ 494.0 | $ 60.0 | $ - | $ 64.0 | $ 6.6 | $ 6.3 | $ 3.6 | $ 3.0 | $ 8.8 | $ 15.0 | $ 7.0 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 103.7 | $ 6.4 | $ 778.4 |
| | Number | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4.1 | 0.0 | |
| High | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ 0.3 | $ 0.6 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 4.1 | $ - | $ 5.0 |
| | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | |
| Extreme | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| Flood | Number | 0 | 0 | 0 | 3 | 0 | 1 | 3 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5.8 | 0.6 | |
| 100 yr | Exposure ($M) | $ - | $ - | $ - | $ 6.0 | $ - | $ 0.3 | $ 1.8 | $ - | $ 0.8 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 5.8 | $ 0.3 | $ 15.0 |
| | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0.0 | |
| 500 yr | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 0.2 | $ - | $ 0.2 |
| Landslide | Number | 16 | 0 | 0 | 2 | 10 | 2 | 1 | 0 | 8 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 22.7 | 2.7 | |
| | Exposure ($M) | $ 208.0 | $ - | $ - | $ 4.0 | $ 2.0 | $ 0.6 | $ 0.6 | $ - | $ 3.2 | $ 5.0 | $ 3.5 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 22.7 | $ 1.3 | $ 251.0 |
| Liquifaction | Number | 1 | 0 | 0 | 2 | 1 | 1 | 3 | 0 | 5 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8.7 | 3.6 | |
| Moderate | Exposure ($M) | $ 13.0 | $ - | $ - | $ 4.0 | $ 0.2 | $ 0.3 | $ 1.8 | $ - | $ 2.0 | $ 10.0 | $ 3.5 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 8.7 | $ 1.8 | $ 45.2 |
| | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | |
| High | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| Very High | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | |
| | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| Wildlife/Structure Fire | Number | 6 | 2 | 0 | 7 | 7 | 0 | 3 | 1 | 5 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 23.6 | 5.0 | |
| Low | Exposure ($M) | $ 78.0 | $ 60.0 | $ - | $ 14.0 | $ 1.4 | $ - | $ 1.8 | $ 3.0 | $ 2.0 | $ - | $ 3.5 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 23.6 | $ 2.5 | $ 189.9 |
| | Number | 2 | 0 | 0 | 4 | 4 | 5 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5.2 | 1.5 | |
| High | Exposure ($M) | $ 26.0 | $ - | $ - | $ 8.0 | $ 0.8 | $ 1.5 | $ - | $ - | $ 0.8 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 5.2 | $ 0.7 | $ 43.0 |
| | Number | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0.2 | |
| Extreme | Exposure ($M) | $ 13.0 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 0.3 | $ 0.1 | $ 13.4 |
| | | | | | | | | | | | | | | | | | | | | | Grand Total | **$ 1,341.0** |

**[1] Loss value is asset replacement value in 2006 dollars. Value shown is found as count of assets at risk from the particular hazard times high-end unit asset value.**
**[2] Grand Total Loss value shown may include the same assets counted multiple times for different hazards.**

## 5.19 SERRANO – OBJECTIVES, GOALS AND ACTIONS

The Serrano Water District (Serrano) reviewed a set of jurisdictional-level hazard maps including detailed critical facility information and localized potential hazard exposure/loss estimates to help identify the top hazards threatening their jurisdiction. See Section 4 for additional details.

Serrano Loss Assessment Table is located at the end of this Section.

### 5.19.1 Capabilities Assessment

The LPG identified current capabilities available for implementing hazard mitigation activities. The Capability Assessment (Assessment) portion of the jurisdictional mitigation plan identifies administrative, technical, legal and fiscal capabilities. This includes a summary of departments and their responsibilities associated to hazard mitigation planning as well as codes, ordinances, and plans already in place associated to hazard mitigation planning. The second part of the Assessment provides Serrano's fiscal capabilities that may be applicable to providing financial resources to implement identified mitigation action items.

### 5.19.2 Existing Institutions, Plans, Policies and Ordinances

The legal and regulatory capabilities of Serrano are shown in Table 5.19.2-1, which presents the existing ordinances and codes that affect the physical or built environment of Serrano. Examples of legal and/or regulatory capabilities can include: the District's building codes, zoning ordinances, subdivision ordinances, special purpose ordinances, growth management ordinances, site plan review, general plans, capital improvement plans, economic development plans, emergency response plans, and real estate disclosure plans.

Table 1
Legal and Regulatory Capability

| Regulatory Tools (ordinances, codes, plans) | Local Authority (Y/N) | Does State Prohibit? (Y/N) | Higher Level Jurisdiction Authority (Y/N) | Comments |
|---|---|---|---|---|
| • Building code | NO | YES | NO | |
| • Zoning ordinance | NO | NO | YES | . |
| • Subdivision ordinance or regulations | NO | NO | YES | |
| • Special purpose ordinances (floodplain management, storm water management, hillside or steep slope ordinances, wildfire ordinances, hazard setback requirements) | NO | NO | YES | |
| • Growth management ordinances (also called "smart growth" or anti- | NO | NO | Y | |

| Table 1<br>Legal and Regulatory Capability | | | | |
|---|---|---|---|---|
| Regulatory Tools (ordinances, codes, plans) | Local Authority (Y/N) | Does State Prohibit? (Y/N) | Higher Level Jurisdiction Authority (Y/N) | Comments |
| sprawl programs) | | | | |
| • Site plan review requirements | NO | NO | YES | |
| • General or comprehensive plan | NO | NO | YES | |
| • A capital improvements plan | YES | NO | NO | |
| • An economic development plan | YES | NO | NO | |
| • An emergency response plan | YES | YES | YES | SEMS/NIMS |
| • A post-disaster recovery plan | NO | YES | YES | NIMS |
| • A post-disaster recovery ordinance | NO | NO | NO | |
| • Real estate disclosure requirements | NO | YES | YES | |

### 5.19.3 Administrative and Technical Capacity

The following is a summary of existing departments in Serrano and their responsibilities related to hazard mitigation planning and implementation, as well as existing planning documents and regulations related to mitigation efforts within the community. The administrative and technical capabilities of Serrano, as shown in Table 5.19.3-1, provides an identification of the staff, personnel, and department resources available to implement the actions identified in the mitigation section of the Plan. Specific resources reviewed include those involving technical personnel such as planners/engineers with knowledge of land development and land management practices, engineers trained in construction practices related to building and infrastructure, planners and engineers with an understanding of natural or manmade hazards, floodplain managers, surveyors, personnel with GIS skills and scientists familiar with hazards in the community.

Table 2
Administrative and Technical Capacity

| Staff/Personnel Resources | YES/NO | Department/Agency and Position |
|---|---|---|
| Planner(s) or engineer(s) with knowledge of land development and land management practices | YES | City of Orange |
| Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure | YES | Serrano Water District |
| Planners or Engineer(s) with an understanding of natural and/or human-caused hazards | NO | |
| Floodplain manager | NO | |
| Surveyors | YES | Out Sourced |
| Staff with education or expertise to assess the community's vulnerability to hazards | YES | ERP |
| Personnel skilled in GIS and/or HAZUS | NO | |
| Scientists familiar with the hazards of the community | NO | |
| Emergency manager | YES | Serrano Water District |
| Grant writers | YES | Serrano Water District/ Engineering Dept |

### 5.19.4 Fiscal Capability

Table 5.19.4-1 shows specific financial and budgetary tools available to Serrano such as community development block grants; capital improvements project funding; authority to levy taxes for specific purposes; fees for water, sewer, gas, or electric services; impact fees for homebuyers or developers for new development; ability to incur debt through general obligations bonds; and withholding spending in hazard-prone areas.

Table 3
Fiscal Capability

| Financial Resources | Accessible or Eligible to Use (Yes/No/Don't Know) |
|---|---|
| 2. Community Development Block Grants (CDBG) | No |
| • Capital improvements project funding | Serrano Water District /Engineering Department |
| • Authority to levy taxes for specific purposes | Yes, Serrano Water District/Administration |
| • Fees for water, sewer, gas, or electric service | Yes |
| • Impact fees for homebuyers or developers for new developments/homes | Yes |
| • Incur debt through general obligation bonds | Yes/ Serrano Water District/ Administration/Board of Directors |
| • Incur debt through special tax and revenue bonds | No |
| • Incur debt through private activity bonds | No |
| • Withhold spending in hazard-prone areas | No |

### 5.19.5 Local Mitigation Capability Assessment

Listed below are Serrano's specific hazard mitigation goals, objectives and related potential actions. For each goal, one or more objectives have been identified that provide strategies to attain the goal. Where appropriate, the District has identified a range of specific actions to achieve the objective and goal.

The goals and objectives were developed by considering the risk assessment findings, localized hazard identification and loss/exposure estimates, and an analysis of the jurisdiction's current capabilities assessment. These preliminary goals, objectives and actions were developed to represent a vision of long-

term hazard reduction or enhancement of capabilities. To help in further development of these goals and objectives, the LPG compiled and reviewed current jurisdictional sources including the District's planning documents, codes, and ordinances. In addition, District representatives met with consultant staff and/or MWDOC to specifically discuss these hazard-related goals, objectives and actions as they related to the overall Plan. Once developed, District staff presented them to the Serrano Board of Directors for their approval.

Public meetings were held throughout the County to present these preliminary goals, objectives and actions to citizens and to receive public input. At these meetings, specific consideration was given to hazard identification/profiles and the vulnerability assessment results. The following sections present the hazard-related goals, objectives and actions as prepared by Serrano's LPG in conjunction with the Hazard Mitigation Working Group, locally elected officials, and local citizens.

### 5.19.6 Serrano Goals

For Serrano, following are five major goals for hazard mitigation planning purposes. The five goals are followed up with detailed objectives and actions:

**Goal 1: Minimize damages to facilities /infrastructure due to natural disasters**

A. Protect existing assets with the highest vulnerability and greatest service value to the effects of natural disasters.

1. Implement Vulnerability Risk Assessment recommendations.
2. Keep Emergency Operations Plan up-to-date
3. Install seismic valves at critical reservoir sites
4. Loop water sources where possible
5. Intertie supply sources where possible
6. Construct interties with neighboring water purveyors
7. Secure above ground assets in all buildings, booster stations, reservoirs, pressure reducing stations, emergency interties, water systems, water reclamation plant, lift stations, pipelines and bridge crossings.
8. Identify all major fuel pipelines, rail transportation corridors, manufacturing facilities, and their vulnerability relative to hazardous material releases.

B. Protect the public water supply from contamination caused by backflow or back-siphonage in the event of an earthquake

1. Continued with backflow prevention program
2. Monitor low-pressure areas in the water system
3. Upgrade all potential hazardous potable water services with the required backflow prevention device to prevent backpressure or back-siphonage that could contaminate the public water supply.

4. Require all single-check fire systems in the District to be upgraded to a Double-Check Detector Assembly. Single-check fire systems cannot be tested to determine if they are working properly. The Double-Check Detector Assembly can be tested and requires an annual test to determine if it is functioning properly. The water quality in fire systems has been proven not safe for human consumption. Random tests on fire system water quality exceeded maximum contaminant levels for potable water including iron, lead, cadmium, manganese, and total coliform.

C. Protect potable water from contamination

1. Strictly enforce standard separation between water infrastructure and other utilities
2. Implement Vulnerability Risk Assessment recommendations
3. Improve security at certain facilities and install surveillance equipment
4. Maintain operations daily/weekly site visit monitoring program to each facility
5. Install and maintain equipment at essential facilities
6. Upgrade SCADA system to existing sites as needed
7. Install emergency collection structures at each tank site to capture released water
8. Keep Emergency Operations Plan up-to-date
9. Review Irvine Lake Operations for potential areas of contamination

D. Protect assets from a major Earthquake event.

1. Perform a seismic study analysis for all structures and facilities, especially the water treatment plant.
2. Examine the integrity of the supply line from Irvine Lake to the water treatment plant.
3. Update the standard specification to comply with latest UBC seismic design codes for structures and pipelines.
4. Conduct routine site inspections of structures and facilities and follow-up on structural deficiencies.
5. Adopt Structural Design Criteria that will resist the most severe earthquake anticipated.

E. Reduce the High Fire Threat to the District's facilities/infrastructure.

1. Develop a comprehensive approach to reducing the possibility of damage and losses due to structural fire/wildfire.
2. Create a fire management plan outlining various impacted facilities and vulnerabilities.

3. Share all infrastructures/building information with local, county, and state fire agencies.
4. Adopt a policy for design of non-combustible facilities to reduce the threat and impact of Wildfire on structures.
5. Provide redundant underground communication systems for critical facilities to insure reliability of operating systems.
6. Provide routine maintenance around facilities to avoid the chance of fire threat and reducing the fuel source.

**Goal 2: Minimize disruption of service due to hazard induced outages**

A. Provide backup system for critical facilities
   1. Build redundancy into the water supply source to mitigate major structural defects to main transmission water pipelines.
   2. Examine the potential of securing a backup supply from the AMP
   3. Loop water sources where possible
   4. Intertie supply sources where possible
   5. Construct interties with neighboring water purveyors
   6. Protect facilities within flood plain areas
   7. Place protective measures in rivers and creeks or relocate facilities out of harms way
   8. Install jointless pipelines in all creek crossings
   9. Improve structural characteristics of reservoirs and pump stations; consider flexible connections at reservoirs for seismic activity
   10. Install isolation valves at all locations when feasible
   11. Design facilities with flexible connections
   12. Install camera and wireless communication at all facilities
   13. Continuing with daily site check
B. Develop new sources of supply
   1. Consider collecting and treating supplies from Villa Park Dam
C. Improve response time
   1. Keep Emergency Response Plans up-to-date
   2. Update system maps to reflect current condition
   3. Maintain stand-by crew for emergency repair
D. Work with the water community in Orange County to examine the benefits of storage of water in Irvine Lake for regional benefit

**Goal 3: Reduce potential loss and injury to human life and to existing assets, facilities, and infrastructure due to human caused hazards**

A. Develop a comprehensive approach to reduce damage and loss due to human caused hazards
    1. Continue and expand cooperation with all outside agencies regarding human caused hazards.
    2. Continue and expand education for administrative and field personnel on possible human caused hazards.
    3. Survey and improve site fencing and other forms of hardening facility deterrence
    4. Improve response time to alarm and emergency events
    5. Modify SCADA system, when feasible, to look for additional parameters of operation that may indicate problem areas

B. Increase the knowledge of employees and the public of extremely hazardous substance handling procedures and terrorism awareness.
    1. Continue and expand safety training for all personnel who may come in contact with said materials
    2. Conduct additional workshops for awareness of hazardous materials incidents for all employees
    3. Examine opportunities for on-line water quality sensing relative to potential human induced contamination, and implement if feasible

**Goal 4: Protect communities from potential earthquake induced dam inundation**

A. Update water reservoir dam failure study for Irvine Lake
    1. Advise local agencies of flooding from potential dam failure
    2. Contract for an updated inundation study, if needed
    3. Provide copies of updated study to appropriate agencies

B. Provide NIMS and SEMS training for all existing or new employees per EPA guidelines.

C. Conduct semi-annual emergency response training exercises for staff

D. Participate and coordinate with WEROC and other member agencies in hazard preparedness.

E. Insure sufficient equipment, materials, and communications hardware to respond and recover from natural hazards.

F. Develop mutual aid response teams, training, and exercises for natural hazards with local member agencies.

**Goal 5: Promote public understanding, support and demand for hazard mitigation.**

A. Educate the public regarding natural and man-made hazards and opportunities for mitigation actions to protect local residents and businesses.

B. Prepare an emergency response preparedness brochure for the local community identifying all types of natural hazards.

C. Promote a partnership between the local, county, and state governments to identify, prioritize, and implement mitigation actions.

D. Promote hazard mitigation in the business community.

E. Use the public media to cover mitigation activities.

F. Publish newsletters for the public and business leaders with information regarding hazardous mitigation of natural and man-made hazards.

G. Develop full cooperation with all outside agencies regarding human caused hazards.

**Serrano - Goals, Objectives and Actions**
**Cross-referenced with identified Hazards Within Orange County**

| Goal, Objective, and Action | Flood/Storm | Wildland/Urban Fire | Earthquake | Dam Failure/Water Tank Failure | Landslide / Mudslide | Tornado / High Winds | Tsunami | Extreme Heat/ Drought | Expansive Soils/Land Subsidence / Liquefaction | Man-Made Hazards/ Contamination |
|---|---|---|---|---|---|---|---|---|---|---|
| G1/A/1 | | | | | | | | | | X |
| G1/A/2 | X | X | X | X | X | X | | X | X | X |
| G1/A/3 | | | X | X | | | | | X | |
| G1/A/4 | | X | | | | | | | | |
| G1/A/5 | X | X | X | X | X | X | | X | X | X |
| G1/A/6 | X | X | X | X | X | X | | X | X | X |
| G1/A/7 | X | X | X | X | X | X | | X | X | X |
| G1/A/8 | | | | | | | | | | X |
| G1/B/1 | | | X | | | | | | | X |
| G1/B/2 | X | X | X | | | | | | | X |
| G1/B/3 | X | X | X | X | X | X | | | X | X |
| G1/B/4 | | X | | | | | | | | |
| G1/C/1 | | | | | | | | | | X |
| G1/C/2 | | | | | | | | | | X |
| G1/C/3 | | | | | | | | | | X |
| G1/C/4 | | | | | | | | | | X |
| G1/C/5 | | | | | | | | | | X |
| G1/C/6 | | | | | | | | | | X |
| G1/C/7 | | | | | | | | | | X |
| G1/C/8 | | | | | | | | | | X |
| G1/C/9 | | | | | | | | | | X |
| G1/D/1 | | | | X | | | | | X | |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| G1/D/2 | | | | X | | | | | X | |
| G1/D/3 | | | | X | | | | | X | |
| G1/D/4 | | | | X | | | | | X | |
| G1/D/5 | | | | X | | | | | X | |
| G1/E/1 | | X | | | | | | | | |
| G1/E/2 | | X | | | | | | | | |
| G1/E/3 | | X | | | | | | | | |
| G1/E/4 | | X | | | | | | | | |
| G1/E/5 | | X | | | | | | | | |
| G1/E/6 | | X | | | | | | | | |
| G2/A/1 | X | | X | | | | | | X | |
| G2/A/2 | X | X | X | X | X | X | | X | X | X |
| G2/A/3 | | X | | | | | | | | |
| G2/A/4 | X | X | X | X | X | X | | X | X | X |
| G2/A/5 | X | X | X | X | X | X | | X | X | X |
| G2/A/6 | X | | | | X | | | | | |
| G2/A/7 | X | | | | X | | | | | |
| G2/A/8 | X | | | | X | | | | | |
| G2/A/9 | | | X | X | | | | | X | |
| G2/A/10 | X | X | X | X | X | X | | X | X | X |
| G2/A/11 | X | X | X | X | X | X | | X | X | X |
| G2/A/12 | | | | | | | | | | X |
| G2/A/13 | X | X | X | X | X | X | | X | X | X |
| G2/B/1 | X | | X | X | X | X | | X | X | X |
| G2/C/1 | X | X | X | X | X | X | | X | X | X |
| G2/C/2 | X | X | X | X | X | X | | X | X | X |
| G2/C/3 | X | X | X | X | X | X | | X | X | X |
| G2/D | X | X | X | X | X | X | | X | X | X |
| G3/A/1 | | | | | | | | | | X |
| G3/A/2 | | | | | | | | | | X |
| G3/A/3 | | | | | | | | | | X |
| G3/A/4 | | | | | | | | | | X |
| G3/A/5 | | | | | | | | | | X |
| G3/B/1 | | | | | | | | | | X |
| G3/B/2 | | | | | | | | | | X |
| G3/B/3 | | | | | | | | | | X |
| G4/A/1 | | | | X | | | | | | |
| G4/A/2 | | | | X | | | | | | |
| G4/A/3 | | | | X | | | | | | |
| G4/B | X | X | X | X | X | X | | X | X | X |
| G4/C | X | X | X | X | X | X | | X | X | X |
| G4/D | X | X | X | X | X | X | | X | X | X |
| G4/E | X | X | X | X | X | X | | X | X | X |
| G4/F | X | X | X | X | X | X | | X | X | X |
| G5/A | X | X | X | X | X | X | | X | X | X |
| G5/B | X | X | X | X | X | X | | X | X | X |
| G5/C | X | X | X | X | X | X | | X | X | X |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| G5/D | X | X | X | X | X | X | | X | X | X |
| G5/E | X | X | X | X | X | X | | X | X | X |
| G5/F | X | X | X | X | X | X | | X | X | X |
| G5/G | X | X | X | X | X | X | | X | X | X |

**Table 5.19-1 Serrano Loss Estimation Table**

| Hazard Type | Item-> | WST | RES | WTP | PS | PRS | EIT | SC | ADM | LS | WWTP | WELL | DIEMER | OC-88 PS | PRS-MET | PP | WWTP-SOCWA | WWTP-OCSD | LS-OCSD | PWL | WWL | Total Loss Value [1] $M |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Replacement Cost | $M -> | 13.0 | 30.0 | 10.0 | 2.0 | 0.2 | 0.3 | 0.6 | 3.0 | 0.4 | 5.0 | 3.5 | 250.0 | 35.0 | 12.0 | 12.0 | 30.0 | 250.0 | 10.0 | 1.0 | 0.5 | |
| Earthquake | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0.0 | |
| Moderate | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 3.0 | $ - | $ - | $ 7.0 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 0.3 | $ - | $ 10.3 |
| | Number | 2 | 2 | 1 | 2 | 4 | 1 | 2 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12.4 | 0.0 | |
| High | Exposure ($M) | $ 26.0 | $ 60.0 | $ 10.0 | $ 4.0 | $ 0.8 | $ 0.3 | $ 1.2 | $ - | $ - | $ - | $ 3.5 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 12.4 | $ - | $ 118.2 |
| | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | |
| Extreme | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| Flood | Number | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4.6 | 0.0 | |
| 100 yr | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ 1.2 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 4.6 | $ - | $ 5.8 |
| | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.8 | 0.0 | |
| 500 yr | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 3.5 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 0.8 | $ - | $ 4.3 |
| Landslide | Number | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.7 | 0.0 | |
| | Exposure ($M) | $ - | $ 30.0 | $ - | $ 2.0 | $ 0.2 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 0.7 | $ - | $ 32.9 |
| Liquifaction | Number | 0 | 0 | 1 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | |
| Moderate | Exposure ($M) | $ - | $ - | $ 10.0 | $ - | $ - | $ - | $ 1.2 | $ - | $ - | $ - | $ 3.5 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 14.7 |
| | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.4 | 0.0 | |
| High | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 1.4 | $ - | $ 1.4 |
| Very High | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | |
| | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| Wildlife/Structure Fire | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.6 | 0.0 | |
| Low | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 3.5 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 0.6 | $ - | $ 4.1 |
| | Number | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2.7 | 0.0 | |
| High | Exposure ($M) | $ - | $ 30.0 | $ - | $ - | $ - | $ - | $ 0.6 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 2.7 | $ - | $ 33.3 |
| | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | |
| Extreme | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| | | | | | | | | | | | | | | | | | | | | | Grand Total | **$ 225.0** |

**[1] Loss value is asset replacement value in 2006 dollars. Value shown is found as count of assets at risk from the particular hazard times high-end unit asset value.**
**[2] Grand Total Loss value shown may include the same assets counted multiple times for different hazards.**

## 5.20 SOUTH COAST WATER DISTRICT – OBJECTIVE, GOALS AND ACTIONS

The South Coast Water District (SCWD) reviewed a set of jurisdictional-level hazard maps including detailed critical facility information and localized potential hazard exposure/loss estimates to help identify the top hazards threatening their jurisdiction. See Section 4 for additional details.

SCWD Loss Assessment Table is located at the end of this section.

### 5.20.1 Capability Assessment

The LPG identified current capabilities available for implementing hazard mitigation activities. The Capability Assessment (Assessment) portion of the jurisdictional mitigation plan identifies administrative, technical, legal and fiscal capabilities. This includes a summary of departments and their responsibilities associated to hazard mitigation planning as well as codes, ordinances, and plans already in place associated to hazard mitigation planning. The second part of the Assessment provides SCWD's fiscal capabilities that may be applicable to providing financial resources to implement identified mitigation action items.

### 5.20.2 Existing Institutions, Plans, Policies and Ordinances

The legal and regulatory capabilities of SCWD are shown in Table 5.20.2-1, which presents the existing ordinances and codes that affect the physical or built environment of SCWD. Examples of legal and/or regulatory capabilities can include: the SCWD's building codes, zoning ordinances, subdivision ordinances, special purpose ordinances, growth management ordinances, site plan review, general plans, capital improvement plans, economic development plans, emergency response plans, and real estate disclosure plans.

**Table 5.20.2-1**
**Legal and Regulatory Capability**

| Regulatory Tools (ordinances, codes, plans) | Local Authority (Yes/No) | State Authority (Yes/No) | Other Level Jurisdiction Authority (Yes/No) | Comments |
|---|---|---|---|---|
| A. Building code | No | Yes | No | |
| B. Zoning ordinance | No | No | Yes | . |
| C. Subdivision ordinance or regulations | No | No | Yes | |
| D. Special purpose ordinances (floodplain management, stormwater management, hillside or steep slope ordinances, wildfire ordinances, hazard setback requirements) | No | Yes | Yes | |

**Table 5.20.2-1 (continued)**
**Legal and Regulatory Capability**

| Regulatory Tools (ordinances, codes, plans) | Local Authority (Yes/No) | State Authority (Yes/No) | Other Level Jurisdiction Authority (Yes/No) | Comments |
|---|---|---|---|---|
| E. Growth management ordinances (also called "smart growth" or anti-sprawl programs) | No | No | Yes | |
| F. Site plan review requirements | No | No | Yes | |
| G. General or comprehensive plan | No | No | Yes | |
| H. A capital improvements plan | Yes | No | No | |
| I. An economic development plan | Yes | | | |
| J. An emergency response plan | Yes | Yes | Yes | SEMS/NIMS |
| K. A post-disaster recovery plan | No | Yes | Yes | NIMS |
| L. A post-disaster recovery ordinance | | | | |
| M. Real estate disclosure requirements | No | Yes | Yes | |
| N. Waste Discharge Requirements | No | Yes | No | State Water Resources Control Board |

## 5.20.3 Administrative and Technical Capacity

The following is a summary of existing departments in SCWD and their responsibilities related to hazard mitigation planning and implementation, as well as existing planning documents and regulations related to mitigation efforts within the community. The administrative and technical capabilities of SCWD, as shown in Table 5.20.3-1, provides an identification of the staff, personnel, and department resources available to implement the actions identified in the mitigation section of the Plan. Specific resources reviewed include those involving technical personnel such as planners/engineers with knowledge of land development and land management practices, engineers trained in construction practices related to building and infrastructure, planners and engineers with an understanding of natural or manmade hazards, floodplain managers, surveyors, personnel with GIS skills and scientists familiar with hazards in the community.

**Table 5.20.3-1**
**Administrative and Technical Capacity**

| Staff/Personnel Resources | Yes/No | Department/Agency and Position |
|---|---|---|
| A. Planner(s) or engineer(s) with knowledge of land development and land management practices | Yes | City of Dana Point, Laguna Beach & San Clemente |
| B. Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure | Yes | South Coast Water District |
| C. Planners or Engineer(s) with an understanding of natural and/or human-caused hazards | No | |
| D. Floodplain manager | No | |
| E. Surveyors | Yes | Out Sourced |
| F. Staff with education or expertise to assess the community's vulnerability to hazards | Yes | ERP |
| G. Personnel skilled in GIS and/or HAZUS | Yes | South Coast Water District Engineer Dept. |
| H. Scientists familiar with the hazards of the community | No | |
| I. Emergency manager | Yes | South Coast Water District |
| J. Grant writers | Yes | South Coast Water District/ Engineering Dept |

## 5.20.4 Fiscal Capability

Table 5.20.4-1 shows specific financial and budgetary tools available to SCWD such as community development block grants; capital improvements project funding; authority to levy taxes for specific purposes; fees for water, sewer, gas, or electric services; impact fees for homebuyers or developers for new development; ability to incur debt through general obligations bonds; and withholding spending in hazard-prone areas.

**Table 5.20.4-1**
**Fiscal Capability**

| Financial Resources | Accessible or Eligible to Use (Yes/No/Don't Know) |
|---|---|
| A. Community Development Block Grants (CDBG) | No |
| B. Capital improvements project funding | South Coast Water District /Engineering Department |
| C. Authority to levy taxes for specific purposes | Yes, South Coast Water District/Administration |
| D. Fees for water, sewer, gas, or electric service | Yes/South Coast Water District |
| E. Impact fees for homebuyers or developers for new developments/homes | Yes/South Coast Water District |
| F. Incur debt through general obligation bonds | Yes/ South Coast Water District/ Administration/Board of Directors |
| G. Incur debt through special tax and revenue bonds | Yes for Revenue Bonds |
| H. Incur debt through private activity bonds | No |
| I. Withhold spending in hazard-prone areas | No |

## 5.20.5 Local Mitigation Capability Assessment Goals

Listed below are SCWD's specific hazard mitigation goals, objectives and related potential actions. For each goal, one or more objectives have been identified that provide strategies to attain the goal. Where appropriate, the SCWD has identified a range of specific actions to achieve the objective and goal.

The goals and objectives were developed by considering the risk assessment findings, localized hazard identification and loss/exposure estimates, and an analysis of the jurisdiction's current capabilities assessment. These preliminary goals, objectives and actions were developed to represent a vision of long-term hazard reduction or enhancement of capabilities. To help in further development of these goals and objectives, the LPG compiled and reviewed current jurisdictional sources including the SCWD's planning documents, codes, and ordinances. In addition, SCWD representatives met with consultant staff and/or MWDOC to specifically discuss these hazard-related goals, objectives and actions as they related to the overall Plan. Once developed, SCWD staff presented them to the SCWD Board of Directors for their approval.

Public meetings were held throughout the County to present these preliminary goals, objectives and actions to citizens and to receive public input. At these meetings, specific consideration was given to hazard identification/profiles and the vulnerability assessment results. The following sections present the hazard-related goals, objectives and actions as prepared by SCWD's LPG in conjunction with the Hazard Mitigation Working Group, locally elected officials, and local citizens.

**Table 5.20.5-1**
**Local Mitigation Capability Assessment**

| Agency Name (Mission/Function) | Programs, Plans, Policies, Regulations, Funding, or Practices | Point of Contact Name, Address, Phone, Email | Effect on Loss Reduction* | | | Comments |
|---|---|---|---|---|---|---|
| | | | Support | Facilitate | Hinder | |
| San Diego Regional Water Quality Board *(DRWQCB) | | Joanne Lim (858) 637-5583 | | | | |
| California Coastal Commission South Coast District | | Carl Schwing 200 Oceangate, 10th Floor Long Beach, Ca 90802 | | | | |
| City of Dana Point | | Brad Fowler (949) 248-3554 | | | | |
| City of Laguna Beach | | Joe Chiqueter<br>(949) 497-0338<br>505 Forest Avenue Laguna Beach, California 92651 USA<br>(949) 497-3311<br>(949) 497-0771 fax | | | | |
| City of San Clemente | | A.J Howard<br>(949) 361-8200<br>City of San Clemente 100 Avenida Presidio, San Clemente, CA 92672 | | | | |

### 5.20.6 SCWD Goals

**Goal 1: Reduce District's Vulnerability to Disruption**

A. Improve site safety and security.

1. Continue implementation of Vulnerability Risk Assessment recommendations.
2. Continue with improvement of site fencing and barriers.
3. Improve reliability of communication throughout the district.

B. Improve response time.

1. Continue with the implementation of security systems.
2. Continue with the implementation of the SCADA project.
3. Establish Security Policies and Procedures Manual.

**Goal 2: Reduce Water Losses and Improve Water Reliability during Disaster Events**

A. Reduce reservoir water losses.

1. Complete Ground Water Recovery Facility.
2. Complete seismic evaluation of district reservoirs.
3. Implement URS study recommendations.

B. Additional water resources.

4. Complete installation of Reservoir Management Systems (RMS).
5. Establish interim migration procedures for JRWSS pipeline breaks.
6. Establish protocol during loss of SCADA.

**Goal 3: Minimize Sewer Interruptions during Disaster Events**

A. Establish emergency by-pass for Sewer Beach Interceptor Tunnel and lift stations.

1. Place protective measures in rivers, creeks, flow control and beaches.
2. Purchase additional by-pass equipment.
3. Conduct emergency generator monthly testing to insure reliability.
4. Implement dual force mains were applicable.
5. Establish protocol during loss of SCADA

**SCWD - Goals, Objectives and Actions**

**Cross-referenced with identified Hazards Within Orange County**

| Goal, Objective, and Action | Flood/Storm | Wildland/Urban Fire | Earthquake | Dam Failure/Water Tank Failure | Landslide / Mudslide | Tornado / High Winds | Tsunami | Extreme Heat/ Drought | Expansive Soils/Land Subsidence / Liquefaction | Man-Made Hazards/ Contamination |
|---|---|---|---|---|---|---|---|---|---|---|
| G1/A/1 | | | | | | | | | | X |
| G1/A/2 | | | | | | | | | | X |
| G1/A/3 | | | | | | | | | | X |
| G1/B/1 | X | X | X | X | X | X | X | X | X | X |
| G1/B/2 | X | X | X | X | X | X | X | X | X | X |
| G1/B/3 | | | | | | | | | | X |
| G2/A/1 | X | X | X | X | X | X | X | X | X | X |
| G2/A/2 | | | X | X | | | X | | X | |
| G2/A/3 | X | X | X | X | X | X | X | X | X | X |
| G2/B/1 | X | X | X | X | X | X | X | X | X | X |
| G2/B/2 | X | X | X | X | X | X | X | X | X | X |
| G2/B/3 | X | X | X | X | X | X | X | X | X | X |
| G3/A/1 | X | | | | | | | | | |
| G3/A/2 | X | X | X | X | X | X | X | X | X | X |
| G3/A/3 | X | X | X | X | X | X | X | X | X | X |
| G3/A/4 | X | X | X | X | X | X | X | X | X | X |
| G3/A/5 | X | X | X | X | X | X | X | X | X | X |

**Table 5.20-1 SCWD Loss Estimation Table**

| Hazard Type | Item-> | WST | RES | WTP | PS | PRS | EIT | SC | ADM | LS | WWTP | WELL | DIEMER | OC-88 PS | PRS-MET | PP | WWTP-SOCWA | WWTP-OCSD | LS-OCSD | PWL | WWL | Total Loss Value [1] $M |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Replacement Cost | $M -> | 13.0 | 30.0 | 10.0 | 2.0 | 0.2 | 0.3 | 0.6 | 3.0 | 0.4 | 5.0 | 3.5 | 250.0 | 35.0 | 12.0 | 12.0 | 30.0 | 250.0 | 10.0 | 1.0 | 0.5 | |
| Earthquake | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0.0 | |
| Moderate | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 3.0 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 0.3 | $ - | $ 3.3 |
| | Number | 15 | 1 | 0 | 12 | 4 | 16 | 0 | 4 | 14 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 25.9 | 0.0 | |
| High | Exposure ($M) | $ 195.0 | $ 30.0 | $ - | $ 24.0 | $ 0.8 | $ 4.8 | $ - | $ 12.0 | $ 5.6 | $ 5.0 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 25.9 | $ - | $ 303.1 |
| | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | |
| Extreme | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| Flood | Number | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.1 | 0.0 | |
| 100 yr | Exposure ($M) | $ 13.0 | $ - | $ - | $ - | $ - | $ - | $ - | $ 6.0 | $ 0.8 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 1.1 | $ - | $ 20.9 |
| | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.6 | 0.0 | |
| 500 yr | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 3.0 | $ 0.8 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 0.6 | $ - | $ 4.4 |
| Landslide | Number | 6 | 0 | 0 | 3 | 0 | 4 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3.4 | 0.0 | |
| | Exposure ($M) | $ 78.0 | $ - | $ - | $ 6.0 | $ - | $ 1.2 | $ - | $ - | $ 0.4 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 3.4 | $ - | $ 89.0 |
| Liquifaction | Number | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | |
| Moderate | Exposure ($M) | $ 13.0 | $ - | $ - | $ 4.0 | $ - | $ - | $ - | $ 6.0 | $ - | $ 5.0 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 28.0 |
| | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | |
| High | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| Very High | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | |
| | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| Wildlife/Structure Fire | Number | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0.0 | |
| Low | Exposure ($M) | $ 13.0 | $ - | $ - | $ - | $ - | $ 0.3 | $ - | $ - | $ 0.4 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 0.2 | $ - | $ 13.9 |
| | Number | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0.0 | |
| High | Exposure ($M) | $ 26.0 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 0.2 | $ - | $ 26.2 |
| | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | |
| Extreme | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| | | | | | | | | | | | | | | | | | | | | | Grand Total | **$ 488.8** |

**[1] Loss value is asset replacement value in 2006 dollars. Value shown is found as count of assets at risk from the particular hazard times high-end unit asset value.**
**[2] Grand Total Loss value shown may include the same assets counted multiple times for different hazards.**

## 5.21 SOCWA – OBJECTIVES, GOALS AND ACTIONS

South Orange County Wastewater Authority (SOCWA) reviewed a set of jurisdictional-level hazard maps including detailed critical facility information and localized potential hazard exposure/loss estimates to help identify the top hazards threatening their jurisdiction. See Section 4 for additional details.

SOCWA Loss Assessment Table is located at the end of this section.

### 5.21.1 Capability Assessment

The LPG identified current capabilities available for implementing hazard mitigation activities. The Capability Assessment (Assessment) portion of the jurisdictional mitigation plan identifies administrative, technical, legal and fiscal capabilities. This includes a summary of departments and their responsibilities associated to hazard mitigation planning as well as codes, ordinances, and plans already in place associated to hazard mitigation planning. The second part of the Assessment provides SOCWA's fiscal capabilities that may be applicable to providing financial resources to implement identified mitigation action items.

### 5.21.2 Existing Institutions, Plans, Policies and Ordinances

The legal and regulatory capabilities of SOCWA are shown in Table 5.21.3-1, which presents the existing ordinances and codes that affect the physical or built environment of SOCWA. Examples of legal and/or regulatory capabilities can include: SOCWA's building codes, zoning ordinances, subdivision ordinances, special purpose ordinances, growth management ordinances, site plan review, general plans, capital improvement plans, economic development plans, emergency response plans, and real estate disclosure plans.

### 5.21.3 Legal and Regulatory Capability

**Table 5.21.3-1**
**Legal and Regulatory Capability**

| Regulatory Tools (ordinances, codes, plans) | Local Authority (Yes/No) | State Authority (Yes/No) | Other Level Jurisdiction Authority (Yes/No) | Comments |
|---|---|---|---|---|
| A. Building code | No | Yes | Yes | Local cities<br>O.C.F.A<br>A.Q.M.D.<br>Some Exceptions Apply<br>HCA < State/County |
| B. Zoning ordinance | No | No | Yes | Coastal Commission |
| C. Subdivision ordinance or regulations | No | No | Yes | Local cities<br>County of Orange |
| D. Special purpose ordinances (floodplain management, storm water management, hillside or steep slope ordinances, wildfire ordinances, hazard setback requirements) | No | Yes | Yes | County of Orange-<br>Army Corps of Engineers<br>USFWS/CDFG<br>Regional Water Quality Control Board<br>SAWPA<br>OCFA<br>CDF/ Forest Service |
| E. Growth management ordinances (also called "smart growth" or anti-sprawl programs) | No | No | No | Local cities<br>County of Orange<br>OCFA |
| F. Site plan review requirements | Yes | No | No | Local cities<br>County of Orange<br>OCFA<br>Permits |
| G. General or comprehensive plan | No | No | No | |
| H. A capital improvements plan | Yes | No | No | RWQCB<br>Habitat Protection<br>LAFCO |
| I. An economic development plan | No | No | No | |
| J. An emergency response plan | Yes | Yes | Yes | SEMS<br>NIMS<br>WEROC |
| K. A post-disaster recovery plan | No | No | Yes | NIMS |

| Table 5.21.3-1<br>Legal and Regulatory Capability | | | | |
|---|---|---|---|---|
| Regulatory Tools (ordinances, codes, plans) | Local Authority (Yes/No) | State Authority (Yes/No) | Other Level Jurisdiction Authority (Yes/No) | Comments |
| L. A post-disaster recovery law | No | No | No | |
| M. Real estate disclosure requirements | No | No | No | |
| N. Waste Discharge Requirement | No | Yes | No | State Water Resource Control Board |

## 5.21.4 Administrative and Technical Capacity

The following is a summary of existing departments in SOCWA and their responsibilities related to hazard mitigation planning and implementation, as well as existing planning documents and regulations related to mitigation efforts within the community. The administrative and technical capabilities of SOCWA, as shown in Table 5.21.4-1, provides an identification of the staff, personnel, and department resources available to implement the actions identified in the mitigation section of the Plan. Specific resources reviewed include those involving technical personnel such as planners/engineers with knowledge of land development and land management practices, engineers trained in construction practices related to building and infrastructure, planners and engineers with an understanding of natural or manmade hazards, floodplain managers, surveyors, personnel with GIS skills and scientists familiar with hazards in the community.

| Table 5.21.4-1<br>Administrative and Technical Capacity | | |
|---|---|---|
| Staff/Personnel Resources | Yes/No | Department/Agency and Position |
| A. Planner(s) or engineer(s) with knowledge of land development and land management practices | Yes | District coordinates with outside consultants |
| B. Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure | Yes | District coordinates with outside consultants<br>In-house and Consultants<br>Engineering Department |
| C. Planners or Engineer(s) with an understanding of natural and/or human-caused hazards | Yes | District coordinates with outside consultants<br>Consultant with VA & ERP |
| D. Floodplain manager | Yes | County of Orange |

| Table 5.21.4-1<br>Administrative and Technical Capacity | | |
|---|---|---|
| Staff/Personnel Resources | Yes/No | Department/Agency and Position |
| E. Surveyors | Yes | Outside consultant |
| F. Staff with education or expertise to assess the community's vulnerability to hazards | Yes | County of Orange- WEROC |
| G. Personnel skilled in GIS and/or HAZUS | Yes | Outside Consultant |
| H. Scientists familiar with the hazards of the community | Yes | County<br>Colleges/University<br>Regional<br>Caltech<br>USGS |
| I. Emergency manager | Yes | Director of Operations<br>Risk/Safety Department |
| J. Grant writers | No | |
| K. Other- Lab Staff/ Specialist | Yes | Internal |

### 5.21.5 Fiscal Capability

Table 5.21.5-1 shows specific financial and budgetary tools available to SOCWA such as community development block grants; capital improvements project funding; authority to levy taxes for specific purposes; fees for water, sewer, gas, or electric services; impact fees for homebuyers or developers for new development; ability to incur debt through general obligations bonds; and withholding spending in hazard-prone areas.

**Table 5.22.5-1**
**Fiscal Capability**

| Financial Resources | Accessible or Eligible to Use (Yes/No/Don't Know) |
|---|---|
| A. Community Development Block Grants (CDBG) | No |
| B. Capital improvements project funding | Yes |
| C. Authority to levy taxes for specific purposes | Yes |
| D. Fees for water, sewer, gas, or electric service | Yes |
| E. Impact fees for homebuyers or developers for new developments/homes | No |
| F. Incur debt through general obligation bonds | No |
| G. Incur debt through special tax and revenue bonds | No |
| H. Incur debt through private activity bonds | No |
| I. Withhold spending in hazard-prone areas | No |
| J. Grants | Yes |

### 5.21.6 Local Mitigation Capability Assessment Goals

Listed below are SOCWA's specific hazard mitigation goals, objectives and related potential actions. For each goal, one or more objectives have been identified that provide strategies to attain the goal. Where appropriate, SOCWA has identified a range of specific actions to achieve the objective and goal.

The goals and objectives were developed by considering the risk assessment findings, localized hazard identification and loss/exposure estimates, and an analysis of the jurisdiction's current capabilities assessment. These preliminary goals, objectives and actions were developed to represent a vision of long-term hazard reduction or enhancement of capabilities. To help in further development of these goals and objectives, the LPG compiled and reviewed current jurisdictional sources including SOCWA's planning documents, codes, and ordinances. In addition, SOCWA representatives met with consultant staff and/or MWDOC to specifically discuss these hazard-related goals, objectives and actions as they related to the overall Plan. The LPG member was Dan Wheeler. Once developed, SOCWA staff presented them to the SOCWA Board of Directors for their approval.

Public meetings were held throughout the County to present these preliminary goals, objectives and actions to citizens and to receive public input. At these meetings, specific consideration was given to hazard identification/profiles and the vulnerability assessment results. The following sections present the hazard-related goals, objectives and actions as prepared by SOCWA's LPG in conjunction with the Hazard Mitigation Working Group, locally elected officials, and local citizens.

### 5.21.7 SOCWA MITIGATION GOALS AND OBJECTIVES

SOCWA reviewed a set of jurisdictional-level hazard maps including detailed critical facility information and localized potential hazard exposure/loss estimates to help identify the top hazards threatening their jurisdiction. Since SOCWA is a regional agency providing the underlying support for a number of the agencies, the overall goals and objectives for the wastewater functions were included in the regional Section 5.4. See Section 4 for additional details on the hazards.

**Table 5.21-1 SOCWA Loss Estimation Table**

| Hazard Type | Item-> | WST | RES | WTP | PS | PRS | EIT | SC | ADM | LS | WWTP | WELL | DIEMER | OC-88 PS | PRS-MET | PP | WWTP-SOCWA | WWTP-OCSD | LS-OCSD | PWL | WWL | Total Loss Value [1] $M |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Replacement Cost | $M -> | 13.0 | 30.0 | 10.0 | 2.0 | 0.2 | 0.3 | 0.6 | 3.0 | 0.4 | 5.0 | 3.5 | 250.0 | 35.0 | 12.0 | 12.0 | 30.0 | 250.0 | 10.0 | 1.0 | 0.5 | |
| Earthquake | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0.0 | 12.1 | |
| Moderate | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 30.0 | $ - | $ - | $ - | $ 6.1 | $ 36.1 |
| | Number | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0.0 | 25.6 | |
| High | Exposure ($M) | $ - | $ - | $ - | $ 4.0 | $ - | $ - | $ - | $ 3.0 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 90.0 | $ - | $ - | $ - | $ 12.8 | $ 109.8 |
| | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | |
| Extreme | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| Flood | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 8.4 | |
| 100 yr | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 0.4 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 4.2 | $ 4.6 |
| | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 5.0 | |
| 500 yr | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 3.0 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 2.5 | $ 5.5 |
| Landslide | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0.0 | 6.2 | |
| | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 90.0 | $ - | $ - | $ - | $ 3.1 | $ 93.1 |
| Liquifaction | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | |
| Moderate | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 1.7 | |
| High | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 0.8 | $ 0.8 |
| Very High | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | |
| | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| Wildlife/Structure Fire | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 4.2 | |
| Low | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 2.1 | $ 2.1 |
| | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 3.2 | |
| High | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 1.6 | $ 1.6 |
| | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | |
| Extreme | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| | | | | | | | | | | | | | | | | | | | | | Grand Total | **$ 253.6** |

**[1] Loss value is asset replacement value in 2006 dollars. Value shown is found as count of assets at risk from the particular hazard times high-end unit asset value.**
**[2] Grand Total Loss value shown may include the same assets counted multiple times for different hazards.**

## 5.22 TRABUCO – OBJECTIVE, GOALS AND ACTIONS

Trabuco Canyon Water District (Trabuco) reviewed a set of jurisdictional-level hazard maps including detailed critical facility information and localized potential hazard exposure/loss estimates to help identify the top hazards threatening their jurisdiction. See Section 4 for additional details.

Trabuco Water District Loss Assessment Table is located at the end of this section.

### 5.22.2 Capability Assessment

The LPG identified current capabilities available for implementing hazard mitigation activities. The Capability Assessment (Assessment) portion of the jurisdictional mitigation plan identifies administrative, technical, legal and fiscal capabilities. This includes a summary of departments and their responsibilities associated to hazard mitigation planning as well as codes, ordinances, and plans already in place associated to hazard mitigation planning. The second part of the Assessment provides Trabuco's fiscal capabilities that may be applicable to providing financial resources to implement identified mitigation action items.

### 5.22.3 Existing Institutions, Plans, Policies and Ordinances

The legal and regulatory capabilities of Trabuco are shown in Table 5.22.3-1, which presents the existing ordinances and codes that affect the physical or built environment of Trabuco. Examples of legal and/or regulatory capabilities can include: the District's building codes, zoning ordinances, subdivision ordinances, special purpose ordinances, growth management ordinances, site plan review, general plans, capital improvement plans, economic development plans, emergency response plans, and real estate disclosure plans.

**Table 5.22.3-1**
**Legal and Regulatory Capability**

| Regulatory Tools (ordinances, codes, plans) | Local Authority (Yes/No) | Does State Regulate? (Yes/No) | Other Level Jurisdiction Authority (Yes/No) | Comments |
|---|---|---|---|---|
| Building code | No | No | Yes | Local cities<br>CA Division of Dams<br>O.C.F.A<br>A.Q.M.D.<br>Some Exceptions Apply |
| Zoning ordinance | Yes | No | Yes | County<br>City of Rancho Santa Margarita |
| Subdivision ordinance or regulations | Yes | No | Yes | Local cities |

**Table 5.22.3-1**
**Legal and Regulatory Capability**

| Regulatory Tools (ordinances, codes, plans) | Local Authority (Yes/No) | Does State Regulate? (Yes/No) | Other Level Jurisdiction Authority (Yes/No) | Comments |
|---|---|---|---|---|
| | | | | County of Orange |
| Special purpose ordinances (floodplain management, stormwater management, hillside or steep slope ordinances, wildfire ordinances, hazard setback requirements) | Yes | Yes | Yes | County of Orange<br>Army Corps of Engineers<br>USFWS/CDFG<br>Regional Water Quality Control Board (RWQCB)<br>USFWS/CDRG<br>Resource Agencies<br>OCFA |
| Growth management ordinances (also called "smart growth" or anti-sprawl programs) | Yes | Yes | Yes | Local cities<br>County of Orange<br>Foothill Specific Plan<br>LAFCO |
| Site plan review requirements | Yes | No | Yes | Local cities<br>County of Orange<br>OCFA<br>Calif. Legislative Bills and Propositions |
| General or comprehensive plan | Yes | Yes | Yes | TCWD Master Plan<br>TCWD Urban Water Management Plan |
| A capital improvements plan | No | No | No | TCWD CIP |
| An economic development plan | No | No | No | Local cities |
| An emergency response plan | Yes | Yes | Yes | CA DHS/EPA<br>SEMS<br>NIMS<br>WEROC |
| A post-disaster recovery plan | No | No | No | NIMS |
| A post-disaster recovery ordinance | No | No | No | Local cities<br>County of Orange<br>State of California |

**Table 5.22.3-1**
**Legal and Regulatory Capability**

| Regulatory Tools (ordinances, codes, plans) | Local Authority (Yes/No) | Does State Regulate? (Yes/No) | Other Level Jurisdiction Authority (Yes/No) | Comments |
|---|---|---|---|---|
| | | | | F.E.M.A |
| Real estate disclosure requirements | Yes | Yes | No | State Realtor Board, School Districts |
| Metrolink & Caltrans | No | No | No | |
| Waste Discharge Requirements | No | Yes | No | State Water Resources Control Board |
| A. Vulnerability Assessment | Yes | Yes | No | EPA<br>CA DHS |
| B. Air Quality- AQMD | No | Yes | Yes | Depending on project location and requirements. |

### 5.22.4 Administrative and Technical Capacity

The following is a summary of existing departments in Trabuco and their responsibilities related to hazard mitigation planning and implementation, as well as existing planning documents and regulations related to mitigation efforts within the community. The administrative and technical capabilities of Trabuco, as shown in Table 5.22.4-1, provides an identification of the staff, personnel, and department resources available to implement the actions identified in the mitigation section of the Plan. Specific resources reviewed include those involving technical personnel such as planners/engineers with knowledge of land development and land management practices, engineers trained in construction practices related to building and infrastructure, planners and engineers with an understanding of natural or manmade hazards, floodplain managers, surveyors, personnel with GIS skills and scientists familiar with hazards in the community.

**Table 5.22.4-1**
**Administrative and Technical Capacity**

| Staff/Personnel Resources | Yes/No | Department/Agency and Position |
|---|---|---|
| A. Planner(s) or engineer(s) with knowledge of land development and land management practices | Yes | District Engineer and outside consultants |
| B. Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure | Yes | District Engineer and outside consultants |
| C. Planners or Engineer(s) with an understanding of natural and/or human-caused hazards | Yes | District coordinates with outside consultants |
| D. Floodplain manager | Yes | County of Orange<br>Sheriff's Department |
| E. Surveyors | Yes | Outside consultant |
| F. Staff with education or expertise to assess the community's vulnerability to hazards | Yes | County of Orange, Emergency Response Plan, Sheriff's Dept., Fire Chief |
| G. Personnel skilled in GIS and/or HAZUS | Yes | MWDOC<br>Center for Demographics Research<br>Outside Consultant |
| H. Scientists familiar with the hazards of the community | Yes | County<br>Orange County Fire Authority<br>Outside Consultants<br>Local University and Non Profit Research Centers |
| I. Emergency manager | Yes | MWDOC WEROC Emergency Coordinator |
| J. Grant writers | Yes | Engineering Department |
| K. Other- Lab Specialist | Yes | Contract Laboratories, Neighboring Water Districts |
| L. Other- Lab Staff | Yes | District's Laboratory, Lab Technician |

### 5.22.5 Fiscal Capability

Table 5.22.5-1 shows specific financial and budgetary tools available to Trabuco such as community development block grants; capital improvements project funding; authority to levy taxes for specific purposes; fees for water, sewer, gas, or electric services; impact fees for homebuyers or developers for new development; ability to incur debt through general obligations bonds; and withholding spending in hazard-prone areas.

**Table 5.22.5-1**
**Fiscal Capability**

| Financial Resources | Accessible or Eligible to Use (Yes/No/Don't Know) |
|---|---|
| K. Community Development Block Grants (CDBG) | No |
| L. Capital improvements project funding | Yes |
| M. Authority to levy taxes for specific purposes | No |
| N. Fees for water, sewer, gas, or electric service | Yes(water and sewer) |
| O. Impact fees for homebuyers or developers for new developments/homes | Yes |
| P. Incur debt through general obligation bonds | Yes |
| Q. Incur debt through special tax and revenue bonds | Yes |
| R. Incur debt through private activity bonds | Don't Know |
| S. Withhold spending in hazard-prone areas | Yes |
| T. Other- Grants | Yes |

### 5.22.6 Local Mitigation Capability Assessment Goals

Listed below are Trabuco's specific hazard mitigation goals, objectives and related potential actions. For each goal, one or more objectives have been identified that provide strategies to attain the goal. Where appropriate, the District has identified a range of specific actions to achieve the objective and goal.

The goals and objectives were developed by considering the risk assessment findings, localized hazard identification and loss/exposure estimates, and an analysis of the jurisdiction's current capabilities assessment. These preliminary goals, objectives and actions were developed to represent a vision of long-term hazard reduction or enhancement of capabilities. To help in further development of these goals and objectives, the LPG compiled and reviewed current jurisdictional sources including the District's planning documents, codes, and ordinances. In addition, District's representatives met with consultant staff and/or MWDOC to specifically discuss these hazard-related goals, objectives and actions as they related to the overall Plan. Once developed, District's staff presented them to the Trabuco Board of Directors for their approval.

Public meetings were held throughout the County to present these preliminary goals, objectives and actions to citizens and to receive public input. At these meetings, specific consideration was given to hazard identification/profiles and the vulnerability assessment results. The following sections present the hazard-related goals, objectives and actions as prepared by Trabuco's LPG in conjunction with the Hazard Mitigation Working Group, locally elected officials, and local citizens.

### 5.22.7 Trabuco Canyon WD Goals

**GOAL 1: Reduce District's Vulnerability to Terrorist Acts and Vandalism**

A. Increase site security at facilities
   1. Implement Vulnerability Risk Assessment recommendations
   2. Install razor wire around site perimeter
   3. Install additional security measures at facility access points
   4. Improve lock system
   5. Install surveillance and lighting equipment
   6. Install additional alarms

B. Increase local authority response time
   1. Keep emergency response plan up-to-date and coordinate with local fire and sheriff authorities
   2. Expand SCADA system monitoring
   3. Add laboratory sampling and analyses for unregulated compounds recommended by EPA or AWWA

**IMPLEMENTATION STRATEGY:**

District constructs site improvements as respective facilities are scheduled for replacement or refurbishment. Projects are implemented as funding is approved as part of annual budget process or available through financial assistance programs.

**GOAL 2: Reduce Risk of Loss of Water Service Following a Hazard**

A. Reduce reservoir water losses
   1. Evaluate water tanks for structural stability and seismic activity
   2. Install flexible couplings and seismic valves at reservoir sites

B. Maintain or Increase available water supplies to system
   1. Loop water sources where possible
   2. Evaluate existing interties with neighboring water purveyors and upgrade or improve

**IMPLEMENTATION STRATEGY:**

Contract for engineering studies for site-specific recommendations for structural and seismic improvements. Acquire funding to install seismic improvements. Continue to coordinate with neighboring districts for interties**.**

**GOAL 3: Protect Imported Water Reliability and Increase Storage**

A. Asses additional sources of emergency water supply

1. Coordinate with IRWD and perform studies for treatment of Irvine Lake Water

B. Increase Emergency Potable Water Storage

1. Coordinate with neighboring water districts for regional water supply and storage projects
2. Construct new storage tanks.

IMPLEMENTATION STRATEGY:

District will contract for engineering studies to evaluate additional treatment of Irvine Lake emergency water, and coordinate with neighboring water districts to prioritize and implement projects on a regional basis. District will contract for engineering studies to evaluate system hydraulics and emergency water storage needs.

**GOAL 4: Provide Quick and Accurate System Information**

A. Provide up to date record drawings and facility operational manuals

1. Install new software and hardware for accessing system infrastructure and manuals

B. Provide immediate access to information to operations, management, and engineering

1. Install new GIS system for emergency response and coordination with other agencies

2. Procure new computer hardware for field emergency use

IMPLEMENTATION STRATEGY:

Projects are implemented as funding is approved as part of annual budget process or available through financial assistance programs.

GOAL 5: Upgrade Existing Water Transmission Main

A. Structurally upgrade and improve existing water transmission main to withstand substructure or foundational degradation, soil corrosion, and seismic activity.
   **1.** Install new structural supports and replace unstable foundation and soils where necessary
   2. Relocate sections to more seismically or stable locations, if necessary. Evaluate site conditions for 3. corrosive materials or unsuitable native soil conditions.

IMPLEMENTATION STRATEGY:

Projects are implemented as funding is approved as part of annual budget process or available through financial assistance programs. Contract for engineering studies for site-specific recommendations for structural and seismic improvements.

**Trabuco - Goals, Objectives and Actions**
**Cross-referenced with identified Hazards Within Orange County**

| Goal, Objective, and Action | Flood/Storm | Wildland/Urban Fire | Earthquake | Dam Failure/Water Tank Failure | Landslide / Mudslide | Tornado / High Winds | Tsunami | Extreme Heat/ Drought | Expansive Soils/Land Subsidence / Liquefaction | Man-Made Hazards/ Contamination |
|---|---|---|---|---|---|---|---|---|---|---|
| G1/A/1 | | | | | | | | | | X |
| G1/A/2 | | | | | | | | | | X |
| G1/A/3 | | | | | | | | | | X |
| G1/A/4 | | | | | | | | | | X |
| G1/A/5 | | | | | | | | | | X |
| G1/A/6 | | | | | | | | | | X |
| G1/B/1 | X | X | X | X | X | | | X | X | X |
| G1/B/2 | X | X | X | X | X | | | X | X | X |
| G1/B/3 | | | | | | | | | | X |
| G2/A/1 | | | X | X | | | | | X | |
| G2/A/2 | | | X | X | | | | | X | |
| G2/B/1 | | X | | | | | | | | |
| G2/B/2 | X | X | X | X | X | | | X | X | X |
| G3/A/1 | X | X | X | X | X | | | X | X | X |
| G3/B/1 | X | X | X | X | X | | | X | X | X |
| G3/B/2 | X | X | X | X | X | | | X | X | X |
| G4/A/1 | X | X | X | X | X | | | X | X | X |
| G4/B/1 | X | X | X | X | X | | | X | X | X |
| G4/B/2 | X | X | X | X | X | | | X | X | X |
| G5/A/1 | X | | X | | X | | | | X | |
| G5/A/2 | X | | X | | X | | | | X | |

**Table 5.22-1 Trabuco Loss Estimation Table**

| Hazard Type | Item-> | WST | RES | WTP | PS | PRS | EIT | SC | ADM | LS | WWTP | WELL | DIEMER | OC-88 PS | PRS-MET | PP | WWTP-SOCWA | WWTP-OCSD | LS-OCSD | PWL | WWL | Total Loss Value [1] $M |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Replacement Cost | $M -> | 13.0 | 30.0 | 10.0 | 2.0 | 0.2 | 0.3 | 0.6 | 3.0 | 0.4 | 5.0 | 3.5 | 250.0 | 35.0 | 12.0 | 12.0 | 30.0 | 250.0 | 10.0 | 1.0 | 0.5 | |
| Earthquake | Number | 8 | 2 | 1 | 12 | 8 | 5 | 1 | 1 | 8 | 1 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 26.7 | 0.0 | |
| Moderate | Exposure ($M) | $ 104.0 | $ 60.0 | $ 10.0 | $ 24.0 | $ 1.6 | $ 1.5 | $ 0.6 | $ 3.0 | $ 3.2 | $ 5.0 | $ 10.5 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 26.7 | $ - | $ 250.1 |
| | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | |
| High | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 0.0 | $ - | $ 0.0 |
| | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | |
| Extreme | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| Flood | Number | 0 | 0 | 1 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2.1 | 0.0 | |
| 100 yr | Exposure ($M) | $ - | $ - | $ 10.0 | $ 6.0 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 2.1 | $ - | $ 18.1 |
| | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.2 | 0.0 | |
| 500 yr | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 0.2 | $ - | $ 0.2 |
| Landslide | Number | 2 | 1 | 0 | 4 | 0 | 2 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3.7 | 0.0 | |
| | Exposure ($M) | $ 26.0 | $ 30.0 | $ - | $ 8.0 | $ - | $ 0.6 | $ - | $ - | $ 1.2 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 3.7 | $ - | $ 69.5 |
| Liquifaction | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | |
| Moderate | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | |
| High | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| Very High | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | |
| | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| Wildlife/Structure Fire | Number | 2 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2.7 | 0.0 | |
| Low | Exposure ($M) | $ 26.0 | $ - | $ - | $ - | $ 0.4 | $ - | $ - | $ - | $ 0.4 | $ - | $ 3.5 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 2.7 | $ - | $ 33.0 |
| | Number | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.9 | 0.0 | |
| High | Exposure ($M) | $ - | $ - | $ - | $ - | $ 0.2 | $ 0.3 | $ - | $ - | $ 0.8 | $ 5.0 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 0.9 | $ - | $ 7.2 |
| | Number | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.3 | 0.0 | |
| Extreme | Exposure ($M) | $ 13.0 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 1.3 | $ - | $ 14.3 |
| | | | | | | | | | | | | | | | | | | | | | Grand Total | **$ 392.4** |

**[1] Loss value is asset replacement value in 2006 dollars. Value shown is found as count of assets at risk from the particular hazard times high-end unit asset value.**
**[2] Grand Total Loss value shown may include the same assets counted multiple times for different hazards.**

## 5.23 TUSTIN - OBJECTIVE, GOALS AND ACTIONS

The City of Tustin (Tustin) reviewed a set of jurisdictional-level hazard maps including detailed critical facility information and localized potential hazard exposure/loss estimates to help identify the top hazards threatening their jurisdiction. See Section 4.0 for additional details.

Tustin Loss Assessment Table is located at the end of this section. As a note, the City of Tustin disagrees with the Loss Estimates identified by the Hazus program for fire threat to the City. Utilizing Hazus, current jurisdiction infrastructure maps, and fire hazard maps the Loss Estimate shows Tustin has having no fire threat identified. In consideration of recent fire activity Tustin feels it important to note its concern for protection of its infrastructure from fire and has provided additional information supporting their position.

Tustin water service facilities have been geographically very close to three major fires in recent years: Baker Canyon Fire in October 1997, Holy Jim / Santiago Canyon Fire in September 1998, and the Sierra Fire in February 2006. In each incident Tustin activated its emergency operations center in preparation for potential evacuations, and impact to services. During the Sierra Fire OCFA requested the Tustin Police Department to be present at the Incident Command Post to assist in the Planning Section Incident Action Planning process. In addition while at the Incident Command Post the OCFA notified Tustin of its vulnerability to urban wildland fires, especially in the northeast portion of the City and the north/central unincorporated water service area.

### 5.23.2 Capability Assessment

The LPG identified current capabilities available for implementing hazard mitigation activities. The Capability Assessment (Assessment) portion of the jurisdictional mitigation plan identifies administrative, technical, legal and fiscal capabilities. This includes a summary of departments and their responsibilities associated to hazard mitigation planning as well as codes, ordinances, and plans already in place associated to hazard mitigation planning. The second part of the Assessment provides Tustin's fiscal capabilities that may be applicable to providing financial resources to implement identified mitigation action items.

### 5.23.3 Existing Institutions, Plans, Policies and Ordinances

The legal and regulatory capabilities of Tustin are shown in Table 5.23.3-1, which presents the existing ordinances and codes that affect the physical or built environment of Tustin. Examples of legal and/or regulatory capabilities can include: the City's building codes, zoning ordinances, subdivision ordinances, special purpose ordinances, growth management ordinances, site plan review, general plans, capital improvement plans, economic development plans, emergency response plans, and real estate disclosure plans.

**Table 5.23.3-1**
**Legal and Regulatory Capability**

| Regulatory Tools (ordinances, codes, plans) | Local Authority (Yes/No) | State Authority (Yes/No) | Other Level Jurisdiction Authority (Yes/No) | Comments |
|---|---|---|---|---|
| A. Building code | Yes | No | Yes | Local<br>OCFA<br>AQMD<br>UBC |
| B. Zoning ordinance | Yes | No | No | |
| C. Subdivision ordinance or regulations | Yes | No | Yes | Local<br>County of Orange |
| D. Special purpose ordinances (floodplain management, storm water management, hillside or steep slope ordinances, wildfire ordinances, hazard setback requirements) | Yes | No | Yes | County of Orange –RDMD<br>Army Corps of Engineers<br>USFWS/CDFG<br>Regional Water Quality Control Board (RWQCB)<br>OCFA<br>Resource Agencies |
| E. Growth management ordinances (also called "smart growth" or anti-sprawl programs) | Yes | No | Yes | Local<br>LAFCO<br>County of Orange<br>OCFA |
| F. Site plan review requirements | Yes | No | Yes | Local<br>County of Orange<br>OCFA |
| G. General or comprehensive plan | Yes | No | No | |
| H. A capital improvements plan | Yes | No | No | |
| I. An economic development plan | No | No | No | |

| Regulatory Tools (ordinances, codes, plans) | Local Authority (Yes/No) | State Authority (Yes/No) | Other Level Jurisdiction Authority (Yes/No) | Comments |
|---|---|---|---|---|
| J. An emergency response plan | Yes | No | Yes | Local<br>State<br>FEMA |
| K. A post-disaster recovery plan | Yes | No | No | NIMS |
| L. A post-disaster recovery regulation | Yes | Yes | Yes | Local<br>County of Orange<br>State of California<br>AQMD<br>EPA<br>FEMA<br>Dept. of Health Services |
| M. Real estate disclosure requirements | Yes | No | Yes | Local<br>Tax Assessor<br>State Real Estate Board |
| N. Ca-DHS | Yes | No | Yes | |
| O. Title M & 22 (potable) USEPA | Yes | No | Yes | |
| P. Air Quality – AQMD | Yes | No | Yes | |
| Q. OSHA | Yes | No | Yes | |
| R. State Water Code | Yes | No | Yes | |

### 5.23.4 Administrative and Technical Capacity

The following is a summary of existing departments in Tustin and their responsibilities related to hazard mitigation planning and implementation, as well as existing planning documents and regulations related to mitigation efforts within the community. The administrative and technical capabilities of Tustin, as shown in Table 5.23.4-1, provides an identification of the staff, personnel, and department resources available to implement the actions identified in the mitigation section of the Plan. Specific resources reviewed include those involving technical personnel such as planners/engineers with knowledge of land development and land management practices, engineers trained in construction practices related to building and infrastructure, planners and engineers with an understanding of natural or manmade hazards, floodplain managers, surveyors, personnel with GIS skills and scientists familiar with hazards in the community.

**Table 5.23.4-1**
**Administrative and Technical Capacity**

| Staff/Personnel Resources | Yes/No | Department/Agency and Position |
|---|---|---|
| A. Planner(s) or engineer(s) with knowledge of land development and land management practices | No | Community Development, Contract Services |
| B. Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure | Yes | Inspectors, Public Works, Building<br>In-house and Outside Consultants |
| C. Planners or Engineer(s) with an understanding of natural and/or human-caused hazards | Yes | WEROC<br>Contract Services<br>Water Services |
| D. Floodplain manager | Yes | County of Orange – RDMD |
| E. Surveyors | No | Outside |
| F. Staff with education or expertise to assess the community's vulnerability to hazards | No | Contract Services |
| G. Personnel skilled in GIS and/or HAZUS | No | Contract Services |
| H. Scientists familiar with the hazards of the community | No | County, USGS |
| I. Emergency manager | Yes | Public Works, Operational Area, WEROC |
| J. Grant writers | Yes | Planning Dept., Engineering Dep. |

### 5.23.5 Fiscal Capability

Table 5.23.5-1 shows specific financial and budgetary tools available to Tustin such as community development block grants; capital improvements project funding; authority to levy taxes for specific purposes; fees for water, sewer, gas, or electric services; impact fees for homebuyers or developers for new development; ability to incur debt through general obligations bonds; and withholding spending in hazard-prone areas.

**Table 5.23.5-1**
**Fiscal Capability**

| Financial Resources | Accessible or Eligible to Use (Yes/No/Don't Know) |
|---|---|
| Community Development Block Grants (CDBG) | Yes |
| Capital improvements project funding | Yes |
| Authority to levy taxes for specific purposes | Don't Know |
| Fees for water, sewer, gas, or electric service | Yes |
| Impact fees for homebuyers or developers for new developments/homes | Yes |
| Incur debt through general obligation bonds | No |
| Incur debt through special tax and revenue bonds | Yes |
| Incur debt through private activity bonds | Don't Know |
| Withhold spending in hazard-prone areas | Don't Know |

### 5.23.6 Local Mitigation Capability Assessment

Tustin will identify their Summary Local Mitigation Capabilities Assessment and contacts for their jurisdiction's yearly update, to be incorporated in the five year update of the Plan.

Listed below are Tustin's specific hazard mitigation goals, objectives and related potential actions. For each goal, one or more objectives have been identified that provide strategies to attain the goal. Where appropriate, the City has identified a range of specific actions to achieve the objective and goal.

The goals and objectives were developed by considering the risk assessment findings, localized hazard identification and loss/exposure estimates, and an analysis of the jurisdiction's current capabilities assessment. These preliminary goals, objectives and actions were developed to represent a vision of long-term hazard reduction or enhancement of capabilities. To help in further development of these goals and objectives, the LPG compiled and reviewed current jurisdictional sources including the City's planning documents, codes, and ordinances. In addition, City representatives met with consultant staff and/or

MWDOC to specifically discuss these hazard-related goals, objectives and actions as they related to the overall Plan. The LPG members were Kathy Barr and Joe Meyers. Once developed, City staff presented them to the Tustin City Council for their approval.

Public meetings were held throughout the County to present these preliminary goals, objectives and actions to citizens and to receive public input. At these meetings, specific consideration was given to hazard identification/profiles and the vulnerability assessment results. The following sections present the hazard-related goals, objectives and actions as prepared by Tustin's LPG in conjunction with the Hazard Mitigation Working Group, locally elected officials, and local citizens.

### 5.23.7 City of Tustin Goals

**Goal 1: Reduce Agency's Vulnerability to Disruption**

A. Improve site security

1. Implement Vulnerability Risk Assessment recommendations
2. Survey and improve site fencing

B. Improve response time

1. Keep Emergency Operations Plan up-to-date

*IMPLEMENTATION STRATEGY:*

Agency constructs site improvements as respective facilities are scheduled for replacement or refurbishment. Projects are implemented as funding is approved as part of annual budget process or available through financial assistance programs.

**Goal 2: Minimize Water Loss (Ensure Reliable Supply) During Disaster Events**

A. Reduce reservoir water losses

1. Improve reservoir structures for seismic activity
2. Install seismic valves at critical reservoir sites
3. Install flexible coupling at reservoir sites

B. Increase available water supplies

1. Loop water sources where possible
2. Maintain supply sources

C. Protect existing assets with the highest vulnerability to the effects of natural disasters

1. Conduct inspections to ensure seismic retrofitting is in place
2. Secure above ground assets in all buildings and at well sites

D. Coordinate and support existing efforts to mitigate natural disaster hazards

1. Continue to use current building and infrastructure codes, standards and guidelines
2. Continue to follow current plans and guidelines

*IMPLEMENTATION STRATEGY:*

Contract for engineering studies of site-specific recommendations for structural stiffening and flexible coupling installation. Acquire funding to install seismic valves. Continue to coordinate with neighboring districts for interties.

**Goal 3: Protect Water Pumping and Water Production System Reliability**

A. Improve local production capacity

1. Construct Pasadena Avenue Well
2. Construct Tustin Avenue Well

B. Increase Potable Water Storage

1. Reconstruct Rawlings Reservoir
2. Reconstruct Simon Ranch Reservoir

*IMPLEMENTATION STRATEGY:*

Staff will coordinate with neighboring water districts, East Orange County Water District, Municipal Water District of Orange County (MWDOC), and Metropolitan Water District of Southern California (MET) to prioritize and implement projects on a regional basis.

**Goal 4: Protect the Public Water Supply from Contamination Caused by Backflow or Back-siphonage in the Event of an Earthquake**

A. Upgrade all potential hazardous potable water services with the required backflow prevention device as needed to prevent backpressure or back-siphonage that could contaminate the public water supply

1. The City is continually monitoring the public water supply and requiring the installation of backflow prevention devices on all hazardous potable services
2. Require all single-check fire systems in the Agency to be upgraded to a Double-Check Detector Assembly

**Goal 5: Protect the public water supply from contamination or service interruption in the event of a fire.**

A. Adopt policy for design of non-combustibles facilities to reduce the threat and impact of urban/wildfires on structures.

1. Establish design standards requiring all facilities to be designed with non-combustible materials

B. Provide routine maintenance around the facilities and reduce fuel sources to avoid the chance of fire threat.

1. Establish routine and regular maintenance schedules for all facilities to ensure that fuel sources have been removed.

C. Adopt policy to upgrade existing facilities or install at new facilities fire detection systems that are most effective.

1. In coordination with City of Tustin building codes and Orange County Fire Authority guidelines upgrade existing or install new fire detection systems that meet current fire detection standards.

**Tustin - Goals, Objectives and Actions**
**Cross-referenced with identified Hazards Within Orange County**

| Goal, Objective, and Action | Flood/Storm | Wildland/Urban Fire | Earthquake | Dam Failure/Water Tank Failure | Landslide / Mudslide | Tornado / High Winds | Tsunami | Extreme Heat/ Drought | Expansive Soils/Land Subsidence / Liquefaction | Man-Made Hazards/ Contamination |
|---|---|---|---|---|---|---|---|---|---|---|
| G1/A/1 | | | | | | | | | | X |
| G1/A/2 | | | | | | | | | | X |
| G1/B/1 | X | X | X | X | X | X | | X | X | X |
| G2/A/1 | | | X | X | | | | | X | |
| G2/A/2 | | | X | X | | | | | X | |
| G2/A/3 | | | X | X | | | | | X | |
| G2/B/1 | | X | | | | | | | | |
| G2/B/2 | X | X | X | X | X | X | | X | X | X |
| G2/C/1 | | | X | X | | | | | X | |
| G2/C/2 | | | X | | | | | | | X |
| G2/D/1 | X | X | X | X | X | X | | X | X | X |
| G2/D/2 | X | X | X | X | X | X | | X | X | X |
| G3/A/1 | X | X | X | X | X | X | | X | X | X |
| G3/A/2 | X | X | X | X | X | X | | X | X | X |
| G3/B/1 | X | X | X | X | X | X | | X | X | X |
| G3/B/2 | X | X | X | X | X | X | | X | X | X |
| G4/A/1 | | | X | | | | | | | X |
| G4/A/2 | | | | | | | | | | X |
| G5/A/1 | | X | | | | | | | | |
| G5/B/1 | | X | | | | | | | | |
| G5/C/1 | | X | | | | | | | | |

**Table 5.23-1 Tustin Loss Estimation Table**

| Hazard Type | Item-> | WST | RES | WTP | PS | PRS | EIT | SC | ADM | LS | WWTP | WELL | DIEMER | OC-88 PS | PRS-MET | PP | WWTP-SOCWA | WWTP-OCSD | LS-OCSD | PWL | WWL | Total Loss Value [1] $M |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Replacement Cost | $M -> | 13.0 | 30.0 | 10.0 | 2.0 | 0.2 | 0.3 | 0.6 | 3.0 | 0.4 | 5.0 | 3.5 | 250.0 | 35.0 | 12.0 | 12.0 | 30.0 | 250.0 | 10.0 | 1.0 | 0.5 | |
| Earthquake Moderate | Number | 6 | 0 | 2 | 4 | 0 | 5 | 7 | 2 | 0 | 0 | 13 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 183.7 | 0.0 | |
| | Exposure ($M) | $ 78.0 | $ - | $20.0 | $ 8.0 | $ - | $ 1.5 | $ 4.2 | $ 6.0 | $ - | $ - | $45.5 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 183.7 | $ - | $ 346.9 |
| High | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 11.8 | 0.0 | |
| | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 11.8 | $ - | $ 11.8 |
| Extreme | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | |
| | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| Flood 100 yr | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.3 | 0.0 | |
| | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 1.3 | $ - | $ 1.3 |
| 500 yr | Number | 1 | 0 | 1 | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 62.6 | 0.0 | |
| | Exposure ($M) | $ 13.0 | $ - | $10.0 | $ 2.0 | $ - | $ - | $ 1.2 | $ - | $ - | $ - | $24.5 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 62.6 | $ - | $ 113.3 |
| Landslide | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 | 0.0 | |
| | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 0.3 | $ - | $ 0.3 |
| Liquefaction Moderate | Number | 1 | 0 | 1 | 1 | 0 | 1 | 2 | 0 | 0 | 0 | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 76.5 | 0.0 | |
| | Exposure ($M) | $ 13.0 | $ - | $10.0 | $ 2.0 | $ - | $ 0.3 | $ 1.2 | $ - | $ - | $ - | $28.0 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 76.5 | $ - | $ 131.0 |
| High | Number | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 61.2 | 0.0 | |
| | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ 0.3 | $ 1.2 | $ 6.0 | $ - | $ - | $ 3.5 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 61.2 | $ - | $ 72.2 |
| Very High | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | |
| | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| Wildlife/Structure Fire Low | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.6 | 0.0 | |
| | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 1.6 | $ - | $ 1.6 |
| High | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | |
| | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| Extreme | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | |
| | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| | | | | | | | | | | | | | | | | | | | | | Grand Total Loss [2] | **$ 678.3** |

**[1] Loss value is asset replacement value in 2006 dollars. Value shown is found as count of assets at risk from the particular hazard times high-end unit asset value.**

**[2] Grand Total Loss value shown may include the same assets counted multiple times for different hazards.**

**[3] Tustin disagrees with the HAZUS methodology assessment of Wildfire & building fire threats within the City of Tustin and surrounding unincorporated water service areas. Instead please reference Table 5.23-2, Table 5.23-3, and Figure 5.22-2.**

**Table 5.23-2 Tustin 2A Worksheet**

**FOR OFFICIAL USE ONLY**

**Inventory Assets**

## Worksheet #2a

**Date:**

**Compile a detailed inventory of what can be damaged by natural & human caused hazards**

**Inventory the assets (critical facilities, infrastructure) that are of special consideration to your district**

**Note which hazards may potentially damage each asset**
**Worksheet 2b requests more specific information on hazard profiles for your district**

1. Do you know where your greatest damages may occur in your hazard areas?
2. Do you know whether your critical facilities will be operational after a hazard event?
3. Is there enough data to determine which assets are subject to the greatest potential damages?
4. Is there enough data to determine whether significant elements of the community are vulnerable to potential hazards?
5. Is there concern about a particular hazard because of its severity, repetitiveness, or likelihood of occurrence?
6. Is additional data needed to justify the expenditure of community or state funds for mitigation initiatives?

Contact District: CITY OF TUSTIN
Contact Name: Joe Meyers
Contact E-Mail: jmeyers@tustinca.org

| | | As Available | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Name or Description of Asset | Sources of Information | Critical Facility | Vulnerable Populations | Economic Assets | Special Considerations | Historic/other considerations | Replacement Value | Contents Value | Function Use or Value | Occupancy or capacity(# of people served or capacity of facility) | Earthquake | Fire | Flooding | Tsunami | High Winds | Dam Failure | Other natural hazard | Terrorism | |
| Water Service Office | | X | Y | | | N | $500,000 | | | | Y | Y | N | N | Y | N | N | Y | Y |
| Water Billing Office | | X | Y | | | N | $500,000 | | | | Y | Y | N | N | Y | N | N | Y | Y |
| Main St. Nitrate Removal Treatment Plant/Well #3 | | X | Y | | | N | $4,000,000 | | | | Y | Y | N | N | Y | N | N | Y | Y |
| Main St. Chlorination Bldg. | | X | Y | | | N | $500,000 | | | | Y | Y | N | N | Y | N | N | Y | Y |

| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Main St. Well #4/Generator Bldg | | X | Y | | | N | $2,000,000 | | | | Y | Y | N | N | N | N | N | Y | Y |
| Main St. Reservoir/Pump Station | | X | Y | | | N | $8,000,000 | | | | Y | Y | N | N | N | N | N | Y | Y |
| Beneta Way Well | | X | Y | | | N | $2,000,000 | | | | Y | Y | N | N | Y | N | N | Y | Y |
| Columbus Tustin Well | | X | Y | | | N | $2,000,000 | | | | Y | Y | N | N | Y | N | N | Y | Y |
| Livingston Well | | X | Y | | | N | $2,000,000 | | | | Y | Y | N | N | N | N | N | Y | Y |
| Pankey Well | | X | Y | | | N | $2,000,000 | | | | Y | Y | N | N | N | N | N | Y | Y |
| Prospect Well | | X | Y | | | N | $2,000,000 | | | | Y | Y | N | N | Y | N | N | Y | Y |
| Simon Booster Station | | | Y | | | N | $1,500,000 | | | | Y | Y | N | N | Y | N | N | Y | Y |
| Tustin Avenue Well | | X | Y | | | N | $2,000,000 | | | | Y | Y | N | N | Y | N | N | Y | Y |
| Vandenberg Well | | X | Y | | | N | $2,000,000 | | | | Y | Y | N | N | Y | N | N | Y | Y |
| Walnut Well | | X | Y | | | N | $2,000,000 | | | | Y | Y | N | N | Y | N | N | Y | Y |
| Yorba Street Well | | X | Y | | | N | $2,000,000 | | | | Y | Y | N | N | Y | N | N | Y | Y |
| LaVeta Well | | X | Y | | | N | $2,000,000 | | | | Y | Y | N | N | N | N | N | Y | Y |
| 17th Street DeSalter | | X | Y | | | N | $10,000,000 | | | | Y | Y | N | N | Y | N | N | Y | Y |
| Newport Well | | X | Y | | | N | $2,000,000 | | | | Y | Y | N | N | Y | N | N | Y | Y |
| Pasadena Well (Future) | | X | Y | | | N | $2,000,000 | | | | Y | Y | N | N | Y | N | N | Y | Y |
| Foothill Reservoir | | X | Y | | | N | $7,000,000 | | | | Y | Y | N | N | Y | N | N | Y | Y |
| Lyttle Reservoir | | X | Y | | | N | $1,000,000 | | | | Y | Y | N | N | Y | N | N | Y | Y |
| Newport Reservoir | | X | Y | | | N | $3,000,000 | | | | Y | Y | N | N | Y | N | N | Y | Y |
| Simon Reservoir | | X | Y | | | N | $3,500,000 | | | | Y | Y | N | N | Y | N | N | Y | Y |

| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Rawlings Reservoir | | X | Y | | | N | $12,000,000 | | | | Y | Y | N | N | Y | N | N | Y | Y |
| EOCWD (OC-48) Turnouts | | X | Y | | | N | $500,000 | | | | Y | Y | N | N | N | N | N | Y | Y |
| EOCWD (OC-43) Turnouts | | X | Y | | | N | $500,000 | | | | Y | Y | N | N | Y | N | N | Y | Y |

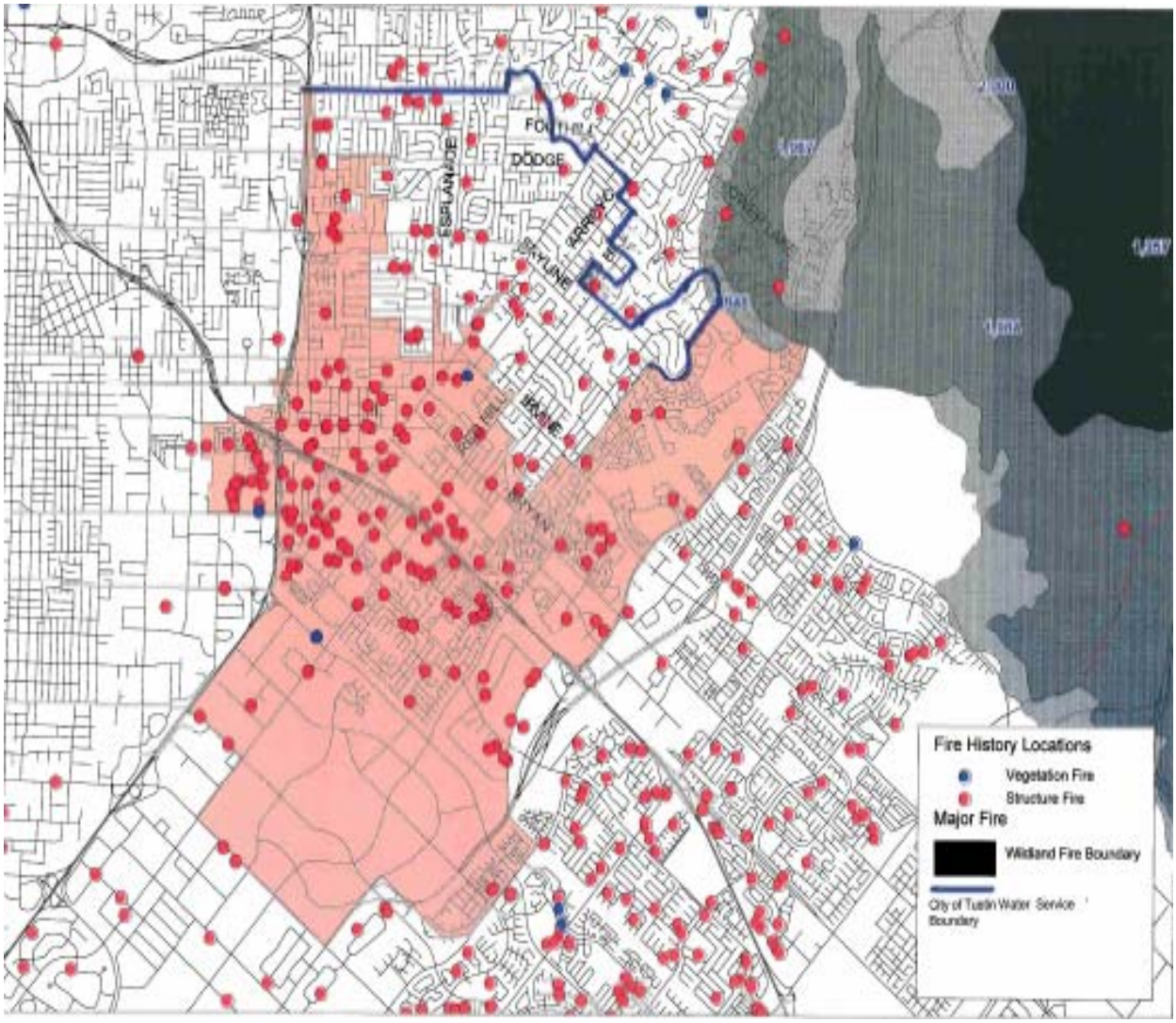
**Table 5.23-3 Tustin Historic Fires above or within Tustin Watershed**

Historic Fires Above or Within Tustin Watershed

| Fire_name | Acres | Cause | Area | Year | Incnum |
|---|---|---|---|---|---|
| | 18754.46 | | 816944069.9 | 1914 | CA1914CNF00000000005 |
| | 1084.65 | | 47247305.86 | 1929 | CA1929CNF00000000017 |
| | 191.24 | | 8330204.64 | 1942 | CA1942CNF00000000002 |
| Green River | 53078.76 | | 2312110901 | 1948 | |
| Nohl | 175.62 | | 7650089.88 | 1951 | CA1951ORC00000000258 |
| Irvine Lake | 112.84 | | 4915471.61 | 1956 | CA1956ORC00000000047 |
| Shoestring | 437.23 | | 19045940.11 | 1957 | CA1957ORC00000000038 |
| Santiago | 109.56 | | 4772220.82 | 1958 | CA1958ORC00000000047 |
| | 138.86 | | 6048901.57 | 1962 | CA1962CNF00000000005 |
| Paseo Grande | 51075.08 | Unknown | 2224830669 | 1967 | |
| Grundy | 1915.29 | | 83430182.08 | 1975 | CA1975ORC00000000051 |
| MINE | 4955.72 | | 215871000.7 | 1977 | CA1977RRU00897200709 |
| PASEO | 3643.72 | | 158720269.6 | 1979 | CA1979RRU01715801480 |
| Gypsum | 20141.89 | Downed power line | 877380838.5 | 1982 | CA1982ORC09155801186 |
| Loma Ridge | 1434.88 | | 62503177.41 | 1984 | |
| Coal Canyon | 449.58 | | 19583636.88 | 1984 | |
| Modjeska | 1017.51 | Arson | 44322839.63 | 1984 | |
| | 539.69 | | 23508804.47 | 1985 | CA1985RRU01708500000 |
| Green River Fire | 134.68 | | 5866773.94 | 1985 | |
| Stagecoach | 581.45 | Arson | 25328070.09 | 1993 | |
| HWY 91 | 176.56 | | 7690881.76 | 1995 | CA1995RRU00655200000 |
| Baker | 6319.53 | Undetermined | 275278547 | 1997 | ORC97052502 |
| Santiago Canyon | 7759.92 | Lightning | 338022237.6 | 1998 | 98045803 |
| Racetrack | 51.69 | Stolen vehicle set on fire | 2251528.08 | 2000 | ORC0071081 |
| Green | 2234.33 | Power Line | 97327372.79 | 2002 | 2008311 |

**Table 5.23-3 Fire History – City of Tustin**

Figure 5.23-3 Fire History – City of Tustin



## 5.24 WESTMINSTER – OBJECTIVE, GOALS AND ACTIONS

The City of Westminster (Westminster) reviewed a set of jurisdictional-level hazard maps including detailed critical facility information and localized potential hazard exposure/loss estimates to help identify the top hazards threatening their jurisdiction. See Section 4.0 for additional details.

Westminster Loss Assessment Table is located at the end of this section.

### 5.24.2 Capability Assessment

The LPG identified current capabilities available for implementing hazard mitigation activities. The Capability Assessment (Assessment) portion of the jurisdictional mitigation plan identifies administrative, technical, legal and fiscal capabilities. This includes a summary of departments and their responsibilities associated to hazard mitigation planning as well as codes, ordinances, and plans already in place associated to hazard mitigation planning. The second part of the Assessment provides Westminster's fiscal capabilities that may be applicable to providing financial resources to implement identified mitigation action items.

### 5.24.3 Existing Institutions, Plans, Policies and Ordinances

The legal and regulatory capabilities of Westminster are shown in Table 5.24.3-1, which presents the existing ordinances and codes that affect the physical or built environment of Westminster. Examples of legal and/or regulatory capabilities can include: the City's building codes, zoning ordinances, subdivision ordinances, special purpose ordinances, growth management ordinances, site plan review, general plans, capital improvement plans, economic development plans, emergency response plans, and real estate disclosure plans.

**Table 5.24.3-1**
**Legal and Regulatory Capability**

| Regulatory Tools (ordinances, codes, plans) | Local Authority (Yes/No) | State Authority (Yes/No) | Other Level Jurisdiction Authority (Yes/No) | Comments |
|---|---|---|---|---|
| A. Building code | Yes | No | No | Planning, Code Enforcement |
| B. Zoning ordinance | Yes | No | No | Planning |
| C. Subdivision ordinance or regulations | Yes | No | No | Planning |
| D. Special purpose ordinances (floodplain management, storm water management, hillside or steep slope ordinances, wildfire ordinances, hazard setback requirements) | Yes | Yes | Yes | County of Orange<br>Army Corps of Engineers<br>RWQCB,USFWS/CDRG |
| E. Growth management ordinances (also called "smart growth" or anti-sprawl programs) | Yes | No | No | Planning |

**Table 5.24.3-1 (continued)**
**Legal and Regulatory Capability**

| Regulatory Tools (ordinances, codes, plans) | Local Authority (Yes/No) | State Authority (Yes/No) | Other Level Jurisdiction Authority (Yes/No) | Comments |
|---|---|---|---|---|
| F. Site plan review requirements | Yes | No | No | Planning |
| G. General or comprehensive plan | Yes | No | No | City General Plan |
| H. A capital improvements plan | Yes | No | No | Water Master Plan |
| I. An economic development plan | Yes | No | No | Community Development |
| J. An emergency response plan | Yes | No | No | SEMS, WEROC,NIMS, WARN |
| K. A post-disaster recovery plan | Yes | No | No | NIMS |
| L. A post-disaster recovery ordinance | Yes | No | No | |
| M. Real estate disclosure requirements | Yes | No | No | State Board of Realtors |
| N. Caltrans | No | Yes | No | |
| O. CA DHS (Security Issues) | Yes | No | No | Vulnerability Assessment |
| P. Title M & 22 (potable) | Yes | Yes | Yes | USEPA |

## 5.24.4 Administrative and Technical Capacity

The following is a summary of existing departments in Westminster and their responsibilities related to hazard mitigation planning and implementation, as well as existing planning documents and regulations related to mitigation efforts within the community. The administrative and technical capabilities of Westminster, as shown in Table 5.24.4-1, provides an identification of the staff, personnel, and department resources available to implement the actions identified in the mitigation section of the Plan. Specific resources reviewed include those involving technical personnel such as planners/engineers with knowledge of land development and land management practices, engineers trained in construction practices related to building and infrastructure, planners and engineers with an understanding of natural or manmade hazards, floodplain managers, surveyors, personnel with GIS skills and scientists familiar with hazards in the community.

**Table 5.24.4-1**
**Administrative and Technical Capacity**

| Staff/Personnel Resources | Yes/No | Department/Agency and Position |
|---|---|---|
| A. Planner(s) or engineer(s) with knowledge of land development and land management practices | Yes | Public Works (Engineers)<br>Planning (Planners) |
| B. Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure | Yes | Public Works ( Engineers)& Contractors |
| C. Planners or Engineer(s) with an understanding of natural and/or human-caused hazards | Yes | Public Works (Engineers)<br>Planning (Planners) |
| D. Floodplain manager | No | County of Orange |
| E. Surveyors | Yes | Public Works Traffic Engineers (Technicians) |
| F. Staff with education or expertise to assess the community's vulnerability to hazards | No | WEROC / County of Orange |
| G. Personnel skilled in GIS and/or HAZUS | Yes | Public Works Employees / Center for Demographic Research, CSUF |
| H. Scientists familiar with the hazards of the community | No | County of Orange, Cal Tech, local Universities |
| I. Emergency manager | Yes | Public Works / Water Supervisor , Cross Connection |
| J. Grant writers | Yes | Public Works / Administrative Analyst |
| K. Lab Specialist | No | Truesdail Labs |

## 5.24.5 Fiscal Capability

Table 5.24.5-1 shows specific financial and budgetary tools available to Westminster such as community development block grants; capital improvements project funding; authority to levy taxes for specific purposes; fees for water, sewer, gas, or electric services; impact fees for homebuyers or developers for new development; ability to incur debt through general obligations bonds; and withholding spending in hazard-prone areas.

**Table 5.24.5-1**
**Fiscal Capability**

| Financial Resources | Accessible or Eligible to Use (Yes/No/Don't Know) |
|---|---|
| A. Community Development Block Grants (CDBG) | No |
| B. Capital improvements project funding | Yes |
| C. Authority to levy taxes for specific purposes | No |
| D. Fees for water, sewer, gas, or electric service | Yes |
| E. Impact fees for homebuyers or developers for new developments/homes | Yes |
| F. Incur debt through general obligation bonds | Yes |
| G. Incur debt through special tax and revenue bonds | Yes |
| H. Incur debt through private activity bonds | Yes |
| I. Withhold spending in hazard-prone areas | Yes |
| J. Grants | Yes |

## 5.24.6 Local Mitigation Capability Assessment Goals

Listed below are Westminster's specific hazard mitigation goals, objectives and related potential actions. For each goal, one or more objectives have been identified that provide strategies to attain the goal. Where appropriate, the City has identified a range of specific actions to achieve the objective and goal.

The goals and objectives were developed by considering the risk assessment findings, localized hazard identification and loss/exposure estimates, and an analysis of the jurisdiction's current capabilities assessment. These preliminary goals, objectives and actions were developed to represent a vision of long-term hazard reduction or enhancement of capabilities. To help in further development of these goals and objectives, the LPG compiled and reviewed current jurisdictional sources including the City's planning documents, codes, and ordinances. In addition, City representatives met with consultant staff and/or MWDOC to specifically discuss these hazard-related goals, objectives and actions as they related to the overall Plan. The LPG members were Vivian Filippelli, Todd Miller and Jerry Vilander. Once developed, City staff presented them to the Westminster City Council for their approval.

Public meetings were held throughout the County to present these preliminary goals, objectives and actions to citizens and to receive public input. At these meetings, specific consideration was given to hazard identification/profiles and the vulnerability assessment results. The following sections present the hazard-related goals, objectives and actions as prepared by Westminster's LPG in conjunction with the Hazard Mitigation Working Group, locally elected officials, and local citizens.

**Table 5.24.6-1**
**Local Mitigation Capability Assessment**

| Agency Name (Mission/Function) | Programs, Plans, Policies, Regulations, Funding, or Practices | Title Address Phone Contact | Effect on Loss Reduction* | | | Comments |
|---|---|---|---|---|---|---|
| | | | Support | Facilitate | Hinder | |
| City of Westminster Water Division | 1. Water Division Best Management Practices | Water Superintendent 14381 Olive Street Westminster, CA 92683 714 895-2876, ext 6205 | X | X | | |
| | 2. Vulnerability Assessment | Water Superintendent 14381 Olive Street Westminster, CA 92683 714 895-2876, ext 6205 | X | X | | |
| | 3.Water Emergency Response Plan / WEROC SEMS, NIMS, WARN | Water Production Supervisor 14381 Olive Street Westminster, CA 92683 714 895-2876,ext 6206 | X | X | | |
| | 4.Urban Water Management Plan | Water Superintendent 14381 Olive Street Westminster, CA 92683 714 895-2876, ext 6205 | X | X | | |
| | 5. Water Master Plan | Water Production Supervisor 14381 Olive Street Westminster, CA 92683 714 895-2876,ext 6206 | X | X | | |

**Table 5.24.6-1 (continued)**
**Local Mitigation Capability Assessment**

| Agency Name (Mission/Function) | Programs, Plans, Policies, Regulations, Funding, or Practices | Title Address Phone Contact | Effect on Loss Reduction* | | | Comments |
|---|---|---|---|---|---|---|
| | | | Support | Facilitate | Hinder | |
| City of Westminster | 1. City General Plan | Planning Manager<br>8200 Westminster Blvd.<br>Westminster, CA 92683<br>714 898-3311, ext 255 | X | X | | |
| | 2. City Emergency Management Plan | Assistant City Manager<br>8200 Westminster Blvd.<br>Westminster, CA 92683<br>714 898-3311, ext 555 | X | X | | |
| The mission of the City of Westminster Water Division is; to provide safe, high quality drinking water and also to ensure 100 percent fire protection and adequate water pressure to the residents of Westminster; to provide these water delivery services at the lowest possible cost in a safe working environment for all City Water Division employees. | | | | | | |
| Orange County Fire Authority | 1. Inventory Program of Hazardous Waste | Assistant Chief<br>1 Fire Authority Rd.<br>Irvine, CA 92602<br>(714) 573-6100 | X | X | | |
| | 2. Fire Code Inspections | Assistant Chief<br>1 Fire Authority Rd.<br>Irvine, CA 92602<br>(714) 573-6100 | X | X | | |
| US Army Corps of Engineers | 1. Reservoir Regulation<br>Prado Dam | Director<br>Los Angeles District<br>915 Wilshire Blvd, Ste 980<br>Los Angeles, CA 90017<br>(213) 452-3908 | X | X | | |
| US Fish & Wildlife Service | 1. Enhance legitimate use & enjoyment of migratory birds & other wildlife | 370 Amapola Ave. Ste 114<br>Torrance, CA 90501<br>(310) 328-1516 | X | X | | |

**Table 5.24.6-1 (continued)**
**Local Mitigation Capability Assessment**

| Agency Name (Mission/Function) | Programs, Plans, Policies, Regulations, Funding, or Practices | Title Address Phone Contact | Effect on Loss Reduction* | | | Comments |
|---|---|---|---|---|---|---|
| | | | Support | Facilitate | Hinder | |
| U.S .Environmental Protection Agency/ Office of Drinking Water | 1. Water Quality; regulate and update drinking water quality standards. | Division of Drinking Water & Environmental Management California DHS<br>P.O. Box 942732-MS216 Sacramento, CA 94234-4320 (916) 323-6111 | X | X | | |

## 5.24.7 City of Wesminster Goals

The City of Westminster has developed two goals for their Hazard Mitigation Plan.

Goal 1. Minimize damages to facilities / infrastructure due to natural disasters

Goal 2. Reduce potential loss and injury to human life and to existing assets, facilities, and infrastructure due to human caused hazards

## 5.24.8 Objectives and Actions

**Goal 1: Minimize damages to facilities / infrastructure due to natural disasters**

A. Protect existing assets with the highest vulnerability to the effects of natural disasters.

1. Continue inspections to ensure retrofitting is in place.
2. Secure above ground assets in all buildings and at well sites

B. Coordinate and support existing efforts to mitigate natural disaster hazards

1. Continue to use current building and infrastructure codes, standards and guidelines
2. Continue to follow current plans and guidelines

**Goal 2: Reduce potential loss and injury to human life and to existing assets, facilities, and infrastructure due to human caused hazards**

A. Develop a comprehensive approach to reduce damage and loss due to human caused hazards

1. Develop and expand cooperation with all outside agencies regarding human caused hazards.

2. Continue and expand education for administrative personnel on possible human caused hazards.

B. Increase the knowledge of government employees and the public of extremely hazardous substance handling procedures and terrorism awareness.

1. Continue and expand OSHA training for all employees who may come in contact with said materials
2. Conduct public workshops for awareness of hazardous materials incidents for government employees

**Westminster - Goals, Objectives and Actions**
**Cross-referenced with identified Hazards Within Orange County**

| Goal, Objective, and Action | Flood/Storm | Wildland/Urban Fire | Earthquake | Dam Failure/Water Tank Failure | Landslide / Mudslide | Tornado / High Winds | Tsunami | Extreme Heat/ Drought | Expansive Soils/Land Subsidence / Liquefaction | Man-Made Hazards/ Contamination |
|---|---|---|---|---|---|---|---|---|---|---|
| G1/A/1 | | | X | | | | X | | X | |
| G1/A/2 | | | X | | | | | | | X |
| G1/B/1 | X | X | X | | | X | X | | X | X |
| G1/B/2 | X | X | X | | | X | X | X | X | X |
| G2/A/1 | | | | | | | | | | X |
| G2/A/2 | | | | | | | | | | X |
| G2/B/1 | | | | | | | | | | X |
| G2/B/2 | | | | | | | | | | X |

**Table 24-1 Westminster Loss Estimation Table**

| Hazard Type | Item-> | WST | RES | WTP | PS | PRS | EIT | SC | ADM | LS | WWTP | WELL | DIEMER | OC-88 PS | PRS-MET | PP | WWTP-SOCWA | WWTP-OCSD | LS-OCSD | PWL | WWL | Total Loss Value [1] $M |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Replacement Cost | $M -> | 13.0 | 30.0 | 10.0 | 2.0 | 0.2 | 0.3 | 0.6 | 3.0 | 0.4 | 5.0 | 3.5 | 250.0 | 35.0 | 12.0 | 12.0 | 30.0 | 250.0 | 10.0 | 1.0 | 0.5 | |
| Earthquake | Number | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 45.2 | 0.0 | |
| Moderate | Exposure ($M) | $ - | $ - | $ - | $ - | $ 0.2 | $ 0.3 | $ 0.6 | $ - | $ - | $ - | $ 14.0 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 45.2 | $ - | $ 60.3 |
| | Number | 2 | 0 | 0 | 1 | 0 | 2 | 2 | 1 | 0 | 0 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 210.6 | 0.0 | |
| High | Exposure ($M) | $ 26.0 | $ - | $ - | $ 2.0 | $ - | $ 0.6 | $ 1.2 | $ 3.0 | $ - | $ - | $ 35.0 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 210.6 | $ - | $ 278.4 |
| | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | |
| Extreme | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| Flood | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 72.7 | 0.0 | |
| 100 yr | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 10.5 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 72.7 | $ - | $ 83.2 |
| | Number | 2 | 0 | 0 | 1 | 1 | 3 | 3 | 1 | 0 | 0 | 11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 182.7 | 0.0 | |
| 500 yr | Exposure ($M) | $ 26.0 | $ - | $ - | $ 2.0 | $ 0.2 | $ 0.9 | $ 1.8 | $ 3.0 | $ - | $ - | $ 38.5 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 182.7 | $ - | $ 255.1 |
| Landslide | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0.0 | |
| | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 0.1 | $ - | $ 0.1 |
| Liquifaction | Number | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 48.3 | 0.0 | |
| Moderate | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ 0.3 | $ - | $ - | $ - | $ - | $ 10.5 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 48.3 | $ - | $ 59.1 |
| | Number | 2 | 0 | 0 | 1 | 1 | 2 | 3 | 1 | 0 | 0 | 11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 207.5 | 0.0 | |
| High | Exposure ($M) | $ 26.0 | $ - | $ - | $ 2.0 | $ 0.2 | $ 0.6 | $ 1.8 | $ 3.0 | $ - | $ - | $ 38.5 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 207.5 | $ - | $ 279.6 |
| Very High | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | |
| | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| Wildlife/Structure Fire | Number | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5.7 | 0.0 | |
| Low | Exposure ($M) | $ 26.0 | $ - | $ - | $ 2.0 | $ - | $ - | $ - | $ - | $ - | $ - | $ 3.5 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 5.7 | $ - | $ 37.2 |
| | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | |
| High | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | |
| Extreme | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| | | | | | | | | | | | | | | | | | | | | | Grand Total | **$ 1,053.1** |

**[1] Loss value is asset replacement value in 2006 dollars. Value shown is found as count of assets at risk from the particular hazard times high-end unit asset value.**
**[2] Grand Total Loss value shown may include the same assets counted multiple times for different hazards.**

## 5.25 YORBA LINDA– OBJECTIVE, GOALS AND ACTIONS

The Yorba Linda Water District (Yorba Linda) reviewed a set of jurisdictional-level hazard maps including detailed critical facility information and localized potential hazard exposure/loss estimates to help identify the top hazards threatening their jurisdiction. See Section 4.0 for additional details.

Yorba Linda Loss Assessment Table is located at the end of this section.

### 5.25.2 Capability Assessment

The LPG identified current capabilities available for implementing hazard mitigation activities. The Capability Assessment (Assessment) portion of the jurisdictional mitigation plan identifies administrative, technical, legal and fiscal capabilities. This includes a summary of departments and their responsibilities associated to hazard mitigation planning as well as codes, ordinances, and plans already in place associated to hazard mitigation planning. The second part of the Assessment provides Yorba Linda's fiscal capabilities that may be applicable to providing financial resources to implement identified mitigation action items.

### 5.25.3 Existing Institutions, Plans, Policies and Ordinances

The legal and regulatory capabilities of Yorba Linda are shown in Table 5.25.4-1, which presents the existing ordinances and codes that affect the physical or built environment of Yorba Linda. Examples of legal and/or regulatory capabilities can include: the District's building codes, zoning ordinances, subdivision ordinances, special purpose ordinances, growth management ordinances, site plan review, general plans, capital improvement plans, economic development plans, emergency response plans, and real estate disclosure plans.

### 5.25.4 Legal and Regulatory Capability

**Table 5.25.4-1**
**Legal and Regulatory Capability**

| Regulatory Tools (ordinances, codes, plans) | Local Authority (Yes/No) | State Authority (Yes/No) | County/Fed Authority (Yes/No) | Comments |
|---|---|---|---|---|
| A. Building code | Yes | Yes | No | Local Cities<br>OCFA |
| B. Zoning ordinance | Yes | No | No | |
| C. Subdivision ordinance or regulations | No | No | No | |

**Table 5.25.4-1 (continued)**
**Legal and Regulatory Capability**

| Regulatory Tools (ordinances, codes, plans) | Local Authority (Yes/No) | State Authority (Yes/No) | County/Fed Authority (Yes/No) | Comments |
|---|---|---|---|---|
| D. Special purpose ordinances (floodplain management, storm water management, hillside or steep slope ordinances, wildfire ordinances, hazard setback requirements) | No | No | No | SAWPA<br>CD Forestry<br>State Parks |
| E. Growth management ordinances (also called "smart growth" or anti-sprawl programs) | Yes | No | No | LAFCO |
| F. Site plan review requirements | Yes | No | Yes | Orange County Fire Authority |
| G. General or comprehensive plan | Yes | Yes | No | Negative Declarations<br>YLWD water master plan |
| H. A capital improvements plan | Yes | No | No | YLWD Board of Directors |
| I. An economic development plan | No | No | No | Water District is an independent agency |
| J. An emergency response plan | Yes | No | No | SEMS, NIMS,WEROC |
| K. A post-disaster recovery plan | Yes | No | No | NIMS |
| L. A post-disaster recovery regulation | Yes | Yes | No | Cities, County, State, Dept of Health Services |
| M. Real estate disclosure requirements | No | Yes | No | Board of Realtors<br>Placentia Yorba School Dist |
| N. Air Quality Emissions | Yes | Yes | No | SCAQMD |
| O. Construction Safety Practices | Yes | Yes | No | Cal OSHA |
| P. Pressure Vessel | Yes | Yes | No | State Dept. of Ind. Safety |
| Q. Wildlife | Yes | Yes | Yes | Wildlife Corridor Conserv. Authority(WCCA)<br>USFWS |
| R. Seismicity / Geology | Yes | Yes | No | Calif. Div of Mines and Geology |
| S. Archeological/Paleontology | No | Yes | No | Local University and Associations |
| T. Water Discharge Requirements | No | Yes | No | State Water Resources Control Board |

### 5.25.5 Administrative and Technical Capacity

The following is a summary of existing departments in Yorba Linda and their responsibilities related to hazard mitigation planning and implementation, as well as existing planning documents and regulations related to mitigation efforts within the community. The administrative and technical capabilities of Yorba Linda, as shown in Table 5.25.5-1, provides an identification of the staff, personnel, and department resources available to implement the actions identified in the mitigation section of the Plan. Specific resources reviewed include those involving technical personnel such as planners/engineers with knowledge of land development and land management practices, engineers trained in construction practices related to building and infrastructure, planners and engineers with an understanding of natural or manmade hazards, floodplain managers, surveyors, personnel with GIS skills and scientists familiar with hazards in the community.

**Table 5.25.5-1**
**Administrative and Technical Capacity**

| Staff/Personnel Resources | Yes/No | Department/Agency and Position |
|---|---|---|
| A. Planner(s) or engineer(s) with knowledge of land development and land management practices | Yes | Hunsaker & Associates, Doug Snyder, PE<br>Principal of Planning, Engineering, Surveying |
| B. Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure | Yes | Parsons Inc., Richard Bentwood, PE<br>Program Manager of Water and Infrastructure Division |
| C. Planners or Engineer(s) with an understanding of natural and/or human-caused hazards | Yes | Carollo Engineers, Brian Powell, PE<br>Program Manager, Security Vulnerability |
| D. Floodplain manager | No | County of Orange, Storm Water Department, RDMD |
| E. Surveyors | Yes | Leighton Consulting, Inc., Tom Benson Jr. PE, GE<br>President of Geotech, Environ, Inspection Engr. |
| F. Staff with education or expertise to assess the community's vulnerability to hazards | Yes | City of Yorba Engineering Staff, Mark Stowell, Director of Public Works<br>Yorba Linda Water District Engineering Staff<br>Ken Vecchiarelli, Engineering Manager |
| G. Personnel skilled in GIS and/or HAZUS | No | DCSE Consulting, Yaz Emrani, President |
| H. Scientists familiar with the hazards of the community | No | Cal Tech Seismology Department, Dr. Kate Hutton, PHD. |
| I. Emergency manager | No | County of Orange Fire Authority<br>Kelly Hubbard, WEROC coordinator, Michael A. Payne, GM Yorba Linda Water District |

**Table 5.25.5-1 (continued)**
**Administrative and Technical Capacity**

| Staff/Personnel Resources | Yes/No | Department/Agency and Position |
|---|---|---|
| J. Grant writers | Yes | Townsend Public Affairs, Sean Fitzgerald, Consultant, writer. |
| K. Public Information | Yes | Mike Robinson, PID |

## 5.25.6 Fiscal Capability

Table 5.25.6-1 shows specific financial and budgetary tools available to Yorba Linda such as community development block grants; capital improvements project funding; authority to levy taxes for specific purposes; fees for water, sewer, gas, or electric services; impact fees for homebuyers or developers for new development; ability to incur debt through general obligations bonds; and withholding spending in hazard-prone areas.

**Table 5.25.6-1**
**Fiscal Capability**

| Financial Resources | Accessible or Eligible to Use (Yes/No/Don't Know) |
|---|---|
| Community Development Block Grants (CDBG) | No |
| Capital improvements project funding | Yes, YLWD Capital Budget 5 yr. |
| Authority to levy taxes for specific purposes | Yes, Special Assessment Areas |
| Fees for water, sewer, gas, or electric service | Yes, for reimbursement of Water |
| Impact fees for homebuyers or developers for new developments/homes | Yes, Water Development fees |
| Incur debt through general obligation bonds | Yes, for Capital Projects |
| Incur debt through special tax and revenue bonds | Yes |
| Incur debt through private activity bonds | No |
| Withhold spending in hazard-prone areas | Don't' Know |

### 5.25.7 Local Mitigation Capability Assessment

Listed below are Yorba Linda's specific hazard mitigation goals, objectives and related potential actions. For each goal, one or more objectives have been identified that provide strategies to attain the goal. Where appropriate, the District has identified a range of specific actions to achieve the objective and goal.

The goals and objectives were developed by considering the risk assessment findings, localized hazard identification and loss/exposure estimates, and an analysis of the jurisdiction's current capabilities assessment. These preliminary goals, objectives and actions were developed to represent a vision of long-term hazard reduction or enhancement of capabilities. To help in further development of these goals and objectives, the LPG compiled and reviewed current jurisdictional sources including the District's planning documents, codes, and ordinances. In addition, District representatives met with consultant staff and/or MWDOC to specifically discuss these hazard-related goals, objectives and actions as they related to the overall Plan. Once developed, District staff presented them to the Yorba Linda Board of Directors for their approval.

Public meetings were held throughout the County to present these preliminary goals, objectives and actions to citizens and to receive public input. At these meetings, specific consideration was given to hazard identification/profiles and the vulnerability assessment results. The following sections present the hazard-related goals, objectives and actions as prepared by Yorba Linda's LPG in conjunction with the Hazard Mitigation Working Group, locally elected officials, and local citizens.

**Table 5.25.7-1**
**Local Mitigation Capability Assessment**

| Agency Name (Mission/Function) | Programs, Plans, Policies, Regulations, Funding, or Practices | Point of Contact Name, Address, Phone, Email | Effect on Loss Reduction* | | | Comments |
|---|---|---|---|---|---|---|
| | | | Support | Facilitate | Hinder | |
| City of Yorba Linda | 1. Old Town Redevelopment | Planning Dept. City of YL | X | X | | Water Mstr. Plans included Old Town |
| Metropolitan Water District of So Cal | 1. Cross Feeder-City of Placentia | MET Engineering | X | X | | Provide additional off-site water supply |
| Orange County Water District | 1. Ground Water Replenishment Program | General Manager, OCWD | X | X | | Provide added water to local aquifer |

**Table 5. 25.7-1 (continued)**
**Local Mitigation Capability Assessment**

| Agency Name (Mission/Function) | Programs, Plans, Policies, Regulations, Funding, or Practices | Point of Contact Name, Address, Phone, Email | Effect on Loss Reduction* | | | Comments |
|---|---|---|---|---|---|---|
| | | | Support | Facilitate | Hinder | |
| Orange County Fire Authority | 1. General Fire Plan of Orange County | Fire Marshall of OCFA | X | X | | Reviews all plans for major developm't |
| Homeland Security, Federal Goverm't | 1. Security Vulnerability Plan | USEPA Haz Mitigation Director | X | X | | Completed and working document |
| Yorba Linda Water District | 1. Capital Improvement Program | Ken Vecchiarelli, Assist. Gen. Manager | X | X | | Approved by the Board of Directors |
| | 2. Annexations | same | X | X | | Areas in Master Plan |
| | 3. New Admin Bldg | Bill Moorhead, Sr. Project Engineer | X | X | | Awaiting Plan Check Approval |
| | 4. Zone 3 Pipeline Replacement | Scott Moulton, Project Engineer | X | X | | Identified in Replcm't program |
| | 5. | | | | | |

## 5.25.8 Yorba Linda WD Goals

Yorba Linda Water District is a member of the Water Emergency Response Organization of Orange County (WEROC) and is actively participating in preparing a Hazard Mitigation Plan for natural and human-caused hazards within the District service area.

**Goal 1: Reduce the possibility of damage and losses to existing assets, critical facilities and buildings due to Earthquakes.**

1. Develop comprehensive approach to reducing the possibility of damage and losses due to earthquake to the Districts critical facilities.

2. Provide training for in-house staff for identifying any structural defects of critical facilities within the extreme and moderate earthquake threat zones.
3. Replace the 1909 Highland Reservoir and design its replacement to latest UBC Seismic Codes.
4. Identify existing water storage tanks which do not have any seismic monitoring systems and develop a capital improvement plan to implement.
5. Develop a policy and protocol for evaluating any structural damage of critical structures and facilities.
6. Identify all reservoirs, booster stations, building facilities built prior to1972 UBC
7. Obtain Seismic Codes and design calculations for structural review.

**Goal 2: Reduce the possibility of damage and losses to existing assets, people, private property, and critical facilities/infrastructure due to floods.**

1. Develop comprehensive approach to reducing the possibility of damage and losses due to floods.
2. Identify the threat of flood on District's critical facilities /infrastructure.
3. Identify District facilities that have limited storm drainage and flood control measures.
4. Protect existing assets with the highest relative vulnerability to the effects of floods within the 100-year floodplain.
5. Construct a storm drainage system for Richfield's well production site to avoid on-site flooding.
6. Coordinate efforts with other internal and external agencies to monitor impending storms.

**Goal 3: Strengthen the District Emergency Response services to insure preparedness during a major natural hazard event.**

1. Provide NIMS and SEMS training for all existing and new employees per OES and FEMA guidelines.
2. Conduct semi-annual emergency response training exercises for District staff: the first year with an outside Emergency Planning consultants, then self-training the following years.
3. Participate and coordinate with Water Emergency Response Organization of Orange County (WEROC) and other member agencies in hazard preparedness.
4. Insure the District has sufficient equipment, materials, and communications hardware to respond and recover from natural hazards.

5. Develop mutual aid response teams, training, and exercises for natural hazards with local member agencies.
6. Prepare an emergency response preparedness brochure for the local community identifying all types of natural hazards.

**Goal 4: Protect Yorba Linda Water District assets from a major Earthquake event.**

1. Perform a seismic study analysis for all District structures and facilities.
2. Update the District standard specification to comply with latest UBC seismic design codes for structures and pipelines.
3. Conduct routine site inspections of District structure and facilities and report any structural deficiencies.
4. Retain a registered structural engineer to evaluate any reported structural defects, conducting facilities inspections, and recommend mitigation measures.
5. Adopt Structural Design Criteria which will resist the most severe earthquake of 8.0.
6. Build redundancy into the District's water supply source to mitigate major structural defects to its main transmission water pipelines.

**Goal 5: Reduce the High Fire Threat to the District facilities/infrastructure.**

1. Develop a comprehensive approach to reducing the possibility of damage and losses due to structural fire/ wildfire.
2. Create a fire management plan outlining various impacted District facilities and vulnerabilities.
3. Share all District infrastructures/building information with local, county, and state fire agencies.
4. Adopt a District policy for design of non-combustible facilities to reduce the threat and impact of Wildfire on structures.
5. Provide redundant underground communication systems for critical facilities to insure reliability of District operating systems.
6. Provide routine maintenance around District facilities to avoid the chance of fire threat and reducing the fuel source.

**Goal 6: Reduce the possibility of damage and losses to existing assets and critical facilities and infrastructure due to risk of landslide or mudslide.**

1. Develop a comprehensive approach to reducing the possibility of damage and losses due to landslide or mudslide.
2. Create a landslide management plan outlining various impacted District facilities and vulnerabilities.
3. Identify all District infrastructures/building currently within the high risk landslide or mudslide areas.
4. Adopt a District policy for design of facilities to reduce the threat and impact of landslide and or mudslide on structures.
5. Protect existing assets with a high relative vulnerability to the effect of landslide or mudslide.
6. Provide routine maintenance around District facilities to avoid the chance of landslide or mudslide by maintaining slopes and plantings within the slide area.

**Goal 7: Increase the reliability of District power and communication systems due to the risk of high wind/Santa Ana wind condition.**

1. Survey the District power and communication systems facilities and develop back-up plan for operating during downed power and telephone lines.
2. Provide back-up mobile utility systems in addition to the regular power and telephone infrastructure equipment.
3. Build an underground redundant cable network to avoid loss of communications due to downed power/telephone poles.
4. Reinforce current structures to withstand a high Santa Ana wind condition or micro burst of high wind.
5. Establish working relationships with local, county, and state agencies, which include information sharing and monitoring of impending events.
6. Educate employees of the potential hazards of high winds/Santa Ana condition.

**Goal 8: Reduce the possibility of damage and losses to existing District assets and critical facilities and infrastructure due to liquefaction.**

1. Develop a comprehensive approach to reducing the possibility of damage and losses due to liquefaction.
2. Create a comprehensive risk analysis of liquefaction areas or zones.
3. Survey District facilities to determine if any are in medium to high threat liquefaction zones.
4. Review District standards and specifications and modify, add, change design criteria to reflect risk of liquefaction including the new Administration building on the Richfield operations site.
5. Educate District employees of the potential hazards of liquefaction to District assets.
6. Review the local city ordinances regarding building codes and development within the liquefaction zones.

**Goal 9: Reduce potential loss and injury to human life and to existing assets, facilities, and infrastructure due to human caused hazards.**

1. Develop a comprehensive approach to reducing the possibility of damage and losses due to human-caused hazards.
2. Protect existing assets with the highest relative vulnerability to the effects of human-caused hazards.
3. Provide training for District employees and other personnel for security on danger signs.
4. Submit applications for grant money for security related facilities for the high risk items.
5. Develop full cooperation with all outside agencies regarding human caused hazards.
6. Conduct education for administrative personnel and other decision makers on the possibility of human caused hazards.

**Goal 10: Promote public understanding, support and demand for hazard mitigation.**

1. Educate the public awareness of hazards and opportunities for mitigation actions to local residents and businesses.
2. Hold public meetings prior to this plan, and hold semi-annual meetings addressing mitigation.
3. Promote a partnership between the local, county, and state governments to identify, prioritize, and implement mitigation actions.

4. Promote hazard mitigation in the business community.
5. Use the public media to cover mitigation activities.
6. Publish bi-monthly newsletters for the public and business leaders with information regarding hazardous mitigation of natural and man-made hazards.

**Goal 11: Reduce potential loss and injury to human life and to existing assets, critical facilities, and infrastructure due to Dam Failure/Water Tank Failure.**

1. Develop a comprehensive approach to reducing the possibility of damage and losses due to Dam and Water Tank Failure hazards.
2. Protect existing assets with the highest relative vulnerability to the effects of failure of the Prado Dam and Bastanchury 2 MG water tank failure.
3. Provide training on security for District employees and other personnel on danger signs in and around these local facilities.
4. Coordinate with and support existing efforts to mitigate dam failure with the Army Corp of Engineers, and Orange County Flood Control District.
5. Coordinate with and support existing efforts to mitigate Bastanchury Water Tank failure with City of Yorba Linda and Hover Development.
6. Develop full cooperation with all outside agencies regarding Prado Dam failure and/or Bastanchury Water Tank failure.

**Goal 12: Reduce potential loss and injury to human life and to existing assets, critical facilities, and infrastructure due to Hazardous Material Release into the groundwater basin.**

1. Develop a comprehensive approach to reducing the possibility of damage and degradation of water quality due to a hazardous material release to the underground groundwater basin.
2. Protect existing water quality assets with the highest relative vulnerability to the effects of hazardous material release in the Santa Ana River watershed basin.
3. Provide training on security for District employees and other personnel on danger signs of a hazardous material release.
4. Identify all major fuel pipelines, rail transportation corridors, manufacturing facilities, and their relative vulnerability of any hazardous material releases to the groundwater basin.
5. Develop full cooperation with all outside agencies regarding human caused hazards.
6. Publish bi-monthly newsletters for the public with information regarding hazardous materials and proper disposal.

**YLWD - Goals, Objectives and Actions**
**Cross-referenced with identified Hazards Within Orange County**

| Goal, Objective, and Action | Flood/Storm | Wildland/Urban Fire | Earthquake | Dam Failure/Water Tank Failure | Landslide / Mudslide | Tornado / High Winds | Tsunami | Extreme Heat/ Drought | Expansive Soils/Land Subsidence / Liquefaction | Man-Made Hazards/ Contamination |
|---|---|---|---|---|---|---|---|---|---|---|
| G1/1 | | | X | X | | | | | X | |
| G1/2 | | | X | X | | | | | X | |
| G1/3 | | | X | X | | | | | | |
| G1/4 | | | X | X | | | | | | |
| G1/5 | X | X | X | X | X | X | | | X | X |
| G1/6 | | | X | X | | | | | | |
| G1/7 | | | X | X | | | | | | |
| G2/1 | X | | | | X | | | | | |
| G2/2 | X | | | | X | | | | | |
| G2/3 | X | | | | | | | | | |
| G2/4 | X | | | X | | | | | | |
| G2/5 | X | | | | | | | | | |
| G2/6 | X | | | X | X | | | | | |
| G3/1 | X | X | X | X | X | X | | X | X | X |
| G3/2 | X | X | X | X | X | X | | X | X | X |
| G3/3 | X | X | X | X | X | X | | X | X | X |
| G3/4 | X | X | X | X | X | X | | X | X | X |
| G3/5 | X | X | X | X | X | X | | X | X | X |
| G3/6 | X | X | X | X | X | X | | X | X | X |
| G4/1 | | | X | X | | | | | X | |
| G4/2 | | | X | X | | | | | | |
| G4/3 | X | X | X | X | X | X | | | X | |
| G4/4 | X | X | X | X | X | X | | | X | |
| G4/5 | | | X | | | | | | | |
| G4/6 | X | | X | X | X | | | | X | |
| G5/1 | | X | | | | | | | | |
| G5/2 | | X | | | | | | | | |
| G5/3 | | X | | | | | | | | |
| G5/4 | | X | | | | | | | | |
| G5/6 | | X | | | | | | | | |
| G6/1 | | | | | X | | | | | |
| G6/2 | | | | | X | | | | | |
| G6/3 | | | | | X | | | | | |
| G6/4 | | | | | X | | | | | |
| G6/5 | | | | | X | | | | | |
| G6/6 | | | | | X | | | | | |
| G7/1 | | | | | | X | | | | |
| G7/2 | | | | | | X | | | | |
| G7/3 | | | | | | X | | | | |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| G7/4 | | | | | | X | | | | |
| G7/5 | | | | | | X | | | | |
| G7/6 | | | | | | X | | | | |
| G8/1 | | | | | | | | | X | |
| G8/2 | | | | | | | | | X | |
| G8/3 | | | | | | | | | X | |
| G8/4 | | | | | | | | | X | |
| G8/5 | | | | | | | | | X | |
| G8/6 | | | | | | | | | X | |
| G9/1 | | | | | | | | | | X |
| G9/2 | | | | | | | | | | X |
| G9/3 | | | | | | | | | | X |
| G9/4 | | | | | | | | | | X |
| G9/5 | | | | | | | | | | X |
| G9/6 | | | | | | | | | | X |
| G10/1 | X | X | X | X | X | X | | X | X | X |
| G10/2 | X | X | X | X | X | X | | X | X | X |
| G10/3 | X | X | X | X | X | X | | X | X | X |
| G10/4 | X | X | X | X | X | X | | X | X | X |
| G10/5 | X | X | X | X | X | X | | X | X | X |
| G10/6 | X | X | X | X | X | X | | X | X | X |
| G11/1 | | | | X | | | | | | |
| G11/2 | | | | X | | | | | | |
| G11/3 | | | | X | | | | | | |
| G11/4 | | | | X | | | | | | |
| G11/5 | | | | X | | | | | | |
| G11/6 | | | | X | | | | | | |
| G12/1 | | | | | | | | | | X |
| G12/2 | | | | | | | | | | X |
| G12/3 | | | | | | | | | | X |
| G12/4 | | | | | | | | | | X |
| G12/5 | | | | | | | | | | X |
| G12/6 | | | | | | | | | | X |

**Table 5.25-1 Yorba Linda Loss Estimation Table**

| Hazard Type | Item-> | WST | RES | WTP | PS | PRS | EIT | SC | ADM | LS | WWTP | WELL | DIEMER | OC-88 PS | PRS-MET | PP | WWTP-SOCWA | WWTP-OCSD | LS-OCSD | PWL | WWL | Total Loss Value [1] $M |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Replacement Cost | $M -> | 13.0 | 30.0 | 10.0 | 2.0 | 0.2 | 0.3 | 0.6 | 3.0 | 0.4 | 5.0 | 3.5 | 250.0 | 35.0 | 12.0 | 12.0 | 30.0 | 250.0 | 10.0 | 1.0 | 0.5 | |
| Earthquake | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | |
| Moderate | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| | Number | 1 | 0 | 0 | 1 | 8 | 4 | 0 | 1 | 1 | 0 | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 18.1 | 6.0 | |
| High | Exposure ($M) | $ 13.0 | $ - | $ - | $ 2.0 | $ 1.6 | $ 1.2 | $ - | $ 3.0 | $ 0.4 | $ - | $ 28.0 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 18.1 | $ 3.0 | $ 70.3 |
| | Number | 12 | 0 | 0 | 11 | 29 | 6 | 4 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 53.7 | 4.7 | |
| Extreme | Exposure ($M) | $ 156.0 | $ - | $ - | $ 22.0 | $ 5.8 | $ 1.8 | $ 2.4 | $ 3.0 | $ - | $ - | $ 3.5 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 53.7 | $ 2.4 | $ 250.6 |
| Flood | Number | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3.5 | 0.9 | |
| 100 yr | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ 0.6 | $ - | $ - | $ - | $ - | $ 7.0 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 3.5 | $ 0.4 | $ 11.6 |
| | Number | 0 | 0 | 0 | 0 | 1 | 3 | 0 | 1 | 0 | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6.5 | 0.6 | |
| 500 yr | Exposure ($M) | $ - | $ - | $ - | $ - | $ 0.2 | $ 0.9 | $ - | $ 3.0 | $ - | $ - | $ 24.5 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 6.5 | $ 0.3 | $ 35.4 |
| Landslide | Number | 10 | 0 | 0 | 5 | 10 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12.6 | 0.3 | |
| | Exposure ($M) | $ 130.0 | $ - | $ - | $ 10.0 | $ 2.0 | $ - | $ 1.2 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 12.6 | $ 0.2 | $ 156.0 |
| Liquifaction | Number | 0 | 0 | 0 | 0 | 3 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | |
| Moderate | Exposure ($M) | $ - | $ - | $ - | $ - | $ 0.6 | $ 1.8 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 2.4 |
| | Number | 0 | 0 | 0 | 1 | 1 | 2 | 0 | 1 | 0 | 0 | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9.2 | 0.1 | |
| High | Exposure ($M) | $ - | $ - | $ - | $ 2.0 | $ 0.2 | $ 0.6 | $ - | $ 3.0 | $ - | $ - | $ 31.5 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 9.2 | $ 0.1 | $ 46.5 |
| Very High | Number | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | |
| | Exposure ($M) | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| Wildlife/Structure Fire | Number | 1 | 0 | 0 | 2 | 9 | 0 | 1 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8.8 | 0.6 | |
| Low | Exposure ($M) | $ 13.0 | $ - | $ - | $ 4.0 | $ 1.8 | $ - | $ 0.6 | $ - | $ - | $ - | $ 7.0 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 8.8 | $ 0.3 | $ 35.5 |
| | Number | 7 | 0 | 0 | 4 | 3 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5.1 | 0.2 | |
| High | Exposure ($M) | $ 91.0 | $ - | $ - | $ 8.0 | $ 0.6 | $ - | $ 1.2 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 5.1 | $ 0.1 | $ 106.0 |
| | Number | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | |
| Extreme | Exposure ($M) | $ 13.0 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ 0.0 | $ - | $ 13.0 |
| | | | | | | | | | | | | | | | | | | | | | Grand Total | **$ 727.3** |

**[1] Loss value is asset replacement value in 2006 dollars. Value shown is found as count of assets at risk from the particular hazard times high-end unit asset value.**
**[2] Grand Total Loss value shown may include the same assets counted multiple times for different hazards.**

# SECTION 6 PLAN MAINTENANCE

This section of the Plan describes the formal process that will ensure that the Plan remains an active and relevant document. The Plan maintenance process includes a schedule for monitoring and evaluating the Plan annually and producing a plan revision every five years. This section describes how MWDOC and the participating districts and agencies will integrate public participation throughout the plan maintenance process. Finally, this section includes an explanation of how jurisdictions intend to incorporate the mitigation strategies outlined in this plan into existing planning mechanisms.

## 6.1 MONITORING, EVALUATING AND UPDATING THE PLAN

### 6.1.1 Plan Monitoring

The PWU participants will be responsible for monitoring the plan annually for updates to jurisdictional goals, objectives, and action items. If needed, these participants will coordinate through the MWDOC to integrate these updates into the Plan. MWDOC will be responsible for monitoring the overall Plan for updates on an annual basis.

### 6.1.2 Plan Evaluation

The Plan will be evaluated by MWDOC and by each participating jurisdiction at least every two years to determine the effectiveness of programs, and to reflect changes in land development or programs that may affect mitigation priorities. The Plan will also be re-evaluated by HMWG leads (or their select jurisdictional representative) based upon the initial STAPPLEE criteria used to draft goals, objectives, and action items for each jurisdiction. MWDOC and PWU representatives will also review the goals and action items to determine their relevance to changing situations in the county, as well as changes in State or Federal regulations and policy. MWDOC and PWU representatives will also review the risk assessment portion of the Plan to determine if this information should be updated or modified, given any new available data. The coordinating organizations responsible for the various action items will report on the status of their projects, the success of various implementation processes, difficulties encountered, success of coordination efforts, and which strategies should be revised. Any updates or changes necessary will be forwarded to MWDOC for inclusion in further updates to the Plan. It is envisioned that the HMWG and each Local Mitigation Planning Team will meet annually to discus the status of the Plan.

### 6.1.3 Plan Updates

MWDOC is the responsible agency for updates to the Plan working in conjunction with the PWU's. All PWU participants will be responsible to provide MWDOC with jurisdictional-level updates to the Plan when/if necessary as described above. Every five years the updated plan will be submitted to COESS and FEMA for review.

### 6.1.4 Implementation Through Existing Programs

County and local jurisdictions will have the opportunity to implement recommended action items through existing programs and procedures that are deemed appropriate. Upon adoption of the Plan, the multi-

jurisdictional participants can use the Plan as a baseline of information on the natural hazards that impact their jurisdictions. They will also be able to refer to existing institutions, plans, policies and ordinances defined for each jurisdiction in Section 5 of the Plan (e.g., General Plan, Comprehensive Plan).

### 6.1.5 Continued Public Involvement

MWDOC is dedicated to involving the public directly in review and updates of the Plan. MWDOC and a representative from each participating jurisdiction will be responsible for monitoring, evaluating, and updating the Plan as described above. During all phases of plan maintenance the public will have the opportunity to provide feedback.

A copy of the Plan will be publicized and available for review on the MWDOC website (without the detailed information). In addition, copies of the plan will be catalogued and kept at all of the appropriate agencies in the county. The existence and location of these copies will also be posted on the county website. The site will contain contact information for members of the HMWG to which people can direct their comments and concerns. All public feedback will be forwarded to the appropriate jurisdiction for review and incorporation (if deemed appropriate). This information will also be forwarded to MWDOC, responsible for keeping track of public comments on the plan.

A press release requesting public comments will also be issued after each evaluation or when deemed necessary by the HMWG. The press release will direct people to the website or appropriate local agency location where the public can review proposed updated versions of the Plan. This will provide the public an outlet for which they can express their concerns, opinions, or ideas about any updates/changes that are proposed to the Plan. The County Emergency Services Coordinator will be responsible for using county resources to publicize the press releases and maintain public involvement through public access channels, web pages, and newspapers as deemed appropriate.

# SECTION 7 REFERENCES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Five Earthquake Scenario Ground Motion Maps for Northern Orange County, July 22, 2005, prepared by Earth Consultants International for Municipal Water District of Orange County.

Asset Management Plan 2005, Orange County Sanitation District, June 2005, prepared by staff and GHD.

# Appendices

Appendix A HMWG Meetings
- A-1 October 2005 Meeting
- A-2: November 2005 Meeting
- A-3: December 2005 Meeting
- A-4: February 2006 Meeting
- A-5: April 2006 Meeting
- A-6: June 2006 Meeting
- A-7: August 2006 Meeting

Appendix B Public Workshops
- B-1: Summary
- B-2: Quick Question Sheet

Appendix C Public Notification
- C-1: October 17, 2005
- C-2: July 5, 2006
- C-3: August 25, 2006

Appendix D Executive Summary of the Value of a Reliable Water Supply

Appendix E MWDOC Hazard Mitigation Data Matrix

Appendix F Participating Jurisdiction Adoption of Plan Letters

Appendix G CA OES Local Hazard Mitigation Plan Crosswalk

# Appendix A-1: October 2005 Meeting

**MWDOC KICKOFF MEETING AGENDA**
October 18, 2005

**Introduction to Team and Project Goals**

- URS Presentation
- Work Group Responsibilities
- Mitigation Planning Process
- Schedule

**Information Sensitivity**

- For Official Use Only (FOUO)

**Definition of Key Terms**

- State Hazard Mitigation Plan Terms

**Local Planning Team**

- Members
- Next Steps

**Preliminary Hazard Identification**

- Hazards Identified
- Hazard Profiles
- Assets
- Vulnerability Analysis

**Next Steps/Q&A**

**Future Meeting Schedule**

**Assignments**

**MWDOC Meeting Summary**
**October 18, 2005**
**9:30 a.m. – 11:30 a.m.**

Kelly Hubbard (WEROC) opened the meeting with a brief summary of the project and self introductions were provided. Kelly introduced URS as the consultant hired to prepare the hazard mitigation plan for the water districts. Diane Douglas (URS), Project Manager, summarized URS qualifications to prepare the hazard mitigation plan.

Diane initiated the presentation prepared to introduce hazard mitigation planning to the group and requested that the group perceive the presentation as an open-ended discussion. She encouraged questions throughout the presentation, rather than waiting until the end of the presentation. All group members were asked to state their name and affiliation when they asked questions so special information requested by them could be acquired and delivered to them in a timely manner. Diane emphasized how it was going to be critical during the planning phase to have all of the water districts co-operate as much as possible to provide information to URS in a timely manner, and to attend and actively participate in the workshops. This would be essential to keep the costs down and prepare a document that would be approved by FEMA.

Important Notes:

- Participants were recommended to review the Orange County HMP. Review the hazards identified by the Hazard Mitigation Working Group (HMWG) so to determine if they wanted any additional hazards addressed in their plan. Kelly will provide a copy of the document to all participants at the November meeting.
- It is important for each utility to identify the hazards that threaten their critical facilities and infrastructure.
- Diane led a discussion on the security of URS' GIS servers, and approach to confidential data. URS signed a confidentiality agreement with MWDOC indicating that no information shared from any participant would be shared beyond the URS project team, and that none of it would appear in the public portion of the HMP.

**Questions asked during the course of the presentation, or concerns expressed include followed by URS answers follow:**

Karl Seckel (MWDOC): Is there a focus on response & recovery and less money available for mitigation?

Diane: Further down the road FEMA will be shifting the funding policies. If you don't have a plan you won't be eligible for funding. They will look at whether you tried to make a plan, are working on a plan, or have a plan.

Theresa Mortiz (Newport Beach): Affirmation that information on all my facilities, all reservoirs is required? Who will have access to that data?

Diane: There is separation between confidential data, like critical facilities data, that will be protected by the confidentiality agreement that even during the public meetings there is no loss of security. There is a necessary component of public participation. Those discussions will involve hazard threats and general concepts but no specific data or maps of the critical facilities and infrastructure.

Douglas: Is most of each district's data in GIS?

Theresa: About half-and-half.

Kelly: WEROC has some of the data for each water district and between our data and their data we should almost cover the entire necessary infrastructure, critical facilities.

Theresa: Do we have to include things like offices, control stations?

Diane: It does help us. We need to get down to even the financial level as to how you get your funding, security, etc. FEMA needs to know where your money comes from in order to know how much they may need to reimburse you in the case of an event.

Diane: What kind of security do you have? Is it provided by the city, private, etc.?

Kelly: Varies per agency.

Theresa: Who provides information on the hazards? Do we? Is it from everyone or just one water district or one person in each water district?

Kelly: Everyone should provide information on what they consider to be a risk.

Diane: Provided an example of the San Diego wildfires and earthquake data. "We rely on more than just local data. We go to universities, research institutes, profiles of past events, non-documented information such has verbal historical records, everything that we can get our hands on. This information is processed in a GIS database and modeled to show the hazards your facilities and infrastructure is susceptible to. Douglas reviewed how GIS works, how the hazard data is one (or several layers), community data is another layer, and critical infrastructure for each jurisdiction will constitute another layer.

Douglas then reviewed Hazard Identification Vulnerability, Risk Assessment, Vulnerability Analysis and Loss Estimate process.

Theresa: Do you want the costs to build or replace infrastructure?

Diane: Since much of your infrastructure may be several years old, it would be best to provide replacement costs. When you're considering replacement costs, or the value of mitigation versus replacement it is useful to consider what it would take to replace the facility. If a facility is damaged who do you hire to fix it? Do you use inside resources or do you go to private subcontractors? What is the temporary replacement? How much does that cost to operate?

Karl: From a facility standpoint we may have that information, but we can't estimate the cost of down time or temporary/emergency replacement. So do we need to look at population usage of our facilities?

Diane: Yes, from a critical facility standpoint this would be important. As an example, if you have a large pipe or reservoir that several districts use to provide water to the public, as well as hospitals, and other critical facilities, that is important to know. These would typically have higher priority for replacement than a pipe that serviced only a restricted and non-critical population.

Karl: We have a "Value of Water Supply Reliability" study that was completed; would that be useful to you?

Diane: Yes, that would be very useful.

Theresa: Do we need to show what fees we charge and where those fees go?

Diane: We need to know your sources of funding. If fees provide one of your major sources of funding, that is important information for us. We also need to know what grants you are eligible for, if you have partnerships with organizations that help support you, etc. This provides input to the Capability Assessment section of the HMP.

Karl: Could you use our Water Rate Funds Annual Report? It is a spreadsheet report that shows the uses of funds for general operations.

Diane: Yes that data would be useful.

Theresa: Regarding our first homework assignment, could you re-email it to me? There was a problem with the format.

Kelly: There were some formatting issues with the forms. I'll modify the format and re-send it to everybody.

Theresa: At what level do you need data for worksheet #1?

Diane: Worksheet #1 is designed more to get the working group members to start thinking about their facilities from a risk and hazard mitigation perspective. It is just general information at this stage; more specific information will be requested later.

James Matte (OCSD): What about roads that we use that may be outside of our jurisdiction? We transport/ship waste to critical facilities in other regions and we don't own all the sites we're shipping to. How do we handle that in the plan?

Diane: I'll ask FEMA how to address that issue. It would be pretty difficult to identify goals, objectives and mitigation actions for every conceivable problem along the roads you drive to multiple facilities in different counties and states. What do you do now if a road or route is closed down? Do you have alternate means of transport? Railroad?

James: We don't use railroad. If a road goes out, we follow secondary routes to the facility we deliver to.

Chuck Fowler (Buena Park): If it's a damn controlled by the Army Corp of Engineers (ACOE) that isn't under our purview, what do we do about that in the case of a dam break? How do we mitigate against something like that?

Diane: The State of California prepared a HMP to cover infrastructure and critical facilities not covered by local jurisdictions. The ACOE would have identified that hazard and mitigation measures to protect the damn from failure.

Kelly H.: There are a number of facilities owned by the water utilities that have the potential to be affected by flood waters in the event of a release at dams outside of their purview.

Diane: The state would have covered damns outside of your purview. You can consider zoning ordinances in floodplains downstream, or widening culverts, drainage ditches etc. that are in your district that would help mitigate the effect of an upstream dam failure.

Theresa: Is that part of our homework?

Diane: One of the things we need to consider in preparing the plan is what goes in the general "up-front" section of the plan and what goes in confidential appendices that address each jurisdiction's critical infrastructure. We'll need to come up with a draft outline that everyone approves of. The general section will address shared hazard vulnerabilities. Then there will be a confidential general section that will have critical infrastructure, and how to mitigate those. Individual sections will address infrastructure for each jurisdiction. What we need to carefully consider, is what level of information goes in the public document that is reviewed by FEMA and isopen to the public; and those elements that are reviewed but remain "for official use only," even by those who review it.

Karl: How specific do we get in writing actual plan? If we identify general objectives, goals and actions to mitigate against a hazard how do we expand on that during our application for funding later?

Diane: You have to mention general objectives, goals, and actions to mitigate hazards in the HMP, and then you expand on that in your application. But you have to be able to reference the HMP and demonstrate that the type of project was approved by the HMWG and the governing body who adopted the plan.

Karl: MWDOC was originally looking at doing a very specific cost-analysis for each project proposed in the HMP but realized the cost would be prohibitive at this stage. Instead, MWDOC decided to create an umbrella plan that would cover several types of projects including adding future planned projects.

Diane: URS advised MWDOC to wait for cost-benefit analysis until the HMP is approved and jurisdictions are ready to determine the cost benefit for mitigation for a specific project. She noted that districts don't want to go through an expensive effort of cost benefit analysis for all potential projects they want to implement and then have a disaster occur that changes all your future plans. She noted URS' San Francisco office has an expert on cost benefit analyses.

Theresa: Does providing more information into the HMP makes it easier later, during the project stage.

Diane: Yes.

Karl: Asks how districts put into the plan issues such as providing back up power as a form of mitigation?

Diane: Districts need to consider prioritization of electricity to their more critical facilities. Mitigating potential destruction of power stations or facilities that provide power to critical facilities should be prioritized.

Kelly: There are multiple pipelines operated by multiple parties, how do we include that data in the plan and keep it secure from outside parties; as well as note that the information applies to different jurisdictions.

Diane: Individual sections will be considered confidential. There can be one general section of the plan that would be a public document without specifically identifying infrastructure resources, and a second general section that would identify shared infrastructure that would be confidential.

Theresa: How would our individual sections be kept confidential?

Diane: If you look at the example of the San Diego Plan that is on the table, you'll see there is an upfront section that has shared data and individual chapters for each participating jurisdiction. In addition to those sections, a confidential appendix was prepared that is not open for public

purview under federal and state law. In this HMP there will be sections that show shared public data such as the hazards and non-secure critical infrastructure, and then there will be confidential sections.

Diane discussed the importance of demonstrating that the districts have cooperative agreements with other jurisdictions (cities, county), and that these jurisdictions were informed of the process. FEMA likes cooperation between jurisdictions.

Kelly: Kelly will notify the Orange County Emergency Management Organization (OCEMO), which represents most cities, the county and special districts.

Diane: Provided an overview of the process of review, editing, and approval of the HMP.
It was noted that each jurisdiction's board of directors or city council will need to approve and adopt the plan.

Theresa: Noted that different jurisdictions have different processes that take varying amounts of time, with some jurisdictions taking considerably longer than others. She wants to know how this affects overall submittal of the plan to FEMA, approval, and accessibility to funding.
Diane: Will check with Robert McCord at FEMA to see whether all jurisdictions need to have adopted the plan for individual jurisdictions who have adopted the plan to be eligible for receiving funding for a specific project. Is there a way to get councils and board members involved early to keep them from slowing down the adoption process?
Karl: MWDOC will play a role in contacting management and elected officials to urge them through the process.
Keith: There are so many agencies involved and boards. Some agencies need this plan in order to get future grants. If some of these agencies haven't approved the plan, will that slow down those the approval of funding for jurisdictions that did get approval from their boards and councils?

Kelly: Who approves first, the jurisdictions or FEMA?

Diane: FEMA. Once they have approved then it's up to the jurisdictions to approve. We haven't encountered that, where different councils have to pressure others to approve the implementation phase. I will follow-up on this.
Theresa: We need to know whether or not if I get my approval to implement that I can go get my funding for my future plans and that the lack of other jurisdictions approval won't slow down my future plans or prevent me from going ahead.

Diane reviewed the Implementation Planning process, summarizing meeting structure, who should attend, and other individuals within each jurisdiction that URS is meeting with to help implement the plan. She noted how important it is to document the process so that FEMA receives a clear record of the effort.

Theresa: What type of timetable are we looking at?

Diane: HMPs must be updated every three to five years, depending on the jurisdiction (local versus state), and once your plan is approved you have to demonstrate what you did to implement that plan in order for the plan update to get funding and approval.

Kelly: If another jurisdiction comes along and wants to join or expand upon the plan can we do that?

Diane: Yes. As an example, tribes or other jurisdictions that have not participated in a County HMP can be rolled into that plan at a plan update.

Theresa: If we address large pipes used by several jurisdictions at the general/shared level can we still address that large pipe in our own jurisdictional section?

Diane: Yes. While there will be an overall general plan section for shared infrastructure, you can also address those sections in your own jurisdiction in your section. It is important to remember that at the plan updates your jurisdiction is participating and that you are implementing the projects and plans that you set in the beginning. During the updates you will also be able to modify your goals and objectives and mitigation actions.

Theresa: We are currently working on updating our General Plan but we don't want to have to go back and continually and update and amend it. Should we wait until this HMP is done before we take our plan to council?

Kelly: Yes, you should wait if you can.

Diane reviewed the process for evaluating and revising the plan, and updating the plan. It will be important to determine whether the people who work on this portion of the plan are the ones who will participate in the implementation plan. She explained that for the San Diego implementation plan, fire chiefs and police chiefs are participating in the implementation plan, but she and the HMP team are meeting with city planners and engineers to make sure the plan is being implemented (change to ordinances, zoning changes, engineering needs).

Diane noted that during this stage and the implementation plan, it is key for the HMWG to understand that they need to be able to go back to their jurisdictions and talk to experts and document the communication process. FEMA wants to see that you've discussed all hazards, risks, goals and objectives with your jurisdiction and other participating jurisdictions very thoroughly.

Kelly: Much of the information needed for the HMP is already in agency Vulnerability Assessments and ERPs, and it just needs to be pulled from those resources.

Diane: We are scheduled to prepare the HMP in seven months and this process usually takes one year. She reiterated that everyone will need to work together to meet the project deadline. Meetings are scheduled monthly for seven months, and participation will be critical because copies of the sign-in-sheets go in the appendix. FEMA wants to see active participation.

Kelly: Asked who has submitted project applications since the January storms. Three districts respond that they have submitted Notice of Intents (NOI) for future projects.

It was requested that attendees give Kelly a list of who will be participating in the working groups and to provide a second contact for each district. The group agreed to continue to meet in the same facility on the third Tuesday of every month from 9 a.m. to noon.

**Action Items**

URS will ask FEMA about the following items:

1. Responsibility of agencies for transport routes to sites that are outside of their jurisdiction.
2. Ability of jurisdictions that are involved in a multi-jurisdiction plan to apply for mitigation grant funding if all of the jurisdictions have not yet adopted the plan.

URS will provide worksheets for the second meeting by October 26, 2005 Jurisdictions will prepare worksheet 1 and 2 and provide them to Kelly Hubbard and Diane Douglas by Nov 11. That information will be integrated into presentation to be given at the November 15, 2005 meeting.

# Kick off Meeting Sign-In Sheet, Oct 18, 2005

| **Title/ Affiliation** | **Phone/ Email/ Contact Info.** | **Phone** |
|---|---|---|
| W/Q Supervisor | zackb@garden_grove.org | |
| Supervisor City G.G. | rbermudez@garden_grove.org | 741-5917 |
| City of Buena Park Water Quality Inspector | cfowler@buenapark.com | |
| SMWD | ronm@smwd.com | 949-459-6544 |
| | | 949-574-1022 |
| MCWD | gordond@mesawater.org | x161 |
| MWDOC | kseckel@mwdoc.com | 714-593-5024 |
| Analyst/ City of New Port Beach | tmorvitz@city.newport-beach.ca.us | |
| Safety & Health Supervisor/ Orange County Sanitation District | jmatte@ocsd.com | 714-593-7155 |
| MWDOC | klyon@mwdoc.com | 714-593-5009 |
| URS Corporation | diane_douglas@urscorp.com | 619 294-9400 |
| URS Corporation | mark_carell@urscorp.com | 619 294-9400 |
| WEROC | khubbard@mwdoc.com | 714-593-5010 |

# APPENDIX A-2: NOVEMBER 15, 2005

**HAZMIT AGENDA**

**NOVEMBER 15, 2006**

**Review: "Where Are We Now?"**

**Schedule**

- Key Dates/Near-Term, Long-Term

**Risk Assessment Part 1: Hazard Identification**

- Orange County HMP Hazards Identified
- Additional Hazards?
- Man-made Hazards

**Risk Assessment Part 2: Profiling Hazards**

- Mapping Hazard "Location" (Geographic Area)
- Mapping Hazard "Extent" (Magnitude or Severity)
- Mapping/Describing "Previous Occurrences"
- Mapping/Describing "Probability of Future Events"
- FEMA Checklist

**Risk Assessment Part 3: Inventory Assets**

- Asset List (Existing and Future)
- Map locations of ALL identified assets (Existing and Future)
- Replacement Values for ALL assets (Existing and Future)
- Summary Worksheets

**Risk Assessment Part 4: Estimate Losses**

- GIS Overlay Analysis of each hazard with existing/proposed assets
- Loss Estimations based upon results

**Worksheet Roundtable**

Hands-on roundtable workshop

(review/complete Worksheets 1, 2a, 2b and 2 summary tables)

**What's Next?**

**Next Meeting – Time and Location**

ORANGE COUNTY REGIONAL WATER & WASTEWATER
MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN
Working Group Meeting #2: November 15, 2005, 9:00 AM

**Orange County Regional Water & Wastewater**
**Multi-Jurisdictional Hazard Mitigation Plan**
**Working Group Meeting No. 2**
**Sign-in Sheet**
**November 15, 2005**

| Name | District/Agency | Email Address | Phone No. |
|---|---|---|---|
| RAY McDOWELL | MNWD | RMcDOWELL@MNWD.COM | 949.425.3527 |
| Kelly Hubbard | WEROC | Khubbard@mwdoc.com | 714-593-5010 |
| RENZO MARIN | ETWD | RMARIN@ETWD.COM | (949)837-7050 |
| LES RUSTENSCHUH | GGW | Lesr@gardengrove.org | (714)225-5638 |
| Robert Bermudez | GGW | rbermudez@garden-grove.org | 741-5917 |
| BOYD LYPKA | OCWD | blypka@ocwd.com | 378-3310 |
| VIVIAN FILIPPELLI | Westminster | VFilippelli@ci.westminster.ca.us | 714 895-2876 x6205 |
| RON Meyer | SMWD | ronm@smwd | (949) 459-6594 |
| LO TAN | OCWD | Ltan@OCWD.com | (714) 378-3368 |
| KEITH LYON | MWDOC | klyon@mwdoc.com | 714 593-5009 |
| CHUCK FOWLER | BUENA PARK | CFOWLER@BUENAPARK.COM | (714) 562-3701 |
| HECTOR RUIZ | TRABUCO CANYON WD | hruiz@tcwd.ca.gov | (949) 858-0277 |

ORANGE COUNTY REGIONAL WATER & WASTEWATER
MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN
Working Group Meeting #2: November 15, 2005, 9:00 AM

**Orange County Regional Water & Wastewater**
**Multi-Jurisdictional Hazard Mitigation Plan**
**Working Group Meeting No. 2**
**Sign-in Sheet**
**November 15, 2005**

| Name | District/Agency | Email Address | Phone No. |
|---|---|---|---|
| Chuck Steinberg | Orange County Water District | STEINBERGS@OCWD.COM | (714) 378-3229 |
| Diane Douglas | URS Corp. | diane_douglas@urscorp.com | 619.294.9400 |

# APPENDIX A-3: DECEMBER 13, 2005

## AGENDA

**Review: "Where Are We Now?"**

**Schedule**

- Key Dates/Near-Term, Long-Term

**Review: Hazard Identification**

- Summary Hazard Worksheet

**Review: Profiling Hazards**

- Mapping Hazard "Location" (Geographic Area)
- Mapping Hazard "Extent" (Magnitude or Severity)
- Mapping/Describing "Previous Occurrences"
- Mapping/Describing "Probability of Future Events"

**Where We Are: Inventory Assets**

- Summary Worksheets
- Asset List (Existing and Future)
- Map locations of ALL identified assets (Existing and Future)
- Replacement Values for ALL assets (Existing and Future)

**Next Step : Estimate Losses**

- GIS Overlay Analysis of each hazard with existing/proposed assets
- Loss Estimations based upon results

**GIS Map Roundtable**

Hands-on roundtable workshop

Review 11x17 versions of overall map

**What's Next?**

**Next Meeting – Jan 17, 2006**

**City of Garden Grove, Courtyard Center**

**12732 Main Street, Garden Grove, CA 92840**

MWDOC Meeting Summary
December 13, 2005
9:00 A.M.

Kelly Hubbard of MWDOC opened the meeting with a brief summary of the Hazard Mitigation Planning project and recapped the project status. She introduced URS, the consultant hired to help prepare the hazard mitigation plan for the water/wastewater districts/agencies. Hubbard also made an announcement for 30 days of compensated volunteer need requested by FEMA to help emergency rescue plan efforts in Louisiana.

Hubbard's opening statement was followed by introductions around the room, then, Angela Leiba, URS Deputy Project Manager, introduced two new staff members working on this project, Senior GIS Analyst Camille Lill and Environmental Analyst Gulsum Rustemoglu. Lill will be responsible for coordinating with each district and/or outside agencies to obtain all assets and hazard data for the planning process. Once data is collected, Lill we be responsible for creating all maps and tables associated with the Risk Assessment portion of the plan. Rustemoglu will maintain responsibility for tracking, collecting, and helping to complete all homework assignments for each participating district/agency. Rustemoglu will also take the lead on completing the two summary worksheets that will be integrated into the Plan (the Summary Hazard Worksheet which will identify each district and their vulnerabilities to selected hazards within the region, and the Summary Assets Worksheet which is a culmination of Worksheets 1, 2a and 2b).

Following the introduction, Leiba gave a Power Point presentation summarizing the planning process and the meeting's objectives. Leiba encouraged questions throughout the presentation. She also encouraged them to review the Orange County HMP, focusing on the hazards identification, risk assessment, and mitigation strategies presented in the Plan. Leiba went over the two Summary Worksheets which were presented at the previous meeting and emphasized that both summary worksheets were required to start the next phase of the planning process. Leiba also pointed out that, the Risk Assessment portion of the plan cannot move forward without having completed data from each of the participating districts/agencies. Leiba focused on making sure each district completed their homework assignments and compiled the three worksheets from the previous meeting onto the Summary Assets Worksheet to ensure a complete listing of all existing and future assets were accounted for in the planning process. Hubbard added explanation to the group that with the passing of the Disaster Mitigation Act in 2000 federal mitigation funding would only be available to districts/agencies with a Hazard Mitigation Plan in

place. Hubbard and Leiba encouraged active involvement from the districts to help assure future mitigation funding.

After the introduction and Power Point Presentation, a round-table GIS mapping session occurred. Lill had prepared 2 copies of the current "Asset Map" including any existing/future asset information that had been provided up to date. Lill and Leiba asked each district to come review the map individually with them, review all homework assignments and verify status of their Two Summary Worksheets. While this was taking place, Hubbard and Rustemoglu worked with each district to answer questions and help complete homework assignments.

**Issues Raised at the Meeting**

- What does the term of "Function Value" exactly mean? Functional Value is the value of the assets loss (e.g. the loss of "value" of that asset). An example was given by Leiba, that if a water pump went down due to an earthquake and water was not able to be pumped to a particular neighborhood, the "loss of revenue" to the district would be considered part of it's "functional value", the loss to the Starbucks on the corner that was not able to produce coffee for it's customers was not. Rustemoglu to verify with FEMA this is the correct definition as intended for the planning process.
- The term "Critical Facilities" shows both on Worksheet 2a and on the Summary Asset Worksheet. What does the term "critical" refer to? Leiba responded that ALL district/agency assets need to be identified under that column. The word "critical" can be deleted. These FEMA worksheets were developed initially for general communities that would have critical and non-critical facilities, not water/wastewater districts.
- Districts wanted to know who they could send their data to. Members were directed them to send their data directly to Hubbard who would forward them to the respective person at URS.

**Action Items**

- Jurisdictions should submit any GIS data, maps, contact information, or asset addresses to Hubbard to be forwarded to Lill.
- A status sheet showing homework submitted, GIS data received etc. (per district/agency), and any data gaps will be sent by Rustemoglu to Hubbard by December 29, 2005.

- Districts/agencies will finalize missing parts of their homework (including Worksheets 1, 2a, and 2b, the Summary Hazard Table and the Summary Asset Table), and e-mail them to Hubbard to be forwarded to URS.

1

ORANGE COUNTY REGIONAL WATER & WASTEWATER
MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN
Working Group Meeting #3: December 13, 2005, 9:00 AM

1

MUNICIPAL WATER DISTRICT OF ORANGE COUNTY

**Orange County Regional Water & Wastewater**
**Multi-Jurisdictional Hazard Mitigation Plan**
**Working Group Meeting No. 3**
**Sign-in Sheet**
**December 13, 2005**

| Name | District/Agency | Email Address | Phone No. |
|---|---|---|---|
| Ron Meyer | SMWD | ronm@smwd.com | (949) 459-6594 |
| Steve Francis | SMWD | SteveF@SMWD.com | (949) 459-6539 |
| Keith Lyon | MWDOC | klyon@mwdoc.com | (714) 593-5009 |
| Chuck Fowler | Buena Park | cfowler@buenapark.com | (714) 562-3701 |
| Renzo Marin | ETWD | RMarin@ETWD.com | (949) 837-7050 |
| Dan Wheeler | SOCWA | DWheeler@SOCWA.com | (949) 234-5404 |
| Ray McDowell | MNWD | RMcDowell@MNWD.com | 949.425.3527 |
| Chuck Steinbergs | OCWD | STEINBERGS@OCWD.com | 714-378-3229 |
| Lo Tan | OCWD | LTAN@OCWD.COM | (714) 378-3368 |
| Boyd Lypka | OCWD | BLYPKA@OCWD.com | 714-378-3310 |
| Gordon Davis | MCWD | GORDOND@MESAWATER.ORG | 949 574-1022 X161 |
| Karl Seckel | MWDOC | Kseckel@mwdoc.com | 714 593 5024 |

ORANGE COUNTY REGIONAL WATER & WASTEWATER
MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN
Working Group Meeting #3: December 13, 2005, 9:00 AM

MUNICIPAL WATER DISTRICT OF ORANGE COUNTY

**Orange County Regional Water & Wastewater**
**Multi-Jurisdictional Hazard Mitigation Plan**
**Working Group Meeting No. 3**
**Sign-in Sheet**
**December 13, 2005**

| Name | District/Agency | Email Address | Phone No. |
|---|---|---|---|
| Vivian Filippelli | Westminster | vfilippelli@ci.westminster.ca.us | 714 895-2876 (6207) |
| Jerry Vilander | Westminster | jvilander@ci." | " |
| Teresa Moritz | City of Newport Beach | tmoritz@city.newport-beach.ca.us | 949 644-3013 |
| Kelly Hubbard | WEROC | khubbard@mwdoc.com | 714-593-5010 |
| Hector Ruiz | TCWD | hruiz@tcwd-ca.gov | 949-855-0277 |
| George Rivera | OCSD | grivera@ocsd.com | 714/593-7156 |

MUNICIPAL WATER DISTRICT OF ORANGE COUNTY

**Orange County Regional Water & Wastewater**
**Multi-Jurisdictional Hazard Mitigation Plan**
**Working Group Meeting No. 3**
**Sign-in Sheet**
**December 13, 2005**

| Name | District/Agency | Email Address | Phone No. |
|---|---|---|---|
| Kathy Barr | City of Tustin | Kbarr@tustinca.org | (714) 573-3151 |
| Joe Meyers | " | jmeyers@tustinca.org | 714 573-3173 |
| Sonny Tran | City of Orange | stran@cityoforange.org | (714) 288-2475 |
| Robert Bermudez | City of GG | rbermudez@garden-grove.org | |
| TIM DEUTSCH | City of Newport Beach | tdeutsch@city.newport-beach.ca.us. | (949) 644-3010 |

# APPENDIX A-4: FEBRUARY 14, 2006

## AGENDA

**Introductions: Kelly Hubbard**

**Power Point Presentation: Diane Douglas**

**Where Are We Now?**

- Data received to date
- Status of maps showing assets
- GIS overlay analysis of each hazard with existing/proposed assets
- Loss Estimations based upon results
- **Introduce Goals, Objectives and Action Worksheets**
- **Introduce Capability Assessment Worksheet**

**Q & A**

**BREAK 15 min**

- GIS Map Roundtable: each agency review 1:24,000 scale maps of assets
- Discuss worksheets & summary worksheets (Q & A)
- Modify Capabilities Assessment Worksheet for Water Districts

**What's Next?**

- **Next Meeting –** March 14, 2006
  City of Garden Grove, Courtyard Center

  12732 Main Street, Garden Grove, CA 92840

**HWG Meeting**

Regarding the maps:

- Chuck from OCWD said that there are things missing that should be shown. Chuck will work with Jeremy.
- Trabuco CWD – maps seem to be shifted slightly, so inaccurate and difficult to locate facilities. Suggested showing only lines that are needed.
- Westminster – Need to show some 6" lines.
- YLWD – Has 1 lift station, but City operates sewer system.
- Newport – Pump & Lift stations appear to have the same symbol. 40+ Pressure Reducing Stations missing. George will list needed changes/revisions.
- Karl – Would like less contrast in hills.

Goals:

- Good idea for agencies to provide updates to management and boards so no surprises during board approval.
- Goals should tie to other planning documents of Agency/city – consistency.
- Could use goals from the VAs, MasterPlans and Urban Water Management Plans.

Other:

- Several agencies should reference the Irvine/IRWD HazMit Plan and identify how they are connected to IRWD/Irvine.
- YLWD needs fire mitigation for facilities along the Chino Hills State Park.
- Growth: Facilities strictly related for growth don't qualify for HazMit Project Grants, but can qualify if the project improves reliability to existing customers.

# AGENDA

**Self Introductions**

**Where Are We Now?**

- Data received to date
- Status of maps showing assets
- GIS overlay analysis of each hazard with existing/proposed assets

**Let's Work**

- Hazmit Plan Grant
  - Salary Info
  - Hours Worksheets
- Capabilities Assessment Worksheet
- Goals, Objectives and Action Worksheets
- Reservoirs w/ Dams Discussion

**What's Next?**

- Hazards Maps
- Loss Estimations
- **Next Meeting** – May 16, 2006, 9 am – 12 noon
  City of Garden Grove, Courtyard Center

  12732 Main Street, Garden Grove, CA 92840

MWDOC meeting #4 Sign in Sheet
Feb 14, 2006

| | | | |
|---|---|---|---|
| 1. | Rick Steiglitz | MCWD | (714) 378-3229 |
| 2. | Ray McDaniel | MWD | 949-425-8527 |
| 3. | Dan Wheeler | SOCWA | (949) 234-5904 |
| 4. | Kelly Hubbard | WEROC | 714-593-5010 |
| 5. | Renzo MARIN | E.T.W.D. | 949-857-7050 |
| 6. | Keith Lyon | MWDOC | 714 593 5009 |
| 7. | Hank Samaripa | YLWD | 714-777-3748 |
| 8. | Sonny Tran | ORANGE | 714-288-2475 |
| 9. | George Murdock | City of Newport Beach | (949) 718-3432 |
| 10. | Teresa Moritz | " | (949) 644-3013 |
| 11. | Jerry Vilander | City of Westminster | (714) 895-2876 extension |
| 12. | Vivian Filippelli | " | " 8f 6907 |
| 13. | Gordon Davis | MCWD | 949-574-1022 x161 |
| 14. | Marty Baker | City of Tustin | 714) 573-3101 |
| 15. | Robert Bernudez | City Garden Grove | 714-741-5917 |
| 16. | Hector Ruiz | Tehachapi Cummings Water District | 661-858-0232 |
| 17 | Karl Seckel | MWDOC | 714 593 5024 |
| 18 | Lo Tam | OCWD | (714) 378-3368 |
| 19 | Boyd Lyons | OCWD | 714-378-3310 |
| 20 | Jeffrey Henderson | City of La Habra | (562) 905-9792 |
| 21 | Jaime Aguilar | SMWD | 949-469-6582 |
| | Diane Dubois | URS | |
| | Jeremy Hollins | URS | |

JIM MORR

**SUBJECT: Notes to Apr 18, 2006 Hazard Mitigation Plan Workgroup meeting.**

**Today's attendance:** Kelly allowed agencies' reps that have completed the forms to leave early. So, ETWD, OCWD & MNWD left early.

**Tracking of agencies' staff work time:**
Kelly provided spreadsheets for agencies to complete on a monthly basis to list hours worked on the HazMit Plan. The spreadsheets will be emailed to the agencies along with Kelly's records of past meeting attendance, and the agencies are requested to complete the form for prior work time even though that time may not be eligible for reimbursement or used toward the 25% matching funds.
The agencies were requested to provide the total dollar compensation/hour for each employee that works on the HazMit Plan.
Chuck Fowler had a question about the timing for filing the reports to Kelly. Kelly wants monthly reports, so when are they due (say by the 10th?) after the month has been completed? Kelly probably needs to check the FEMA reporting deadline.

**Maps:**
Handout distributed.
Kelly reported that the 241 & 261 toll roads will be added to the maps.
URS will provide a hazard analysis table for each agency. But, URS will not provide individual agency maps. Instead, URS will provide regional maps (1 water plus 1 wastewater) with each participating agency outlined. If the agencies want individual maps, we can coordinate with CDR for a price.
Terresa said that NB might have GIS maps for inundation zones. And Renzo said that he will check for ETWD. This needs follow up.
Kelly requested that agencies identify (provide a list) of their assets that are within inundation zones. It was not clear to me, but I believe that Kelly has PDF files of inundations zones??
Kelly needs to check with IRWD for an inundation zone map related to Irvine Lake for the cities of Orange and Tustin, and Serrano if they stay in the process.
Kelly reviewed the 5 hazards that will not be mapped. And, agencies need to let Kelly know if they want any of these hazards included, and they need to provide info about the hazards that they want included.

**Draft Table of Contents of Plan:**
Handout distributed.
Hank from YLWD asked if groundwater contamination would be included as a hazard. Kelly replied that it would not be specifically listed.
Volume 1 will be general (basically a description of processes to produce the Plan) and a public document. So, agencies need to comment if they discover info that should not be public.
In Volume 2, general goals and objectives (that apply to all agencies) will be listed at the beginning. Each agency's Volume 2 information will be provided to only that agency. However, agencies may choose to share information regarding common issues and projects – it is up to the agencies to do that.

**Kelly reported about the D.C. trip.**

Kelly reviewed the worksheets with the participants in detail, and answered numerous questions.
Regarding the Legal and Regulatory Capability, a better understanding of the meaning of "L. A post-disaster recovery ordinance" would help. Kelly thought that Laws and Regulations would be included in Ordinances, but Ordinances are technically different.
Regarding M, Real estate…, an agency listed might include the State Realty Board.
Other agencies/jurisdictions that might be listed include Airports, agencies that oversee digging related to Native Indian and other arch/paleo artifacts.
Regarding T, it should be listed as the "Water Code" rather than Title 22 or Title 17.
Regarding the Admin & Technical Capacity, agencies such as the State Division of Oil & Gas might be listed, colleges and universities, and the USGS.
Also, some agencies might include field personnel if they participate in the planning of mitigation projects.

**Goals & Objectives:**
Kelly reviewed, and asked the agencies to start considering. The Goals/Objectives will be due 2 weeks after the May meeting (so by May 26). The Goals/Objectives should look out at least 5 years, but agencies can chose to look further. Also, the Goals/Objectives should be approved by the agencies' management and/or Boards/Councils.

**Other Time-table:**
Kelly's timeline is to complete the workgroup meetings in June, and have Boards/Councils approvals of the Plan during the summer.

3. OCSD
4. SCWD
5. Laguna Beach

# Hazard Mitigation Working Group
## Sign In Sheet 9-12
## April 18, 2006

| | Name | Title/ Affiliation | Email | Phone |
|---|---|---|---|---|
| 1 | RENZO MARIN | T/R ANALYST ETWD | RMARIN@ETWD.COM | 949 837-7050 |
| 2 | Hector Ruiz | Dist. Eng. TCWD | hruiz@tcwd.ca.gov | (949)858-0277 |
| 3 | Julian Filippelli | Management analyst/westminster | | 714-895-2876 X6209 |
| 4 | CHUCK FOWLER | WATER QUALITY BUENA PARK | CFOWLER@BUENAPARK.com | (714) 562-3701 |
| 5 | RAY McDOWELL | Super MNWD | RMcDOWELL@MNWD.COM | 949.755.6798 |
| | Jerry Vilander | Super Westminster | | |
| | Tom Miller | Leadworker Westminster | | 714 895-2876 ext 6209 |
| 6 | Dan Wheeler | Chief Operator SOCWA | Dwheeler@SOCWA.com | 949 234 5408 |
| 7 | KEITH LYON | MWDOC | klyon@mwdoc.com | 714 553 5009 |
| 8 | Kathy Barr | Tustin | Kbarr@tustinca.org | 573-3157 |
| 9 | BOYD LUPKA | OCWD | blupka@ocwd.com | 378-3210 |
| 10 | HANK SAMARIPA | YORBA LINDA WATER DISTRICT | hsamaripa@ylwd.com | 777-3748 |
| 11 | GORDON DAVIS | RMC / MESA CONSOLIDATED WATER DIST | GORDOND@MESAWATER.ORG | 949-574-1022 |
| 12 | DON TUNISON | GARDEN GROVE | | 714 741-5395 |
| | LO TAN | ORANGE COUNTY WATER DISTRICT | LTAN@OCWD.COM | (714) 378-3368 |
| 13 | Terresa Moritz | City of Newport Beach WRD | tmoritz@city.newport-beach.ca.us | 949 644 3017 |
| 14 | Sonny Tran | Orange | stran@cityoforange.org | 714-288-2475 |
| | Chuck Steinberg | OCWD | steinbergs@ocwd.com | 714-378-3226 |
| 15 | Jeff | Fullerton | | 11:10 |

## AGENDA

**Introductions: Kelly Hubbard**

**Power Point Presentation: Diane Douglas**

**Open Question and Answer Format for Presentation**

**Where Are We Now? Working Session**

- Data received to date
- Overview hazards maps/risk analysis
- Loss estimations based upon results
- Status of Capability Assessments
- Status of Goals/Objectives and Actions

**Q & A**

**Homework**

**Unfinished Worksheets (Last Call!)**

**Jurisdiction Descriptions:**

- Government Structure and Governing Board
- General Operation Description (may include purpose)
- Source of Water & Percent

*Some district/city websites provide this information, but many don't. Most websites just have detailed histories. Either provide link to source of information, or brief description of operations.*

- **Next Meeting** – Tuesday, July 18, 2006

**Hazard Mitigation Working Group Meeting**

**Summary of June 20, 2006**

If you missed this meeting, there will be additional items sent to you via email and postal mail. Please call me when you received these items.

If you are one of the agencies who at the meeting did not receive your maps or spreadsheets, please let me know. I will be tracking who receives them and still needs them.

**Homework (DUE FRIDAY, JULY 7, 2006):**

- Items listed on Agency Memo
    - Goals & Objectives note: a general guideline is 10 to 15 goals with approximately 6 action items per goal.
- Review of Loss Estimation spreadsheets
- Review of "Inventory of Critical Facilities and Infrastructure Exposure Value by Jurisdiction"
- Review of Maps & GIS Data Sheets (will be emailed or on a FTP site by end of the week)
- June Labor Hours (as well as any hours prior to June)

**Public Meetings:**

- Proposed Month: August
- More Information to come on how the meetings will be noticed. Suggestions included:
    - MWDOC website
    - Q & A Sheet on website
    - Online survey
    - Green Ad
- North County Community Meeting
    - Potential Locations: Tustin or Newport Beach
- South County Community Meeting
    - Potential Locations: Santa Margarita or Moulton Niguel

**Timeline**: This timeline is a working document, meaning it will probably change as I review the materials and assess our progress.

- Homework Due (7/7/06)
- Jurisdiction Appointments (wk of 7/10/06) – I have requested that URS meet with each agency and myself to review any of your changes/corrections or questions to ensure no further confusion of the materials.
- Public Notice of Community Meetings (7/21/06)
- Community Meetings (August wks 2/3)
- URS First Draft Document (9/1/06)
- MWDOC Review (9/15/06)
- URS Second Draft Document (9/29/06)
- Jurisdiction Review & OES Initial Feedback (10/13/06)
- URS Final Draft Document (10/27/06)

- Hazard Mitigation Plan Outline
- Summary Asset Sheet (FYI: we filled in the blanks together at the January apts.)

# AGENDA

## WEROS South EOC, 26081 Via Pera, Mission Viejo

**Draft Plan Review (Copies Distributed)**

- General Overview
- Sections 1-4, and 6-7 – Conceptual Review
- Section 5 – Review of Individual Jurisdictional Information

**Public Meetings Discussion**

- Notifications
- Confidential Information
- Attendance

**Board Meetings & Approvals**

- Document Status
- WEROC / MWDOC Attendance

**What's Next?**

- **Draft Plan Review Comments –** Due by Friday, August 25, 5pm
- **Public Meetings**
  - September 12, 2006, 5-7pm @ Tustin
  - September 14, 2006, 5-7pm @ MNWD
- **Final Draft in Hand** – October 13, 2006 5pm
- **Board Approvals** – October & November
- **OES & FEMA Approvals** – October & November
- **December Meeting** –
  - Maps Discussion & Final Plan Copies
  - SEOC, December 12, 2006, 10-noon
  - Join in for an optional lunch (on your own) to celebrate completion

**Hazard Mitigation Planning Group Meeting: Draft Review**
**August 15, 2006**
**South EOC, 9am-12pm**

Kelly Hubbard:

- Recognize significant problems are still in document
- URS is no longer responsible for written documents, just maps, tables, final printing, some assistance with public meetings
- Kelly is the new "go-to" person on the plan
- Today is feedback day on Content & Quality of the plan. Please do not make massive changes because of grammar.
- HMWG stands for "Hazard Mitigation Working Group" and refers to the multi agency group meetings run by Kelly.
- LPG stands for "Local Planning Group" and refers to the group of individuals at each agency that assisted in the research and preparation of this plan.

Sections 1-4, 6-7 are general sections (FEMA required)

- Table of Contents, references to tables and charts need to be reviewed and corrected
- Appendix & Acronyms list need to be added to the front of the document

Section 1- Introduction (FEMA required wording/concepts/etc)

PWU: Participating Water Utilities, includes water and wastewater utilities

Add general wastewater description including SARI line in section one. It is important to include the SARI line.

Section 2- Participants- Jurisdiction Descriptions

URS tried to make consistent agency descriptions, covering

1. General Service Area
2. Who & What Serving
3. Governing Structure

Section 3- Planning Process

3-12 Participant list- main contact people highlighted, discrepancy with who should be highlighted, title corrections, etc- let Kelly know

Section 4- Risk Assessment Overviews

Pg 4.3- Which Hazards are considered- Write up of Hazards begins pg 4.7

In 4.3.2, Contamination/Salt Water Intrusion should add potential for contamination of groundwater by unknown substance. History could include MTBE, was used as a mandated gasoline additive that leaked from underground storage tanks and contaminated the groundwater. Another contaminate is Perchlorate – several basins have detected this chemical in groundwater, which percolated in the basin from manufacturing plants of rocket fuel. OCWD should have good history.

4.3.4, Drought/Extreme Heat – could use improvement?

In 4.3.9, remove ">25 Percent" from title because it is confusing, and add it to the description in

Pg 4.9- Disaster History- An agency with specific disaster/events should let Kelly know to include and or give her a brief write up about it

*Saltwater Intrusion, wastewater needs a better write up

Pg 4-10 Dams and Large reservoirs- if have additional feedback, please give to Kelly.
Still need section on Prado Seepage
Pg 4-11 Chart is based on county HMP (not summary assets) [thus one of ETWD dams are unaccounted for]
Pg 4-24-Floods need write up- damage to wastewater, January 2005 floods
Pg 4.27- High Winds- Santa Ana: potentially large affect on power supply; trees falling and pipes being uprooted
Pg 4.28 Landslide, Slope Failure- need to add Bluebird Canyon 2005 (SCWD)
Pg 4.32- Tornados- Water Spout
Pg 4.35- Wildfires
Pg 4.3.13- Manmade Hazard: Haz Mat release or terrorism
Pg 4-44- numbers are skewed because it includes METS numbers. Individuals compared values to that of their agency's equipment and found large differences in amounts. Kelly will look into making a regional vs. local cost sheet or decrease MET values?
Switch location of pages 4-44 and 4-45. 4-45 quantifies the number of facilities and then 4-44 adds the replacement cost. Placing 4-44 closer to the remaining tables might make it easier for the reader to notice the explanations of the abbreviations listed on 4-44, and the abbreviations are not used on 4-45.
Pg 4-45- Table 4.4-2: OCWD, SMWD, TCWD, MNWD, and Tustin have corrections that need to be made to their numbers. Tustin stated that they have about 14,500 Potable Service Connections instead of 14,000, and SMWD has greater than 1 Hydrants.

Table 4.4-3- based on facilities location and agency hazard maps

- computer program does hazard analysis
- facility listed under highest potential damage/hazard
- Despite appearing disproportionate, high values were discussed as beneficial to agencies future ability to request adequate grants for repair, regardless of the damage in the future, even if value seems larger than needed now.
- Clear notation (footnote?) will be made to state that numbers are based on highest cost of 25 regional agencies
- Add notes to tables 4.4-3 and forward to the effect that the value is based on the highest value facility, and ensure that there are descriptions of moderate, high and extreme earthquakes (same for Fire threat), and reference to the page/section.
- Moderate/high earthquake threats need explanation of levels on charts, add references to the table (table 4.4-3, table 4.4-4)
- Fire Threat is based on County Map

Need to add:

- 100 year flood pdf map
- Tables reformatted to fit page
- Good explanations for where maps and charts came from, data used

* On table 4.4-15 and forward, identify in the title of the chart what PWL and WWL stands for: "Inventory of Potable Water Line **(PWL)** and Waste Water Line **(WWL)** By Jurisdiction". Also, clarify that the numbers in the chart represent "miles of pipe".
Chuck from OCWD questioned about using "potable", "non-potable" and "wastewater" instead of just potable and wastewater.
*Add note that only major pipelines are included in numbers, not smaller ones (< 12")

Section 4.4.3- Cost of losing water service (for both agency and public). Some Earthquake redundancy

- Section will be integrated better

*4.4.3 Earthquake faults are located in S. California, not OC
Section 5- formatting (reads Section 4- Risk Assessment, page numbers)

Section 5- -Wastewater will be added to section five under regional considerations.
-"Have-nots" depend on sewer trunks
-There is a regional overview/review for approval and Master Plan to abide by for Wastewater fixing
-Wastewater regional facilities will have a separate section at front of document
-In section five, Karl suggested adding the agencies' names as a header to help the reader.

* Joint Loss estimation table will be renamed. (It is currently unclear and vague)
* Mention of Regional Water Quality Control Board should now also include State- due to new regulations
*4-170-OCWD- missing "A"

In section 7, the Orange County Haz Mat Plan is listed – it probably should be "Mit". Also, the header is section seven, but the first line says section 5.
WEROC will try e-mailing out maps, if not, we will burn cds and send out maps that way

Comments and Revisions are due by 5pm next week Friday August 25, 2006.

A hard copy summary sheet was passed around. Based off that sheet, Kelly will adjust the numbers on all other tables and charts. Individual agencies are responsible for correcting the information in their written sections in the plan.

All agencies represented agreed to making the plan a Public Document that will be posted online.

**Upcoming Public Meetings**

Press Release: WEROC/MWDOC will put out regional press releases the last week of August/first week of September. A copy of the press release has been distributed and can be published in individual agencies local newspapers.

Bill Inserts: Already distributed to agencies

| | |
|---|---|
| SCWD- | ½ customers received insert in water bill, Insert available at front desk, Local press release, website |
| SOCWA - | website |
| OCWD- | website |
| Orange | local press release/ad, Website |
| Tustin | local newspaper (looking into), Insert at front counter, Website, City cable TV station |
| YLWD | website, local newspaper |
| La Habra | website, City newsletter, City cable TV channel |
| SMWD | TBD |
| ETWD | website, newsletter |
| TCWD | website, Front desk |
| MNWD | bill insert, Website |
| Newport | City cable channel, place notice at public library, website |
| Garden Grove | website, billing |

Handouts at Public meeting will be available for review by PIO, GM's, and elected officials at least 1 week prior to public meeting

ETWD, TCWD, SOCWA, and Newport are missing significant portions of their written documents.

Public comments must be received by the end of that week- September 15
Hard copy drafts and Comment cards will be available at the meeting
The meeting will be "open house" style- see a PowerPoint presentation explaining Hazard Mitigation Grant Planning Process, see maps, drafts, and ask questions.

**********

**Board Approval**

Regarding the agencies taking the Plan for Board/Council approval, Newport Beach probably will do in November, and OCWD will take to Committee and the Board in November.

Work VERY hard to get draft approval from board by early November. All boards need to approve because they will be getting approved by agency boards, OES, and the OA at the same time.

Remember that it is a dynamic, living document and adjustments can be noted for future changes, but approval is needed now to allow grant requests.

October 13- a final draft of the plan will be available in CD format for the elected officials to approve, however, the committee approval process can begin prior so that the board can approve by early November.

Summary:

| | |
|---|---|
| August 25- | Final Agency Revisions due in hard copy format to Kelly |
| September 12- | North County Public Meeting |
| September 14- | South County Public Meeting |

October/November- Board Approvals

**Hazard Mitigation Meeting**
**August 15, 2006**

**Sign-In**

| Name | Agency |
|---|---|
| Kelly Hubbard | WEROC |
| Karl Seckel | MWDOC |
| Kathy Barr | Tustin |
| Joe Meyers | Tustin |
| Ron Meyer | SMWD |
| Steve Frances | SMWD |
| Hank Samaripa | YLWD |
| Mark Cole | SCWD |
| Steve Sanchez | SCWD |
| Renzo Marin | ETWD |
| Sonny Tran | Orange |
| Hector Ruiz | TCWD |
| Jerry Vilander | La Habra |
| Terresa Moritz | City of Newport Beach |
| George Murdoch | City of Newport Beach |
| Lo Tan | OCWD |
| Dan Wheeler | SOCWA |
| Boyd Lypka | OCWD |
| Chuck Steinbergs | OCWD |
| Keith Lyon | MWDOC |
| Robert Bermudez | Garden Grove |
| Heather Fong | MWDOC |

# APPENDIX B: PUBLIC WORKSHOPS

B-1: Summary
B-3: Quick Question Sheet

**Orange County Regional Water and Wastewater**
**Multi-Hazard Mitigation Plan**

**Public Workshops – Recap**

**Location:** Tustin Community Center
300 Centennial Way
Tustin, CA

**Date:** September 12, 2006

**Time:** 5-7 p.m.

**Number of People Attending:**

10 Community members, including two representatives from the Orange County Grand Jury
12 Water and/or wastewater service providers
**22 Total**

**Service Providers Represented:**

City of Buena Park (Chuck Fowler)
City of Garden Grove (Robert Bermudez, Zack Barrett)
City of La Habra (Jerry Vilander)
City of Newport Beach (Terresa Moritz)
City of Orange (Sonny Tran)
City of Westminster (Vivian Filippelli, Todd Miller)
Municipal Water District of Orange County
- Director Larry Dick
- Karl Seckel
- Kelly Hubbard
- Michelle Tuchman
- Keith Lyon

**Questions/Comments by Community Members:**

1. How is salt water prevented from entering the aquifer in the event of an earthquake?
2. Maybe you could differentiate in the legend between blind-thrust faults and other faults on Figs. 2 & 4. Puente Hills and San Joaquin Hills shouldn't be projected to surface as other faults on (other) figures are.
3. If WEROC is heading up the preparation a Hazard Mitigation Plan, then why isn't WEROC reviewing and advising the City of Tustin to mitigate the location of a new well by moving it to a "safer" location?
4. Who is responsible for responding to a Hazardous Material issues? What are the "guaranteed" response times and who determines where they respond first?

find out about water and wastewater preparedness planning. He had a general interest in the risk maps, how the water and wastewater community would respond to various situations and was interested in participating in test exercises with his local water supplier. He was put in contact with his water provider.

6. An interested homeowner asked about the feasibility and availability of test kits for water quality purposes to determine if water was safe to drink during a disaster. His main interest was being self sufficient to test water for safety. We discussed how the water community would communicate with the public, through radio and television publicity, regarding whether or not water is safe to drink. One problem with the concept of “kits” is that there are many items to test for in addition to the typical tests for bacteriological safety and adequate chlorine residual

7. What are the differences in how private and public water utilities are regulated? In terms of emergency preparedness, water rates, and water quality.

8. Why is IRWD not part of the plan?

9. Who was the primary author of the plan and was HAZUS used to generate some of the charts and tables?

10. Please explain the relation between the maps, charts, and tables, and what does it tell us about each utilities situation.

11. What are the water utilities experience regarding coordination with the County, cities, and private companies? As interdependencies been discussed?

**Multi-Hazard Mitigation Plan**

**Public Workshops – Recap**

**Location:** Moulton Niguel Water District
27500 La Paz Road
Laguna Niguel, CA

**Date:** September 14, 2006

**Time:** 5-7 p.m.

**Number of People Attending:**
5 Community members
21 Water and/or wastewater service providers
**26 Total**

**Service Providers Represented:**
El Toro Water District (5)
- Jerry Werner, Director
- John Dudley, Director
- William Kahn, Director
- Ted Martin, Director
- Bob Hill

Laguna Beach County Water District (Christopher Regan)
Moulton Niguel Water District (4)
- Tom Stephenson
- Todd Wovacek
- Ray McDowell
- Carol Sanders

City of Newport Beach (George Murdoch)
Santa Margarita Water District (Ron Meyer, Steve Francis)
South Coast Water District (Mike Dunbar, Mark Cole, Linda Homscheid)
Trabuco Canyon Water District (Hector Ruiz)
Municipal Water District of Orange County
- Karl Seckel
- Kelly Hubbard
- Michelle Tuchman
- Keith Lyon

**Questions/Comments by Community Members:**
1. Five years is too long between plan updates.

Valley" concept. Why not build a Diamond Valley lake in South County?

3. A general overview of how we developed the Plan was requested.
4. General comments regarding community involvement and how nice it was for the different Agencies to develop a Plan.
5. Questions regarding water quality and water availability during drought.
6. Another resident was interested in the ability to mobilize a treatment facility to provide potable water for communities during emergency situations. A discussion occurred about the BUREC mobile water treatment system that was relocated from New Mexico to Louisiana during the Katrina recovery effort. In that case, the mobile water treatment system was operating and producing potable water within about a week to provide water to a hospital and for the local community. The same system could help recovery efforts in Orange County to a certain extent, but could not produce water in the large quantities needed to meet demands for large portions of the County. We discussed the need for the public to be prepared to be without the water system for at least 3 days and possibly longer until recovery efforts are sufficient to allow the public systems to be placed into operation following a full battery of water quality testing.

7. One resident asked about the ability to drink water out of Lake Mission Viejo. The answer is that without considerable treatment, the Lake Mission Viejo water cannot be consumed by the public. The Lake is an open reservoir open to the environment and recreational uses and is home to many water fowl and so it would be extremely dangerous to drink and would likely result in sickness.

8. After discussing the regional water system in Orange County and the need for improvements in the water system serving south Orange County in the event an earthquake or other occurrence interrupt imported supply deliveries, one resident noted his concern with the lack of reliability. The discussion included the need for residents to be prepared at home to be self sufficient for 3 days or more and then that limited service would begin to be restored, but that full restoration of the regional water system may take as many as 20 or 30 days in the event of a large destructive earthquake.

9. A local Emergency Preparedness Team from the Laguna Woods Community was interested in coordinating specifically between the hospitals and the water community. The representatives were interested in the general background information provided and to better understand what types of response would be expected from the water community. Again, the issue was stressed that hospitals, as well as residents, should plan to be self-sufficient for 3 days or more until the regional system can be restored. The local water providers in south Orange County are planning on increasing the ability to meet drinking water needs from the current level of about 5 days (plus or minus) to between 10 and 20 days.

10. How are agencies that are not participating in the regional Hazard Mitigation Plan with MWDOC covered under the Hazard Mitigation Process? Several agencies have independently completed Hazard Mitigation Plans for their service areas, but others are not preparing the plans. If plans are not prepared, the ability to access pre- and post-hazard mitigation funding is withheld by FEMA. The biggest obstacle to completion of a plan by an agency is the amount of work, including consultant and staff time, to develop and present all of the necessary information. That was one of the benefits of the 20 agencies who have participated in the MWDOC effort – getting the economy of scale of

**Orange County Regional Water and Wastewater**
**Multi-Hazard Mitigation Plan – Public Workshop**

**Hazard Mitigation Planning FACT SHEET**

### *What is a Hazard Mitigation Plan?*

A Hazard Mitigation Plan is a pre-disaster strategic plan written to guide how a community will lower its risk and exposure to disasters.

### *Why prepare a Hazard Mitigation Plan?*

Jurisdictions, like the water and wastewater agencies participating in the Regional Multi-Hazard Mitigation Plan, are dedicated to ensuring service to their customers and to safeguarding those services when disaster strikes. Having an approved Hazard Mitigation Plan helps meet that goal and also makes those jurisdictions eligible to receive Federal Emergency Management Agency (FEMA) grants, which ease the financial impacts of emergency preparedness planning and the response measures developed before and after natural and manmade disasters.

### *Who is preparing the Plan?*

The Municipal Water District of Orange County is coordinating the efforts of 19 participating entities. *(List of participating water and wastewater service providers is on back.)* URS Corporation is providing assistance. A grant from FEMA is helping underwrite the cost of preparing the Plan.

### *What is the purpose of this workshop?*

The 20-member Hazard Mitigation Working Group met for nearly a year – from October 2005 to June 2006 – to identify the hazards that have significance for Orange County water and wastewater entities and to assess the risks related to these hazards. Now it's time to share the information we've compiled with the public and get your input. In particular, your comments will assist us in ensuring we have addressed the concerns of the public. Your input will also help us prioritize mitigation measures with appropriate implementation strategies.

### *What elements are included in the Plan process?*

***When will the Plan be complete?***

The Final Plan is scheduled to be presented for adoption by November 2006 to the boards of directors and the city councils governing the 20 participating water and wastewater agencies. The Orange County Regional Water and Wastewater Multi-Hazard Mitigation Plan will be submitted to FEMA and the Office of Homeland Security for approval.

## Participating Water and Wastewater Service Providers

### Regional Service Providers

Municipal Water District of Orange County
Orange County Water District
Orange County Sanitation District
South Orange County Wastewater Authority

### Retail Agencies

City of Buena Park
El Toro Water District
City of Garden Grove
Laguna Beach County Water District
City of La Habra
Mesa Consolidated Water District
Moulton Niguel Water District
City of Newport Beach
City of Orange
Santa Margarita Water District
Serrano Water District
South Coast Water District
Trabuco Canyon Water District
City of Tustin
City of Westminster
Yorba Linda Water District

# APPENDIX C PUBLIC NOTIFICATIONS

C-1: November 15, 2005
C-2: July 5, 2006
C-3: August 25, 2006

MWDOC PREPARES DISASTER PLANNING DOCUMENT

**Countywide Water District Plan to Cover Natural and Man-made Disasters**

A hazard mitigation plan that identifies risks posed by natural and man-made disasters – and ways to minimize damage before those disasters occur is currently being prepared by the Municipal Water District of Orange County, and participating county water and wastewater utilities (Hazard Mitigation Working Group). The federal Disaster Mitigation Act of 2000 requires all local governments to create such a disaster plan in order to qualify for mitigation funding in the future. MWDOC has hired a consultant, URS Corp., to assist in the creation of a plan for the water utilities.

This news release is being provided to inform the public that the plan is being prepared. Public workshops will be held during the spring of 2006 to solicit input from the public after the working group identifies natural and man made hazards that may damage their facilities, and identifies mitigation measures that can be implemented to minimize damage prior to an event. Public input into this process is very important and residents are encouraged to attend the workshops, make comments and ask questions.

The planning document will focus on potential impacts of disasters such as earthquakes, fires and floods, along with human-caused hazards including terrorist attacks. The plan, once complete must go to the Governing Board for each participating utility for adoption.

Contact Kelly Hubbard at MWDOC [(714) 593-5010] for more information.

# County Water Utilities Seek Public Input in Plan Development

## *Plan Will Help Identify and Protect Region in Case of Disaster*

A countywide plan to identify risks posed by natural and manmade disasters — and ways to minimize potential damage before it occurs — is being prepared by a coalition of 20 Orange County water and wastewater agencies. (Listed on reverse side.)

These 20 agencies will sponsor two workshops in September to gather input and suggestions from the public. The workshops will includes the results of risk analyses for hazards specific to Orange County, including earthquakes, fires and floods. There will also be a discussion on manmade hazards.

Public workshops will be held at two locations:

*North County:* City of Tustin
300 Centennial Way • Tustin
September 12, 2006 • 5:00 p.m. to 7:00 p.m.

*South County:* Moulton Niguel Water District
27500 La Paz Road • Laguna Niguel
September 14, 2006 • 5:00 p.m. to 7:00 p.m.

The finalized plan will be approved by the respective city councils and boards of directors of the participating service providers, and implemented as part of the comprehensive Federal Disaster Mitigation Act of 2000.

If you have any questions contact your local water district, or Kelly Hubbard, Municipal Water District of Orange County, (714) 593-5010, khubbard@mwdoc.com

# Disaster Preparedness is a Necessity; Your Input is Requested

The Federal Disaster Mitigation Act of 2000 requires all governmental agencies have disaster preparedness plans to help ensure the safety of its citizens in the event of an emergency, and to qualify for future funding should a disaster occur. With the help of a grant from the Federal Emergency Management Agency, 20 local service providers are now developing the Orange County Regional Water and Wastewater Multi-Hazard Mitigation Plan. Your comments and suggestions are critical as we continue the planning process.

"Public participation in disaster-preparedness planning is extremely important. Residents are encouraged to attend the workshops, ask questions and give us their comments. We look forward to developing a comprehensive plan that includes input from the residents we serve," says Kelly Hubbard of the Water Emergency Response Organization of Orange County, which is headquartered at the Municipal Water District of Orange County.

*Hazard Mitigation Working Group Participants Include:*

- City of Buena Park
- El Toro Water District
- City of Garden Grove
- City of La Habra
- Laguna Beach County Water District
- Mesa Consolidated Water District
- Moulton Niguel Water District
- Municipal Water District of Orange County
- City of Newport Beach
- City of Orange
- Orange County Sanitation District
- Orange County Water District
- Santa Margarita Water District
- Serrano Water District
- South Coast Water District
- South Orange County Wastewater Authority
- Trabuco Canyon Water District
- City of Tustin
- City of Westminster
- Yorba Linda Water District

***PRESS RELEASE***

**COUNTY WATER, WASTEWATER AGENCIES SEEK**
**PUBLIC INPUT IN DISASTER-PREPAREDNESS PLAN**

**Your City** *(August __, 2006)* – A draft plan identifying the risks posed by natural and manmade disasters – and ways to minimize potential damage before it occurs – will be available for public review and input at two community workshops sponsored by the Orange County water and wastewater agencies preparing the document.

The ____(your agency)___ , along with 19 other agencies compiling the Orange County Regional Water and Wastewater Multi-Hazard Mitigation Plan, has spent nearly a year performing risk analyses for disasters specific to the area and developing numerous strategies and corresponding actions to reduce the possible effects. These disasters, including earthquakes, fires, floods and manmade hazards, will be discussed at two public workshops:

NORTH COUNTY: City of Tustin
Tustin Community Center
300 Centennial Way
Tustin, CA 92780
5:00 p.m. – 7:00 p.m.
September 12, 2006

SOUTH COUNTY: Moulton Niguel Water District
27500 La Paz Rd
Laguna Niguel, Ca 92677
5:00 p.m. – 7:00 p.m.
September 14, 2006

**-- more --**

will be presented for approval to the respective city councils or boards of directors of the participating water-service providers, and implemented as part of the comprehensive Federal Disaster Mitigation Act of 2000.

The Act requires all governmental agencies have disaster preparedness plans to help ensure the safety of its citizens in the event of an emergency, and to qualify for future funding should a disaster occur.

"Public participation in disaster-preparedness planning is extremely important. Residents are encouraged to attend the workshops, ask questions, and give us their comments. We look forward to a comprehensive plan that includes the input of those we serve," said Kelly Hubbard of the Water Emergency Response Organization of Orange County, which is headquartered at the Municipal Water District of Orange County, and is the agency coordinating the planning effort.

A grant from the Federal Emergency Management Agency is helping underwrite the cost of compiling the plan.

Hazard Mitigation Working Group Participants Include:

City of Buena Park
El Toro Water District
City of Garden Grove
City of La Habra
City of Laguna Beach
Mesa Consolidated Water District
Moulton Niguel Water District
Municipal Water District of Orange County
City of Newport Beach
City of Orange
Orange County Sanitation District
Orange County Water District
Santa Margarita Water District
Serrano Water District
South Coast Water District
South Orange County Wastewater Authority
South Coast Water District
City of Tustin
City of Westminster
Yorba Linda Water District

# # #

# DETERMINING THE VALUE OF WATER SUPPLY RELIABILIY

# IN ORANGE COUNTY, CALIFORNIA

**PREPARED BY THE ORANGE COUNTY BUSINESS COUNCIL, SEPTEMBER 2003 FOR MUNICIPAL WATER DISTRICT OF ORANGE COUNTY**

# IN ORANGE COUNTY, CALIFORNIA

# EXECUTIVE SUMMARY

## STUDY OBJECTIVE

This study provides insights into how to value water supply reliability by providing estimates of the economic impacts of different water shortages that could result in Orange County. Understanding the value of water supply reliability gives planners a tool to aid in assessing infrastructure projects that can increase reliability. This study does not assess the likelihood of different disruptions to water supply, but instead estimates the economic impacts of the resulting water shortages if a particular supply interruption occurs. The economic impact estimates provided herein can be combined with assessments of the likelihood of shortages derived from other studies. Together, that information can give insights into the benefits of projects that reduce the probability or severity of water shortages, allowing water engineers and the public to apply benefit-cost tests to projects that improve water supply reliability.

Two types of shortages are examined in this study – short-term emergency disruptions and multiple-year droughts. A range of scenarios was examined for both situations. Those scenarios were:

| | |
|---|---|
| Emergency Disruptions: | Water supply reductions of 20%, 40%, 60%and80% for 10, 20, 30, and 60 days. |
| Drought: | Water supply reductions of 5% and 20% for one, two, and three years. |

The estimated economic impacts are separated into business impacts and residential impacts. This allows planners to choose the impacts that best match particular scenarios or projects being studied. For example, residential users are often required to reduce their water usage by more than business customers during water shortages to help preserve the economic base of the area. So a planner might wish to combine the impacts of a 60% reduction in water delivery to residential customers with the impact of a 20% reduction in water delivery to businesses. In addition to residential and business impacts, this report also includes an estimate of the value of landscape losses that would be expected during droughts, and a discussion of the impact of emergency outages on damages from firestorms due to a lack of water supply for firefighting.

## BACKGROUND

Orange County is a major metropolitan region whose economy can be substantially slowed by short-term or long-term water disruptions. If Orange County were a country, its gross product in 2002 would rank

areas in the United States, Orange County has the 11th largest gross product, behind Los Angeles (2nd) and ahead of Minneapolis/St. Paul (12th) and Seattle (13th). Orange County's population, at close to three million persons, makes it the 5th largest county in the United States. Orange County has more residents than 21 of the country's states, including Utah, Nevada, and Idaho. In a large and economically important region, infrastructure planning should be based on careful assessments of the impacts of possible disruptions to service. This report supports that goal by assessing the economic impact of disruptions to water supply.

Orange County obtains its water from three primary locations – a large groundwater basin underneath northern Orange County which is supplied via the Santa Ana River, imported water from the Colorado River and California State Water Project, and local water supply facilities (recycled supplies, groundwater and surface water supplies). It should be noted that the Santa Ana River water also includes imported water from the upstream watershed areas that shows up as irrigation runoff into the river, or via wastewater discharges. Figure 1 provides a map of the major water facilities in Orange County. Northern Orange County obtains approximately 66-75% of its water from the large subterranean groundwater basin. Brea and La Habra obtain about 60% from local supplies and about 40% from imported water. Southern Orange County (south of Irvine) obtains most of its water from imported water, about 86% of total, and 98% of potable. This imported water is delivered through two pipelines and treated at the Diemer Filtration Plant. The two pipelines are the Allen McColloch Pipeline and the East Orange County Feeder No. 2. The Diemer Filtration Plant, located in Yorba Linda, supplies up to 520 million gallons of water per day (800 cubic feet per second), providing almost 100% of the treated imported supplies to Orange County. The Diemer Plant, the Allen-McColloch Pipeline and the East Orange County Feeder No. 2 pipeline are essential for supplying water, particularly to South Orange County. An outage of any one of the three facilities has the potential to create supply problems until service is restored. In particular, an outage of the Diemer Plant would be an extremely difficult event with which to deal.

## STUDY REGIONS

Because of the differing mix of water sources in Orange County, South Orange County is more vulnerable to emergency disruptions than other areas of the County. In modeling water shortages, this study divides the county into three regions, based on the availability of local groundwater. Those regions are shown in Figure 2 and the resources available to each region are discussed below and included in Table 1:

- Brea/La Habra, which receives locally produced water from California Domestic Water Company, limited local wells, and imported water from Metropolitan. This area's water reserves are held in the Orange County Reservoir and tank storage. About 60% of the water used in this area on an annual basis is derived locally as opposed to being provided by Metropolitan Water District of Southern California (Met).

- Orange County's main groundwater basin, which incorporates all of Orange County north of and including Irvine (excluding Brea and La Habra), is managed by Orange County Water District. This region receives the bulk of its water from local wells and imported water from Met. Between 66% and 75% of the water used by this area on an annual basis is derived locally as

groundwater basin and limited tank storage.

- South Orange County, which incorporates the remainder of the County, is located south of Irvine. Also included in South Orange County is the area of San Diego County abutting San Clemente. This region receives its water from imported sources primarily along with limited local supplies. This areas' reserves are held in tank storage and storage provided by the El Toro R-6 Reservoir along with several other small reservoirs.

Regions as shown in Figure 1 were defined based on the cities served by local water agencies. Region definitions correspond to differing availability of local water sources, and thus differing vulnerability to water shortages, particularly emergency disruptions that reduce the supply of water imported from the Colorado River or State Water Project.

**Table 1: Orange County Supplies to Meet Consumptive Demand Projected for 2002-03 by Three Regions**

| Region | Source | Annual Use by af | % Total Supply | % of Potable | Storage Volume[3] |
|---|---|---|---|---|---|
| Brea/ LaHabra | Cal Domestic | 12,000 | 55 | 100 | |
| | Local GW | 1,200 | 6 | 100 | |
| | Met | 8,471 | 39 | 100 | |
| | Recycled | -0- | 0 | | |
| | Totals | 21,671 | 100% | | 252 af |
| | | | | | |
| Basin[1] | OCWD Basin | 387,010 | 72 | 75 | |
| | Surface Stream | 8,000 | 1 | -- | |
| | Met | 124,943 | 23 | 25 | |
| | Recycled | 16,675 | 3 | -- | |
| | Totals | 536,628 | 100% | | Footnote 4 |
| | | | | | |
| South OC[2] | Local GW | 2,714 | 2 | 2 | |
| | Met | 108,227 | 86 | 98 | |
| | Subtotal Potable | 110,941 | | 100 | |
| | Recycled | 14,753 | 12 | | |
| | Totals | 125,694 | 100% | 100% | 1,282 af |

Projections are agency responses to MWDOC's Spring 2002 "5-Year Survey." Agency projections assumed that the OCWD Basin Pumping Percentage (BPP) would be set at 75%. If the BPP were lower, OCWD GW pumping would be lower and Met import higher. For 2003-04,the BPP has been set at 66% due to basin overdraft and replenishment constraints. In addition to the amount of Met import shown to meet consumptive demand, there is also Met import purchased to replenish the Groundwater Basin. For 2002-03, OCWD planned to purchase 90,700 af of replenishment supplies. Any purchase of long-term treated (in-lieu) would reduce pumping by an equal amount.

[1]Basin includes all of Anaheim, Irvine Ranch Water District, Santiago County Water District and Yorba Linda Water District (these areas have portions both within and outside of the groundwater basin. South OC includes SOCWA's San Onofre area as well as the Los Alisos area of IRWD. [3]Reservoir and tank storage. It is assumed that about 30% of tank storage is available for emergency supply with the rest dedicated to operational and fire-fighting storage.

[4]Proportional to pumping capacity (current estimate 500 cfs ± among all producers)

## STUDY METHODOLOGY

This study quantifies the economic impact of short-term supply disruptions due to emergency outages and multiple-year water shortages caused by droughts. Economic impact estimates are derived primarily from two sources – estimates of business impacts and estimates of residential impacts. The business impacts are reductions in output or employment that would be caused by water shortages. The residential impacts are values that residents place on the "inconveniences" caused by water shortages. Those "inconveniences" can be large, and can include quantifiable economic losses such as damage to landscape. Yet the value that households place on water supply reliability likely goes well beyond simple measures of, for example, replacement costs for damaged landscapes.

Results from other studies in California were adapted to Orange County to provide estimates of economic impacts. Business impacts were based on a survey of firms in San Diego conducted in 1994. Those firms were asked to quantify how water shortages of varying magnitudes would affect their economic output. Residential impacts are based on a survey of households conducted for the California Urban Water Agencies in 1993. In that survey, residents were asked how much they would be willing to pay to avoid water shortages of varying magnitudes. This approach is utilized in this study since more specific economic and non-economic impacts' data is unavailable.

A complete estimate of the economic impact of water shortages requires adding together business and residential impacts. The data source used for business impacts focused only on reductions in business activity, and the data source used to estimate residential impacts focused on reductions to household water supply and so likely did not capture impacts on business activity.

In addition to business and residential impacts, for drought scenarios a separate estimate of damage to landscapes is provided. Landscape impacts were often approximately one to two percent of total impacts and were typically not more than ten percent of total impacts, and so landscape losses are not discussed further in this executive summary. Other impacts, such as losses due to fires based on a inability or reduced ability to fight fires in cases of water shortages in emergencies such as major earthquakes, were not quantified. Incremental fire damage due to interruptions in water supply can be large sources of economic loss, but quantifying those losses requires detailed understanding of the water distribution system, backup supplies of water that can be used for firefighting, and factors such as topography, prevailing winds, and settlement patterns that would contribute to likely locations and extent of fires in the case of a major natural disaster. All of those posed data requirements that were beyond the scope of this study.

In the long run, an unreliable water supply could deter business from locating in Orange County or could be an impetus for Orange County firms to locate elsewhere. This study does not attempt to quantify the impact of water shortages on business location decisions and hence the analysis provided herein could underestimate the full economic impact of water shortages.

## BUSINESS IMPACTS

Business Impacts are based on a survey of firms conducted by CIC Research for San Diego County Water Authority (CIC Research, 1993, 1994, and 1999). The San Diego survey asked firms how much they

– for two time periods, 2 months and 6 months. The original study was conducted in 1993, and 690 firms responded, for a 24% response rate. That response rate is within the range of what is expected for surveys of firms.

The results are reported for eleven different industry groups. For each industry group, the survey allows one to infer how firms in that group will reduce output in response to water reductions of the specified magnitude and duration. The data was used to form inputs into the IMPLAN input-output model for Orange County. The IMPLAN model takes direct economic inputs and calculates indirect and induced effects. For example, if a manufacturing firm reduces its output, it will buy less from suppliers (indirect effects), and might lay off employees, who then have less income to buy products from other Orange County companies (induced effects). The San Diego survey results were adapted to the economic structure of each of the three Orange County regions by apportioning impacts based on the amount of economic activity in each region. The Basin contains the largest share of the County's economic activity, and so would bear the largest share of business losses if water shortages were to occur in that area. In actuality, because of the benefits of storage provided by the groundwater basin, the basin area is less likely to incur emergency or drought impacts than other portions of Orange County.

## RESIDENTIAL IMPACTS

The residential impacts are based on a contingent valuation study of water customers conducted by Barakat and Chamberlin (1994) for California Urban Water Agencies (CUWA). Contingent valuation is an advanced survey technique used to elicit how persons value products that are not available in a private market. In this case, the contingent value survey examined how persons would value projects that reduce the likelihood of future water shortages. While water is available in some markets (i.e. the market for bottled water), there is no market for improvements in the reliability of public water supply.

In the CUWA study, the survey respondents were first given information about the types of lifestyle adjustments that water reductions ranging from 10% to 50% would require of them. Then those persons were asked to vote for a dollar value payment that would guarantee that a specified type of shortage would not occur, and respondents were asked to vote "yes" or "no" on the additional payment as if their bill would increase by the amount specified if a majority of users voted "yes". A range of possible payments and water shortages was offered, to give detailed information about average willingness to pay to avoid water shortages of varying magnitudes.

The CUWA survey was conducted in the service area of member water agencies. For this study, we used the results from Orange County where 1,800 households were surveyed, of which 623 completed the survey. Willingness-to-pay values from the CUWA study were expressed as monthly payments. Those payments were converted into a present value by discounting at 5% over a 50-year planning horizon, to obtain equivalent one-time payments, which were then multiplied by the number of households in each study region to get the residential impacts from water shortages in each region.

1. The study has produced dollar estimates of economic impacts of given water shortages to both the business and residential sectors of three regions within Orange County. The water shortage scenarios analyzed included both short-term emergency disruptions (10 to 60 days in duration) and multiple-year drought situations (1 to 3 years). The three regions of the County analyzed were defined based on the availability of local supplies and the potential risk of supply reliability impacts. The detailed summaries of the various impacts analyzed are included in Tables 2, 3, 4 and 5.

2. The data used to develop the dollar estimates for the economic impacts of water shortages was adapted for the Orange County analyses from previous studies conducted by others. Overall, the best available data and studies were used and when assumptions had to be made, they were done in a conservative manner.

3. The results revealed that business impacts are larger than residential impacts. For short-term, emergency disruptions, the difference between business impacts and residential impacts varies depending on the magnitude and length of a shortage. For an 80% water loss in South Orange County for 60 days, business impacts are approximately five times as large as residential impacts. For a 20% water loss in the Basin, business impacts are approximately ten times as large as resident impacts. At low levels of water disruption, resident impacts more closely approximate business impacts. For example, the residential impacts from a 20% water loss for 10 days in South Orange County are about 75% of the business impacts from the same disruption.

4. For total O.C. during an **emergency outage** that causes a 20% water supply shortfall and lasts from 10 to 60 days, the economic impacts range from $0.4 to $3 billion.

5. For total O.C. during a **drought** that results in a 5% shortage to the Basin area and 20% shortage outside the basin area for a 1 to 3 year period, the economic impacts range from $15 to $43 billion.

6. If shortages were to occur:

   - South Orange County would experience approximately 12% of the business and employment impacts, but 25% of the residential and landscape losses. South Orange County has a higher dependence on imported water supplies and hence is more vulnerable to supply outages.

   - The Orange County Basin would experience 84% of the business impacts and 71% of the residential and landscape losses, but has a significant supply of water available from the groundwater basin and hence is somewhat insulated from imported water supply emergency disruptions.

   - Brea/La Habra area would experience about 3% of all impacts.

7. Drought scenarios generally cause a higher level of impact than do emergency outages and exceed all but the worst-case emergency disruptions. The exception is a 60-day 60% reduction in water supplies to the Basin business sector, which would exceed the impact of a year-long 5% drought in the Basin. (20% reduction in imported supply assuming a 75% BPP.)

8. In most scenarios, about ½ of the business losses are in the manufacturing and service sectors. Employment losses are highest in services and retail throughout the County.

The data developed in this evaluation need to be applied carefully in evaluating the potential economic impacts of shortages and in evaluating the benefits of projects to improve the supply reliability to any of the three regions in Orange County. The next step in the process, which was beyond the scope of this study, is to develop a portfolio of projects that can help to mitigate or offset potential emergency and drought related shortages. Evaluation of potential projects is being completed as part of the study efforts by Municipal Water District of Orange County in its South Orange County Water Reliability Study and the Orange County Water Reliability Program (also involves work by Orange County Water District).

**Selected Tables of Results**

**Table 2: Emergency Shortages, Business Impacts (2002 dollars in millions)**

| | | | | |
|---|---|---|---|---|
| **South Orange County** | | | | |
| | Duration | | | |
| Water Reduction | 60 days | 30 days | 20 days | 10 days |
| 20% | $268 | $119 | $76 | $37 |
| 40% | $695 | $326 | $213 | $104 |
| 60% | $1,117 | $525 | $344 | $169 |
| 80% | $1,543 | $732 | $482 | $238 |
| **Basin** | | | | |
| 20% | $1,955 | $873 | $561 | $271 |
| **Brea/La Habra** | | | | |
| 20% | $80 | $36 | $23 | $11 |
| 40% | $211 | $98 | $64 | $31 |
| 60% | $346 | $162 | $106 | $52 |

**Table 3: Emergency Shortages, Residential Impacts (2002 dollars in millions)**

| | | | | |
|---|---|---|---|---|
| South County | | | | |
| Water Reduction | 60 days | 30 days | 20 days | 10 days |
| 20% | $179 | $89 | $60 | $30 |
| 40% | $228 | $114 | $76 | $38 |
| 60% | $273 | $137 | $91 | $46 |
| 80% | $331 | $165 | $110 | $55 |
| Basin | | | | |
| | duration | | | |
| Water Reduction | 60 days | 30 days | 20 days | 10 days |
| 20% | $501 | $250 | $167 | $83 |
| Brea/La Habra | | | | |
| Water Reduction | 60 days | 30 days | 20 days | 10 days |
| 20% | $24 | $12 | $8 | $4 |

## Table 4: Drought, Business Impacts (2002 dollars in millions)

| South Orange County | | | |
|---|---|---|---|
| | Duration | | |
| Water Reduction | 1 year | 2 years | 3 years |
| 5% | $958 | $1,917 | $2,817 |
| 20% | $2,817 | $5,634 | $8,452 |
| **Basin** | | | |
| | Duration | | |
| Water Reduction | 1 year | 2 years | 3 years |
| 5% | $6,728 | $13,455 | $20,183 |
| 20% | $20,438 | $40,876 | $61,314 |
| **Brea/La Habra** | | | |
| | Duration | | |
| Water Reduction | 1 year | 2 years | 3 years |
| 5% | $272 | $545 | $818 |
| 20% | $837 | $1,674 | $2,511 |

## Table 5: Drought, Residential Impacts (2002 dollars in millions)

| South Orange County | | | |
|---|---|---|---|
| | Duration | | |
| Water Reduction | 1 year | 2 years | 3 years |
| 5% | $962 | $1,924 | $2,886 |
| 20% | $1,088 | $2,176 | $3,263 |
| **Basin** | | | |
| | Duration | | |
| Water Reduction | 1 year | 2 years | 3 years |
| 5% | $2,695 | $5,391 | $8,086 |
| 20% | $3,048 | $6,095 | $9,143 |
| **Brea/La Habra** | | | |
| | Duration | | |
| Water Reduction | 1 year | 2 years | 3 years |
| 5% | $130 | $259 | $389 |
| 20% | $147 | $293 | $440 |

# Orange County Water Distribution System

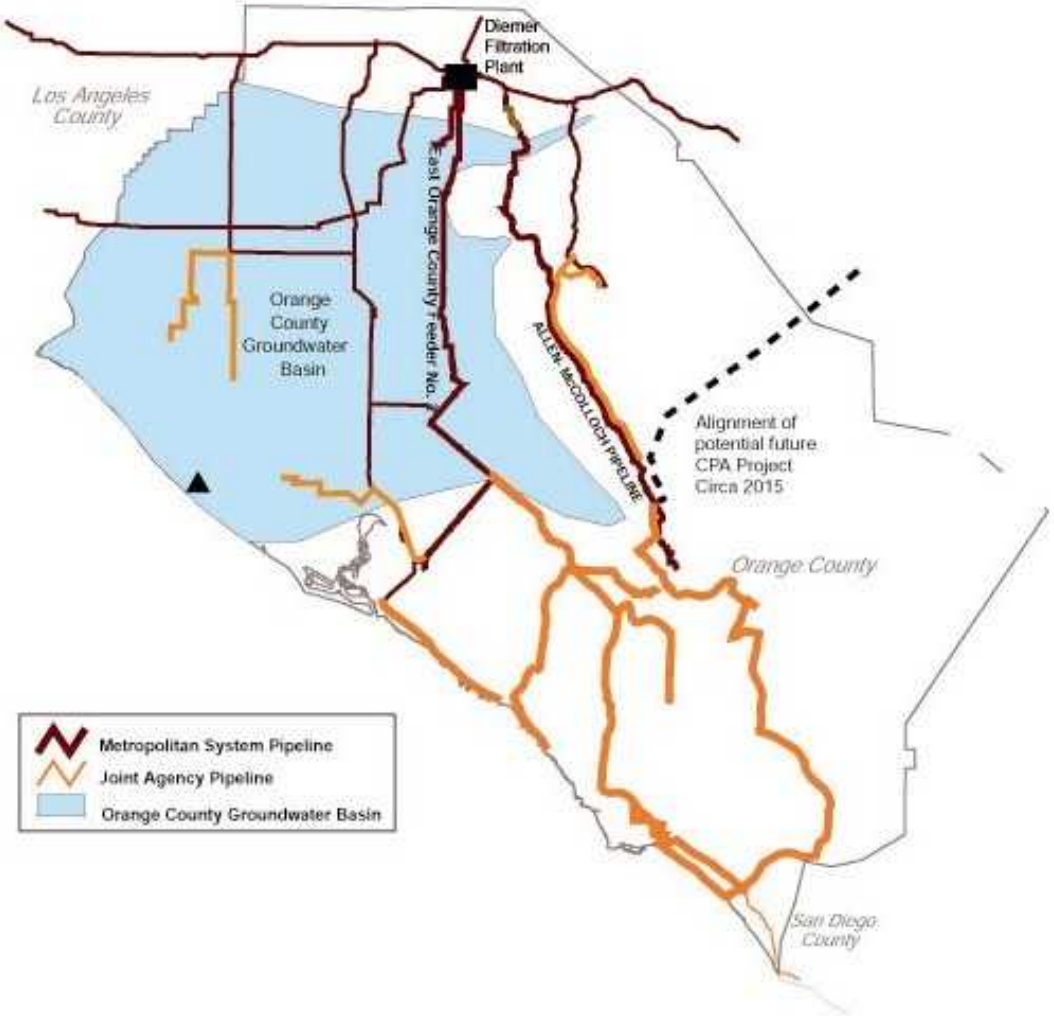


Figure 1

# Three Study Regions in Orange County Based on Mix of Local and Imported Water Sources

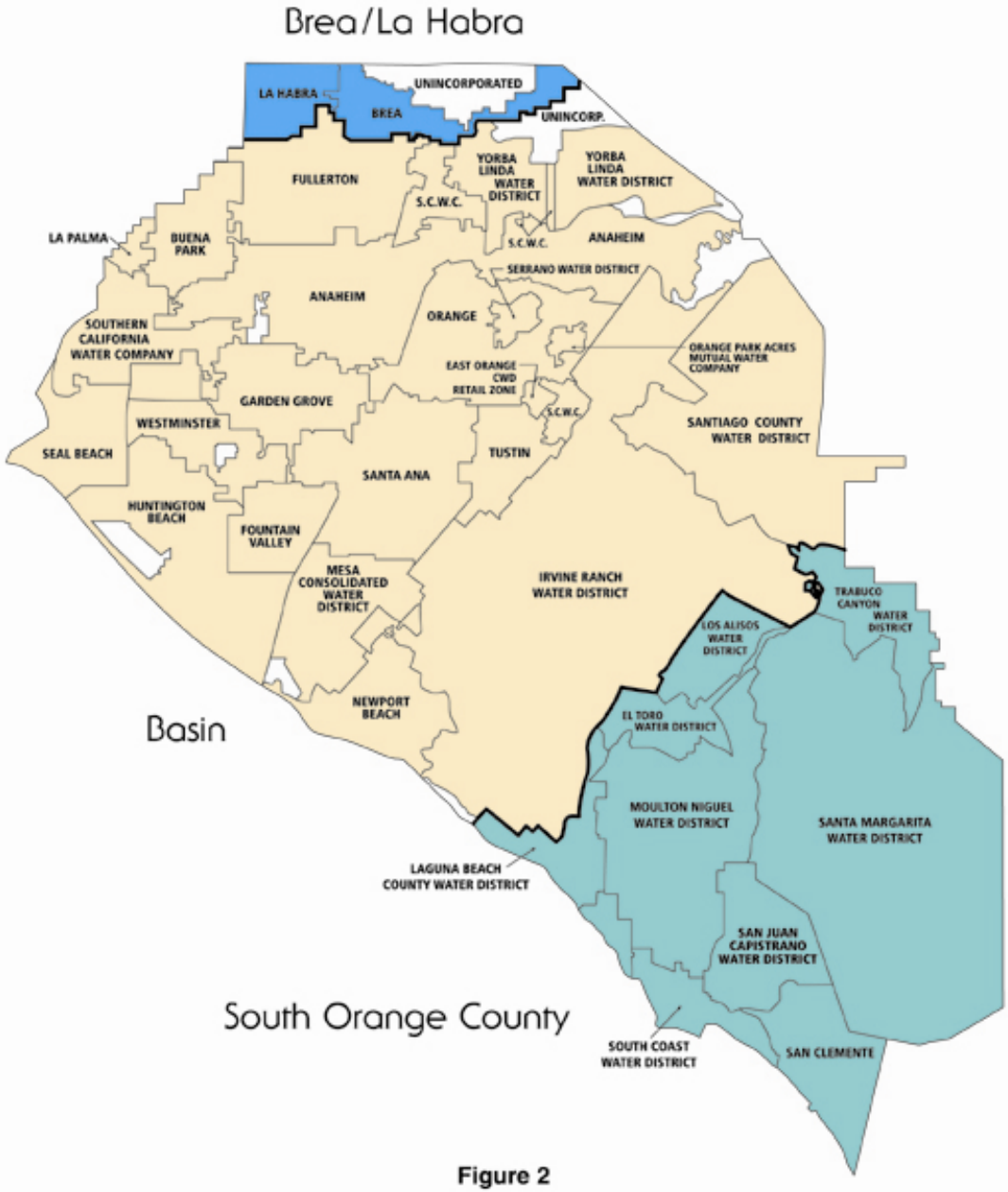


Figure 2

## APPENDIX E: MWDOC HAZARD MITIGATION DATA MATRIX

| CATEGORY | Data Layer | Source | Path to in-house data | Acquired (Y/N) | Limitations |
|---|---|---|---|---|---|
| **Landslide** | | | | | |
| | Slope - derived from 10 meter DEMs | USGS | G:\gis\projects\1577\27655113\support\Slope | y | |
| **Earthquakes** | | | | | |
| | Faults | CDR-CSUF | G:\gis\projects\1577\27655113\support\CSU_Fullerton\EARTHQUAKE_DATA | y | |
| | Probabilistic Peak Horizontal Acceleration | USGS | G:\gis\projects\1577\27655113\support\USGS | y | National-level model |
| **Flood** | | | | | |
| | Flood - 100-yr | HAZUS from FEMA-FIRM | G:\gis\projects\1577\27655113\support\HazardData\HAZUS | y | Does not take into account levee upgrades to the Santa Ana River |
| | Flood - 500-yr | HAZUS from FEMA-FIRM | G:\gis\projects\1577\27655113\support\HazardData\HAZUS | y | Does not take into account levee upgrades to the Santa Ana River |
| | Dams | HAZUS from FEMA-FIRM | G:\gis\projects\1577\27655113\support\HazardData\HAZUS | y | |
| **Liquefaction** | | | | | |
| | Faults | CDR-CSUF | G:\gis\projects\1577\27655113\support\CSU_Fullerton\EARTHQUAKE_DATA | y | |
| | Liquefaction | Orange County | G:\gis\projects\1577\27655113\support\County | y | No metadata provided by Orange County |
| **Tsunami** | | | | | |
| | Tsunami Inundation Maps | Orange County | G:\gis\projects\1577\27655113\support\MWDOC_Tsunami_PDFS | y | PDFs only, no GIS Data |
| | Tsunami Events | NOAA-NGDC | G:\gis\projects\1577\27655113\support\NOAA | | Point locations for events |
| | Tsunami Runup | NOAA-NGDC | G:\gis\projects\1577\27655113\support\NOAA | | Point locations for runup |
| | Tsunami Maximum Runup | CA OES | G:\gis\projects\1577\27655113\support\OES | y | Only up to 10 meter inundation |
| **Wildfire** | | | | | |
| | Fire Threat Model | CDF-FRAP | G:\gis\projects\1577\27655113\support\FRAP | y | 100 meter cell data |

# APPENDIX F: Participating Jurisdiction Adoption of Plan Letters

# CITY OF BUENA PARK

Department of Public Works
James A. Biery, Director


RECEIVED
DEC 0 7 2006
MWD OF OC

December 4, 2006

Kelly Hubbard, Coordinator
Water Emergency Response Organization of Orange County
Municipal Water District of Orange County
10500 Ellis Avenue
Fountain Valley, CA 92728

**Subject: Adoption of the Orange County Regional Water and Wastewater Multi-Hazard Mitigation Plan**

Dear Ms. Hubbard,

The City of Buena Park (City) recognizes the natural and manmade hazards that can affect the Orange County water and wastewater community. Due to the potential affects those disasters can have on our ability to provide (water and/or wastewater) services to our customers we determined it was of benefit to participate in the Orange County Regional Water and Wastewater Multi-Hazard Mitigation.

The City participated in the year long process with the Hazard Mitigation Working Group (staff representatives from the 20 agencies) to identify critical infrastructure that is vulnerable to natural hazards. Based on the information developed both regional and individual agency goals, objectives and actions were prepared. The Pre-Draft Hazard Mitigation plan was advertised and shared with the public at three meetings.

The final draft plan was presented to our City Council for the review and adoption as our official agency hazard mitigation plan. It is recognized that this plan is adopted in coordination with our Malicious Event Vulnerability Assessment and Emergency Response Plan. Staff will utilize both documents as a guideline for future hazard mitigation actions, projects and grant proposals.

This letter serves to document that the City Council of Buena Park adopted the plan on November 14, 2006 with the recognition that the State Office of Emergency Services and the Federal Emergency Management Agency may suggest required changes to the plan, which will be incorporated.

Sincerely,

Jim Biery, P.E.
Director of Public Works

By: _____
Richard B. Kern
Associate Engineer

6650 Beach Boulevard, P.O. Box 5009, Buena Park, California, 90622-5009
(714) 562-3670 Fax (714) 562-3677
www.buenapark.com

# El Toro Water District

RECEIVED

NOV 0 3 2006

MWD OF OC

October 31, 2006

Water Emergency Response Organization
Of Orange County
Municipal Water District of Orange County
10500 Ellis Avenue
Fountain Valley, CA 92728

Attention: Ms. ~~Kelly~~ Hubbard Kelly

Subject: El Toro Water District Adoption of the Orange County Regional Water and Wastewater Multi-Hazard Mitigation Plan

Dear Ms. Hubbard:

On October 26, 2006 the Board of Directors of the El Toro Water District approved Resolution No. 06-10-2 which certified adoption of the above referenced Plan. Said Resolution is attached for your files.

Do not hesitate to contact me at (949) 837-7050, Ext. 219 or Mr. Renzo Marin at Ext. 217 if you should require any additional information. We look forward to working with you in the future as we prepare to take advantage of state and federal hazard mitigation funding opportunities. Your understanding of the plan development process and guidance was greatly appreciated.

Sincerely,

EL TORO WATER DISTRICT

Bob

Robert R. Hill
General Manager

cc: Mr. Renzo Marin

24251 Los Alisos Boulevard • Lake Forest, CA 92630 • (949) 837-7050 • FAX (949) 837-7092 • E-mail: district@etwd.com

RECEIVED

NOV 1 6 2006

PUBLIC WORKS
WATER

RESOLUTION NO. 8749-06

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF GARDEN GROVE ADOPTING THE ORANGE COUNTY REGIONAL WATER AND WASTEWATER MULTI-HAZARD MITIGATION PLAN PURSUANT TO THE DISASTER MITIGATION ACT OF 2000

WHEREAS, The Plan was prepared pursuant to the requirements of the Hazard Mitigation Act of 2000; and

WHEREAS, The City of Garden Grove recognizes the natural and manmade hazards that can affect the Orange County water and wastewater community; and

WHEREAS, The City of Garden Grove recognizes the potential effects those disasters can have on its ability to provide water and/or wastewater services to its customers; and

WHEREAS, The City of Garden Grove participated in the year long process with the Hazard Mitigation Working Group (staff representatives from the 20 public agencies) to identify critical infrastructure that is vulnerable to natural hazards; and

WHEREAS, The City of Garden Grove also participated in developing both regional and individual agency goals, objectives and action; and

WHEREAS, The Pre-Draft Hazard Mitigation Plan was advertised and shared with the public at two meetings; and

WHEREAS, It is recognized that this Plan is adopted in coordination with the Water Services Emergency Response Plan and staff will utilize both documents as a guideline for future hazard mitigation actions, projects and grant proposals; and

WHEREAS, The City of Garden Grove determined it was of benefit to participate in the Orange County Regional Water and Wastewater Multi-Hazard Mitigation Plan; and

WHEREAS, The Plan will require updating every five years and the Municipal Water District of Orange County will act as the regional facilitator for monitoring and updating of the Plan;

NOW THEREFORE, BE IT HEREBY RESOLVED that the City Council of the City of Garden Grove acknowledges the importance of Hazard Mitigation Planning and adopts the Plan with the recognition that the State Office of Emergency Services and the Federal Emergency Management Agency may suggest revisions to the Plan, which will be incorporated.

Adopted this 13th day of November 2006.

ATTEST:

/s/ WILLIAM J. DALTON
MAYOR

/s/ RUTH E. SMITH
CITY CLERK

STATE OF CALIFORNIA )
COUNTY OF ORANGE ) SS:
CITY OF GARDEN GROVE )

I, RUTH E. SMITH, City Clerk of the City of Garden Grove, do hereby certify that the foregoing Resolution was duly adopted by the City Council of the City of Garden Grove, California, at a meeting held on the 13th day of November 2006, by the following vote:

| | | | |
|---|---|---|---|
| AYES: | COUNCIL MEMBERS: | (4) | LEYES, NGUYEN, ROSEN, DALTON |
| NOES: | COUNCIL MEMBERS: | (0) | NONE |
| ABSENT: | COUNCIL MEMBERS: | (1) | KREBS |

/s/ RUTH E. SMITH
CITY CLERK

I declare under penalty of perjury that the foregoing instrument is a full, true and correct copy of the original on file in this office.

ATTEST: Kathleen Bailor
KATHLEEN BAILOR, Deputy City Clerk
City of Garden Grove

DATED: November 15, 2006

# LAGUNA BEACH COUNTY WATER DISTRICT

**DIRECTORS:**
JANE EGLY, President
KELLY BOYD, Vice President
TONI ISEMAN
CHERYL KINSMAN
ELIZABETH SCHNEIDER

**LEGAL COUNSEL:**
PAULA E. MEYER, ESQ.

**OFFICERS:**
RENAE M. HINCHEY
General Manager
JAMES R. NESTOR
District Engineer/
Assistant General Manager
ROBERT L. WESTPHAL
Auditor/Treasurer
CHRISTOPHER J. REGAN
Manager of Administration & Public Affairs

INCORPORATED 1935

January 31, 2007

Kelly Hubbard, Coordinator
Water Emergency Response Organization of Orange County
Municipal Water District of Orange County
10500 Ellis Avenue
Fountain Valley, CA 92728

Re: Adoption of the Orange County Regional Water and Wastewater Multi-Hazard Mitigation Plan

Dear Kelly:

Laguna Beach County Water District (LBCWD) recognizes the natural and manmade hazards that can affect the Orange County water and wastewater community. Due to the potential affects those disasters can have on our ability to provide water service to our customers, the District would like to participate in the Orange County Regional Water and Wastewater Multi-Hazard Mitigation.

LBCWD participated in the year-long process with the Hazard Mitigation Working Group (staff representatives from the 20 agencies) to identify critical infrastructure vulnerable to natural hazards. Based on the information developed in this process, agencies prepared regional and individual agency goals, as well as objectives and actions. The Pre-Draft Hazard Mitigation plan was advertised and shared with the public at three meetings.

At its January 30, 2007 meeting, the Board of Directors reviewed and adopted the final draft plan as our official agency hazard mitigation plan. This plan was adopted in coordination with our Malicious Event Vulnerability Assessment and Emergency Response Plan, and both will be used as guidelines for future hazard mitigation actions, projects, and grant proposals.

This letter serves to document that the Board of Directors of Laguna Beach County Water District adopted the plan on January 30, 2007, recognizing that the State Office of Emergency Services and the Federal Emergency Management Agency may suggest required changes to the plan that will be incorporated.

Sincerely,

Renae M. Hinchey

Renae M. Hinchey
General Manager

306 THIRD STREET • P.O. BOX 967, LAGUNA BEACH, CA 92652 • TEL: 949.494.1041 • FAX: 949.497.1021

City of La Habra
"A Caring Community"

ADMINISTRATION BUILDING
201 E. La Habra Boulevard
P.O. Box 337
La Habra, CA 90633-0337
Office: (562) 905-9700
Fax: (562) 905-9719

RECEIVED
OCT 19 2006
M... OF OC

October 16, 2006

Kelly Hubbard, Coordinator
Water Emergency Response Organization of Orange County
Municipal Water District of Orange County
10500 Ellis Avenue
Fountain Valley, Ca 92728

**SUBJECT: Adoption of the Orange County Regional Water and Wastewater Multi-Hazard Mitigation Plan.**

Dear Ms. Hubbard:

The City of La Habra recognizes the natural and manmade hazards that can affect the Orange County water and wastewater community. Due to the potential affects those disasters can have on our ability to provide (water and/or wastewater) services to our customers we determined it was of benefit to participate in the Orange County Regional Water and Wastewater Multi-Hazard Mitigation.

The City of La Habra participated in the year long process with the Hazard Mitigation Working Group (staff representatives from the 20 agencies) to identify critical infrastructure that is vulnerable to natural hazards. Based on the information developed both regional and individual agency goals, objectives and actions were prepared. The Pre-Draft Hazard Mitigation plan was advertised and shared with the public at three meetings.

The final draft plan was presented to our Council for review and adoption as our official agency hazard mitigation plan. It is recognized that this plan is adopted in coordination with our Vulnerability Assessment and Emergency Response Plan. Staff will utilize both documents as a guideline for future hazard mitigation actions, projects and grant proposals.

This letter serves to document that the City Council of the City of La Habra has adopted the plan on October 16, 2006 with the recognition that the State Office of Emergency Services and the Federal Emergency Management Agency may suggest required changes to the plan, which will be incorporated.

Sincerely,

Don Hannah, *Assistant City Manager*
City of La Habra

Printed on Recycled Paper.

Mesa Consolidated
Water District

RECEIVED

DEC 0 4 2006

MWD OF OC

*District Mission: Dedicated to Satisfying our Community's Water Needs*

November 29, 2006


**BOARD OF DIRECTORS**

**PAUL E. SHOENBERGER**
President
Division II

**JAMES F. ATKINSON**
First Vice President
Division IV

**FRED BOCKMILLER**
Vice President
Division I

**SHAWN DEWANE**
Vice President
Division V

**TRUDY OHLIG-HALL**
Vice President
Division III

**VICTORIA L. BEATLEY**
Interim General Manager

**COLEEN L. MONTELEONE**
District Secretary/
Interim Treasurer

**BOWIE, ARNESON, WILES & GIANNONE**
Legal Counsel


Kelly Hubbard, Coordinator
Water Emergency Response Organization of Orange County
Municipal Water District of Orange County
10500 Ellis Avenue
Fountain Valley, CA 92728

RE: Adoption of the Orange County Regional Water and Wastewater Multi-Hazard Mitigation Plan

Dear Ms. Hubbard:

Mesa Consolidated Water District (Mesa) recognizes the natural and manmade hazards that can impact the Orange County water and wastewater community. Due to the potential effects those disasters can have on our ability to provide (water and/or wastewater) services to our customers we determined it was of benefit to participate in the Orange County Regional Water and Wastewater Multi-Hazard Mitigation.

Mesa participated in the year long process with the Hazard Mitigation Working Group (staff representatives from the 20 agencies) to identify critical infrastructure that is vulnerable to natural hazards. Based on the information developed both regional and individual agency goals, objectives and actions were prepared. The Pre-Draft Hazard Mitigation plan was advertised and shared with the public at three meetings.

The final draft plan was presented to Mesa's Board of Directors for review and adoption as our official agency hazard mitigation plan. It is recognized that this plan is adopted in coordination with our Malicious Event Vulnerability Assessment and Emergency Response Plan. Staff will utilize both documents as a guideline for future hazard mitigation actions, projects and grant proposals.

This letter serves to document that the Board of Directors of Mesa Consolidated Water District adopted the plan on November 28, 2006, with the recognition that the State Office of Emergency Services and the Federal Emergency Management Agency may suggest required changes to the plan, which will be incorporated.

Sincerely,

Vicki Beatley

Victoria L. Beatley
Interim General Manager


P.O. Box 5008 ♦1965 Placentia Avenue (92627) ♦Costa Mesa, California 92628-5008
Telephone (949) 631-1200 ♦ FAX (949) 574-1036
**www.mesawater.org**

January 31, 2007

**Moulton Niguel Water**
*WATER QUALITY AND SERVICE ARE #1*

Ms. Kelly Hubbard, Coordinator
Water Emergency Response Organization of Orange County
Municipal Water District of Orange County
10500 Ellis Avenue
Fountain Valley, California 92728

Regarding: **Adoption of the Orange County Regional Water and Wastewater Multi-Hazard Mitigation Plan**

Dear Ms. Hubbard:

The Moulton Niguel Water District (MNWD) recognizes the natural and manmade hazards that can affect the Orange County water and wastewater community. Due to the potential affects those disasters can have on our ability to provide water and wastewater services to our customers, we determined it was of benefit to participate in the Orange County Regional Water and Wastewater Multi-Hazard Mitigation.

MNWD participated in the yearlong process with the Hazard Mitigation Working Group (staff representatives from the 20 agencies) to identify critical infrastructure that is vulnerable to natural hazards. Based on the information developed both regional and individual agency goals, objectives and actions were prepared. The Pre-Draft Hazard Mitigation plan was advertised and shared with the public at three meetings.

The final draft plan was presented to our Board of Directors on October 19, 2006 for review and adoption as our official agency hazard mitigation plan. It is recognized that this plan is adopted in coordination with our Malicious Event Vulnerability Assessment and Emergency Response Plan. Staff will utilize both documents as a guideline for future hazard mitigation actions, projects, and grant proposals.

This letter, along with Resolution No. 06-23 of the Board of Directors of MNWD attached to this letter, serves to document that the Board of Directors of MNWD adopted the plan on October 19, 2006 with the recognition that the State Office of Emergency Services and the Federal Management Agency may suggest required changes to the plan, which will be incorporated.

Sincerely,

MOULTON NIGUEL WATER

John V. Foley
General Manager

JVF:LCG

Attachment

*a public agency at:*
27500 La Paz Road, Laguna Niguel, CA 92677-3489
Mailing Address: P.O. Box 30203, Laguna Niguel, CA 92607-0203
949/831-2500

MUNICIPAL WATER DISTRICT OF ORANGE COUNTY

10500 Ellis Avenue
P.O. Box 20895
Fountain Valley, California 92728
(714) 963-3058
Fax: (714) 964-9389
www.mwdoc.com

Susan Hinman
*President*
Wayne A. Clark
*Vice-President*
Ergun Bakall
*Director*
Brett R. Barbre
*Director*
Larry D. Dick
*Director*
Joan C. Finnegan
*Director*
Ed Royce, Sr.
*Director*
Kevin P. Hunt, P.E.
*General Manager*

MEMBER AGENCIES

City of Brea
City of Buena Park
East Orange County Water District
El Toro Water District
Emerald Bay Service District
City of Fountain Valley
City of Garden Grove
Golden State Water Co.
City of Huntington Beach
Irvine Ranch Water District
Laguna Beach County Water District
City of La Habra
City of La Palma
Mesa Consolidated Water District
Moulton Niguel Water District
City of Newport Beach
City of Orange
Orange County Water District
Orange Park Acres Mutual Water Co.
City of San Clemente
City of San Juan Capistrano
Santa Margarita Water District
Santiago County Water District
City of Seal Beach
Serrano Water District
South Coast Water District
Trabuco Canyon Water District
City of Tustin
City of Westminster
Yorba Linda Water District

October 18, 2006

Kelly Hubbard, Coordinator
Water Emergency Response Organization of Orange County
Municipal Water District of Orange County
10500 Ellis Avenue
Fountain Valley, Ca 92728

Dear Ms. Hubbard,

**Adoption of the Orange County Regional Water and Wastewater Multi-Hazard Mitigation Plan**

The Municipal Water District of Orange County (MWDOC) recognizes the natural and manmade hazards that can affect the Orange County water and wastewater community. Due to the potential affects those disasters can have on our ability to provide (water and/or wastewater) services to our customers we determined it was of benefit to participate in the Orange County Regional Water and Wastewater Multi-Hazard Mitigation.

MWDOC participated in the year long process with the Hazard Mitigation Working Group (staff representatives from the 20 agencies) to identify critical infrastructure that is vulnerable to natural hazards. Based on the information developed both regional and individual agency goals, objectives and actions were prepared. The Pre-Draft Hazard Mitigation plan was advertised and shared with the public at three meetings.

The final draft plan was presented to our governing board for review and adoption as our official agency hazard mitigation plan. It is recognized that this plan is adopted in coordination with Emergency Response Plan. Staff will utilize both documents as a guideline for future hazard mitigation actions, projects and grant proposals.

This letter serves to document that the Governing Board of MWDOC adopted the plan on October 18, 2006 with the recognition that the State Office of Emergency Services and the Federal Emergency Management Agency may suggest required changes to the plan, which will be incorporated.

Sincerely,

Karl Seckel
Assistant General Manager

# CITY OF NEWPORT BEACH

RECEIVED
NOV 17 2006
MWE

November 15, 2006

Kelly Hubbard, Coordinator
Water Emergency Response Organization of Orange County
Municipal Water District of Orange County
10500 Ellis Avenue
Fountain Valley, Ca 92728

**Subject: Adoption of the Orange County Regional Water and Wastewater Multi-Hazard Mitigation Plan**

Dear Ms. Hubbard,

The City of Newport Beach recognizes the natural and manmade hazards that can affect the Orange County water and wastewater community. Due to the potential affects those disasters can have on our ability to provide water and wastewater services to our customers we determined it was of benefit to participate in the Orange County Regional Water and Wastewater Multi-Hazard Mitigation.

The City of Newport Beach participated in the year long process with the Hazard Mitigation Working Group (staff representatives from the 20 agencies) to identify critical infrastructure that is vulnerable to natural hazards. Based on the information developed both regional and individual agency goals, objectives and actions were prepared. The Pre-Draft Hazard Mitigation plan was advertised and shared with the public at three meetings.

The final draft plan was presented to our City Council for review and adoption as our official Water and Wastewater hazard mitigation plan. It is recognized that this plan is adopted in coordination with our Malicious Event Vulnerability Assessment and Emergency Response Plan. Staff will utilize both documents as a guideline for future hazard mitigation actions, projects and grant proposals.

This letter serves to document that the City Council of the City of Newport Beach adopted the plan on November 14, 2006 with the recognition that the State Office of Emergency Services and the Federal Emergency Management Agency may suggest required changes to the plan, which will be incorporated.

Sincerely,

Homer L. Bludau

Homer Bludau
City Manager

c: Dave Kiff, Assistant City Manager
Pete Antista, Utilities Director

*Directors*
PHILIP L. ANTHONY
WES BANNISTER
KATHRYN L. BARR
DENIS R. BILODEAU
RICHARD CHAVEZ
JAN DEBAY
SHAWN NELSON
STEPHEN R. SHELDON
JOSE SOLORIO
ROGER C. YOH

# ORANGE COUNTY WATER DISTRICT

*Orange County's Groundwater Authority*

*Officers*
PHILIP L. ANTHONY
*President*
JAN DEBAY
*First Vice President*
KATHRYN L. BARR
*Second Vice President*
—
VIRGINIA GREBBIEN
*General Manager*

October 19, 2006

Kelly Hubbard, Coordinator
Water Emergency Response Organization of Orange County
Municipal Water District of Orange County
10500 Ellis Avenue
Fountain Valley, CA 92708

Subject: Adoption of the Orange County Regional Water and Wastewater Multi-Hazard Mitigation Plan

Dear Miss Hubbard:

The Orange County Water District (OCWD) recognizes the natural and manmade hazards that can affect the Orange County water and wastewater community. Due to the potential affects those disasters can have on our ability to provide (water and/or wastewater) services to our customers, we determined it was of benefit to participate in the Orange County Regional Water and Wastewater Multi-Hazard Mitigation.

OCWD participated in the year long process with the Hazard Mitigation Working Group (staff representatives from the 20 agencies) to identify critical infrastructure that is vulnerable to natural hazards. Based on the information developed, both regional and individual agency goals, objectives and actions were prepared. The Pre-Draft Hazard Mitigation plan was advertised and shared with the public at three meetings.

The final draft plan was presented to our Board of Directors for review and adoption as our official agency hazard mitigation plan. It is recognized that this plan is adopted in coordination with our Malicious Event Vulnerability Assessment and Emergency Response Plan. Staff will utilize both documents as a guideline for future hazard mitigation actions, projects and grant proposals.

This letter serves to document that the Board of Directors of the Orange County Water District adopted the plan on October 18, 2006 with the recognition that the State Office of Emergency Services and the Federal Emergency Management Agency may suggest required changes to the plan, which will be incorporated.

P.O. Box 8300, Fountain Valley, CA 92728-8300 • 10500 Ellis Avenue, Fountain Valley, CA 92708
Telephone (714) 378-3200 Fax (714) 378-3373 Web Page www.ocwd.com

Truly yours,

Virginia Grebbien
General Manager

VG:LT

H:Document\Local Resources\LT\LoTan\OCWD Hazard Mitigation Plan

RECEIVED
NOV 30 2006
MWD OF OC

**RESOLUTION NO. 10137**

**A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF ORANGE APPROVING AND ADOPTING THE ORANGE COUNTY REGIONAL WATER AND WASTEWATER MULTI-HAZARD MITIGATION PLAN AS THE CITY'S OFFICIAL AGENCY HAZARD MITIGATION PLAN.**

**WHEREAS,** Federal legislation has historically provided funding for disaster relief, recovery and some hazard mitigation planning; and

**WHEREAS,** the Federal Disaster Mitigation Act of 2000 (Public Law 106-390; herein the DMA), the latest legislation to improve the hazard mitigation planning process, reinforces the importance of mitigation planning and emphasizes planning for disasters before they occur, allowing, among other things, national post-disaster Hazard Mitigation Grant Program funds to be used for planning activities, and increasing the amount of such funds available to states and communities that have developed a comprehensive, enhanced mitigation plan prior to a disaster; and

**WHEREAS,** the City of Orange participated with the Municipal Water District of Orange County (MWDOC) and eighteen other participating water and wastewater utilities in the County of Orange to develop that certain Orange County Regional Water and Wastewater Multi-Hazard Mitigation Plan, dated as of September 29, 2006 (herein referred to as the Plan), a copy of which has been presented to the City Council at the meeting at which this Resolution has been adopted; and

**WHEREAS,** in order to become eligible for funding and technical assistance for state and federal hazard mitigation programs, the City Council of the City of Orange is required to formally adopt the Plan.

STATE OF CALIFORNIA )
COUNTY OF ORANGE ) SS.
CITY OF ORANGE )

I, MARY E. MURPHY, City Clerk of the City of Orange, California, DO HEREBY CERTIFY

that the foregoing **RESOLUTION NO. 10137, (adopted 11/ 28/ 2006),** is a true and correct copy

as it appears on file in this office.

WITNESS my hand and Seal this 29th day of November, 2006.

(SEAL)

Mary E. Murphy

City Clerk of the City of Orange

BOARD OF DIRECTORS
BETTY H. OLSON, PH.D CHARLEY WILSON
SAUNDRA F. JACOBS SAM JOHNSON
ROGER FAUBEL JOHN J. SCHATZ
GENERAL MANAGER

# Santa Margarita Water District

RECEIVED
NOV 20 2006
MWD OF OC

November 15, 2006

Kelly Hubbard, Coordinator
Water Emergency Response Organization of Orange County
Municipal Water District of Orange County
10500 Ellis Avenue
Fountain Valley, Ca 92728

RE: Adoption of the Orange County Regional Water and Wastewater Multi-Hazard Mitigation Plan. Contract No. C-1717C.

Dear Ms. Hubbard:

This letter serves to document that the Board of Directors of the Santa Margarita Water District adopted the Orange County Regional Water and Wastewater Multi-Hazard Mitigation Plan on October 25, 2006. The Board of Directors recognizes that the State Office of Emergency Services and the Federal Emergency Management Agency may suggest changes to the plan, which would then be incorporated therein.

If you have any questions regarding this matter, please direct them to Ron Meyer at (949) 459-6594.

Sincerely,

John J. Schatz
General Manager
Santa Margarita Water District

26111 Antonio Parkway, Suite A, Las Flores, CA 92688
Mailing Address: P.O. Box 7005, Mission Viejo, CA 92690-7005
Customer Service (949) 459-6420 • Administration (949) 459-6600 • Operations (949) 459-6430

RECEIVED
NOV 1 7 2006
MWD OF OC

**SERRANO WATER DISTRICT**
18021 EAST LINCOLN STREET
VILLA PARK, CA 92861-6446
**714-538-0079**

**Directors**
Robert F. Rickerl, President
Lloyd Appelman
Jerry L. Haight
Kenneth P. Henderson
C.L. "Larry" Pharris, Jr., Vice President

David H. Noyes, General Manager

November 14, 2006

Kelly Hubbard, Coordinator
Water Emergency Response Organization of Orange County
Municipal Water District of Orange County
10500 Ellis Avenue
Fountain Valley, Ca 92728

**Re: Adoption of the Orange County Regional Water and Wastewater Multi-Hazard Mitigation Plan**

Dear Ms. Hubbard,

The Serrano Water District recognizes the natural and manmade hazards that can affect the Orange County water and wastewater community. Due to the potential affects those disasters can have on our ability to provide (water and/or wastewater) services to our customers we determined it was of benefit to participate in the Orange County Regional Water and Wastewater Multi-Hazard Mitigation.

Serrano Water District participated in the year long process with the Hazard Mitigation Working Group (staff representatives from the 20 agencies) to identify critical infrastructure that is vulnerable to natural hazards. Based on the information developed both regional and individual agency goals, objectives and actions were prepared. The Pre-Draft Hazard Mitigation plan was advertised and shared with the public at three meetings.

The final draft plan was presented to our Board of Directors for review and adoption as our official agency hazard mitigation plan. It is recognized that this plan is adopted in coordination with our Malicious Event Vulnerability Assessment and Emergency Response Plan. Staff will utilize both documents as a guideline for future hazard mitigation actions, projects and grant proposals.

This letter serves to document that the Board of Directors of the Serrano Water District adopted the plan on November 14, 2006 with the recognition that the State Office of Emergency Services

SOCWA

South Orange County Wastewater Authority

RECEIVED

DEC 11 2006

MWD OF OC

December 8, 2006

Kelly Hubbard, Coordinator
Water Emergency Response Organization of Orange County
Municipal Water District of Orange County
10500 Ellis Avenue
Fountain Valley, CA 92728

RE: Adoption of the Orange County Regional Water and Wastewater Multi-Hazard Mitigation Plan

Dear Ms. Hubbard:

The South Orange County Wastewater Authority recognizes the natural and manmade hazards that can affect the Orange County water and wastewater community. Due to the potential affects those disasters can have on our ability to provide wastewater services to our customers we determined it was of benefit to participate in the Orange County Regional Water and Wastewater Multi-Hazard Mitigation.

South Orange County Wastewater Authority participated in the year long process with the Hazard Mitigation Working Group to identify critical infrastructure that is vulnerable to natural hazards. Based on the information developed both regional and individual agency goals, objectives and actions were prepared. The Pre-Draft Hazard Mitigation plan was advertised and shared with the public at three meetings.

The final draft plan was presented to our Board of Directors for review and adoption as our official agency hazard mitigation plan. It is recognized that this plan is adopted in coordination with our Malicious Event Vulnerability Assessment and Emergency Response Plan. Staff will utilize both documents as guideline for future hazard mitigation actions, projects and grant proposals.

This letter serves to document that the Board of Directors of South Orange County Wastewater Authority adopted the plan on December 7, 2006, with the recognition that the State Office of Emergency Services and the Federal Emergency Management Agency may suggest required changes to the plan, which will be incorporated.

Sincerely,

Tom Rosales

Tom Rosales
General Manager
South Orange County Wastewater Authority

34156 Del Obispo Street • Dana Point, CA 92629 • Phone: (949) 234-5400 • Fax: (949) 489-0130 • Website: www.socwa.com

A public agency created by: CITY OF LAGUNA BEACH • CITY OF SAN CLEMENTE • CITY OF SAN JUAN CAPISTRANO • EL TORO WATER DISTRICT • EMERALD BAY SERVICE DISTRICT
IRVINE RANCH WATER DISTRICT • MOULTON NIGUEL WATER DISTRICT • SANTA MARGARITA WATER DISTRICT • SOUTH COAST WATER DISTRICT • TRABUCO CANYON WATER DISTRICT

STAFF MEMBERS

Don Chadd, General Manager
Hector Ruiz, District Engineer
Sharon E. Smith, Secretary/Treasurer

TRABUCO CANYON
WATER DISTRICT

BOARD OF DIRECTORS

Glenn Acosta, President
James Haselton, Vice President
Matthew Disston, Director
Michael Safranski, Director
Edward Mandich, Director

RECEIVED
OCT 2 6 2006
MWD OF OC

October 23, 2006

Ms. Kelly Hubbard, Coordinator
Water Emergency Response Organization of Orange County
Municipal Water District of Orange County
10500 Ellis Avenue
Fountain Valley, CA 92728

RE: Adoption of the Orange County Regional Water and Wastewater Multi-Hazard Mitigation Plan

Dear Ms. Hubbard:

The Trabuco Canyon Water District (TCWD) recognizes the natural and manmade hazards that can affect the Orange County water and wastewater community. Due to the potential affects those disasters can have on our ability to provide water and wastewater services to our customers, TCWD determined it was of benefit to participate in the Orange County Regional Water and Wastewater Multi-Hazard Mitigation.

TCWD participated in the year-long process with the Hazard Mitigation Working Group (staff representatives from the 20 agencies) to identify critical infrastructure that is vulnerable to natural hazards. Based on the information developed, both regional and individual agency goals, objectives, and actions were prepared. The Pre-Draft Hazard Mitigation Plan was advertised and shared with the public at three meetings.

The final draft plan was represented to the TCWD Board of Directors at its October 18, 2006 Regular Board Meeting for review and adoption as TCWD's official agency hazard mitigation plan. It is recognized that this plan is adopted in coordination with the Malicious Event Vulnerability Assessment and Emergency Response Plan. Staff will utilize both documents as a guideline for future hazard mitigation actions, projects, and grant proposals.

32003 Dove Canyon Drive, Trabuco Canyon, CA 92679 · 949/858-0277 · Fax: 949/858-3025
www.tcwd.ca.gov

This letter serves to document that the Board of Directors of the Trabuco Canyon Water District adopted the plan on October 18, 2006 with the recognition that the State Office of Emergency Services and the Federal Emergency Management Agency may suggest required changes in the plan which will be incorporated.

Sincerely,

Don Chadd
General Manager
Trabuco Canyon Water District

DC:ses

# City of Westminster

CIVIC CENTER
8200 WESTMINSTER BOULEVARD
WESTMINSTER, CALIFORNIA 92683
(714) 898-3311

MARGIE L. RICE
MAYOR

FRANK G. FRY
MAYOR PRO TEM

KERMIT D. MARSH
COUNCIL MEMBER

ANDY QUACH
COUNCIL MEMBER

ANDREW E. HALL
INTERIM CITY MANAGER

October 26th, 2006

RECEIVED
OCT 30 2006
MWD OF OC

Kelly Hubbard, Coordinator
Water Emergency Response Organization of Orange County
Municipal Water District of Orange County
10500 Ellis Avenue
Fountain Valley, CA 92728

**Subject: Adoption of the Orange County Regional Water and Wastewater Multi-Hazard Mitigation Plan**

Dear Ms. Hubbard,

The City of Westminster recognizes that natural and manmade hazards can affect the Orange County water and wastewater community. Due to the potential affects those disasters can have on our ability to provide water services to our customers, we determined it was beneficial to participate in the Orange County Regional Water and Wastewater Multi-Hazard Mitigation Plan.

The Westminster Water Division participated in a year long process with the Hazard Mitigation Working Group (staff representatives from 20 agencies) to identify critical infrastructure that is vulnerable to natural hazards. Based on the information developed, both regional and retail agency goals, objectives, and actions were prepared. The Pre-Draft Hazard Mitigation Plan was advertised and shared with the public at three meetings.

The final draft plan was presented to our City Council for review and adoption as our official hazard mitigation plan. It is recognized that this plan is adopted in coordination with our Vulnerability Assessment and Water Emergency Response Plan. Water Division Staff will also utilize both documents as a guideline for future hazard mitigation actions, projects, and grant proposals.

This letter serves to document that the Westminster City Council adopted the plan on October 25, 2006 with Resolution No. 4044, with the recognition that the State Office of Emergency Services, and the Federal Emergency Management Agency, may suggest required changes to the plan, which will be incorporated.

Sincerely,

Scott Miller

Scott Miller / Water Superintendent
City of Westminster

**YORBA LINDA WATER DISTRICT**

DIRECTORS

Paul R. Armstrong

Michael J. Beverage

Ric P. Collett

William R. Mills

John W. Summerfield

GENERAL MANAGER

Michael A. Payne

4622 Plumosa Drive
P.O. Box 309
Yorba Linda, CA 92885

Tel: (714) 777-9593
Fax: (714) 701-0413

Email: ylwd@ylwd.com
Web: www.ylwd.com

RECEIVED

OCT 30 2006

MWD OF OC

October 26, 2006

Kelly Hubbard, Coordinator
Water Emergency Response Organization of Orange County
Municipal Water District of Orange County
10500 Ellis Avenue
Fountain Valley, CA 92728

Re: Adoption of the Orange County Regional Water and Wastewater Multi-Hazard Mitigation Plan

Dear Ms. Hubbard,

The Yorba Linda Water District recognizes the natural and manmade hazards that can affect the Orange County water and wastewater community. Due to the potential affects those disasters can have on our ability to provide (water and/or wastewater) services to our customers we determined it was of benefit to participate in the Orange County Regional Water and Wastewater Multi-Hazard Mitigation.

Yorba Linda Water District participated in the year long process with the Hazard Mitigation Working Group (staff representatives from the 20 agencies) to identify critical infrastructure that is vulnerable to natural hazards. Based on the information developed both regional and individual agency goals, objectives and actions were prepared. The Pre-Draft Hazard Mitigation plan was advertised and shared with the public at three meetings.

The final draft plan was presented to Yorba Linda Water District's Board of Directors for review and adoption as our official agency hazard mitigation plan. It is recognized that this plan is adopted in coordination with Malicious Event Vulnerability Assessment and Emergency Response Plan. Staff will utilize both documents as a guideline for future hazard mitigation actions, projects and grant proposals.

This letter serves to document that the Board of Directors of Yorba Linda Water District adopted the OC HAZMIT plan on October 26, 2006 with the recognition that the State Office of Emergency Services and the Federal Emergency Management Agency may suggest required changes to the plan, which will be incorporated.

Sincerely,

Michael A. Payne
General Manager
Yorba Linda Water District

Attachment: Certified Copy of YLWD Resolution No. 06-11

**YORBA LINDA WATER DISTRICT**

DIRECTORS

Paul R. Armstrong

Michael J. Beverage

Ric P. Collett

William R. Mills

John W. Summerfield

GENERAL MANAGER

Michael A. Payne

4622 Plumosa Drive
P.O. Box 309
Yorba Linda, CA 92885

Tel: (714) 777-9593
Fax: (714) 701-0413

Email: ylwd@ylwd.com
Web: www.ylwd.com

October 26, 2006

To Whom It May Concern:

The attached is a true and correct copy of Resolution 06-11 adopted at the Board of Directors meeting held October 26, 2006.

Certified by:

Michael A. Payne
Secretary/General Manager

**RESOLUTION NO. 06-11**

**RESOLUTION OF THE BOARD OF DIRECTORS
OF YORBA LINDA WATER DISTRICT
ADOPTING THE ORANGE COUNTY REGIONAL WATER AND WASTEWATER MULTI-HAZARD MITIGATION (HAZMIT) PLAN**

**WHEREAS,** the Yorba Linda Water District recognizes the natural and manmade hazards that can affect the Orange County water and wastewater community and due to the potential affects those disasters can have on its ability to provide services to its customers, and

**WHEREAS,** the District provides retail water and sewer services to residents in most of the City of Yorba Linda, portions of the Cities of Placentia, Brea and Anaheim, and certain unincorporated areas of Orange County, and

**WHEREAS,** the District's mission is to provide reliable, high quality water and sewer services in an environmentally responsible manner, and

**NOW, THEREFORE, BE IT RESOLVED** that the Board of Directors of Yorba Linda Water District finds and determines as follows:

**Section 1.** The District determines it is of benefit to participate in the Orange County Regional Water and Wastewater Multi-Hazard Mitigation Plan.

**Section 2**. The District hereby declares that it adopts the Orange County Regional Water and Wastewater Multi-Hazard Mitigation Plan, subject to incorporation of comments, if any, by the State Office of Emergency Services and the Federal Emergency Management Agency upon completion of their review.

**Section 3**. The District staff shall prepare a letter to the Water Emergency Response Organization of Orange County certifying adoption, substantially in the form of Exhibit A.

**PASSED AND ADOPTED** this 26th day of October 2006 by the following called vote:

AYES: Armstrong, Mills, Summerfield
NOES: None
ABSENT: Beverage, Collett
ABSTAIN: None

President, Paul R. Armstrong
Yorba Linda Water District

ATTEST:

Secretary, Michael A. Payne
Yorba Linda Water District

# Appendix G CA OES Local Hazard Mitigation Plan Crosswalk

**FEMA Region IX – CA OES Local Hazard Mitigation Plan (LHMP) Crosswalk (includes Flood Mitigation Assistance {FMA} Requirements)**

**Jurisdiction:** **Date of Plan:**

**Instructions for using the plan review crosswalk single/multi-jurisdiction local hazard mitigation plans (LHMPs) as well as FMA.**

Attached is a Plan Review Crosswalk based on the ***Multi-Hazard Mitigation Planning Guidance Under the Disaster Mitigation Act of 2000***, dated March 2004. This Plan Review Crosswalk is consistent with the *Disaster Mitigation Act of 2000* (P.L. 106-390), enacted October 30, 2000 and *44 CFR Part 201 – Mitigation Planning, Interim Final Rule* (the Rule), published February 26, 2002.

**Explanation of the Rule "shall" and "should" language. Planning criteria with the word *"shall"* means that the information is required to be included in the mitigation plan in order to receive FEMA approval. Planning criteria that have the words *"should"* indicates information that supports comprehensive local and State planning, but is not required at this time.**

**SCORING SYSTEM**

**N – Needs Improvement:** The plan does not meet the minimum for the requirement. Reviewer's comments must be provided.

**S – Satisfactory:** The plan meets the minimum for the requirement. Reviewer's comments are encouraged, but not required.

Each requirement includes separate elements. All elements of a requirement must be rated "Satisfactory" in order for the requirement to be fulfilled and receive a summary score of "Satisfactory." ***All planning elements must be included; however, a "Needs Improvement" score in the gray shaded areas will not preclude the plan from being approved by FEMA.*** When reviewing Single Jurisdiction Plans (SJP), reviewers may want to put an N/A in the boxes for multi-jurisdictional plan requirements. When reviewing multi-jurisdictional plans, reviewers may want to put an N/A in the prerequisite box for single jurisdiction plans.

States that have additional requirements can add them in the appropriate sections of the *Multi-Hazard Mitigation Planning Guidance* or create a new section and modify this Plan Review Crosswalk to record the score for those requirements. ***As part of a jurisdiction's participation in California's local hazard mitigation planning program, California requests completion of a local capabilities assessment as indicated in Section 2.2 of this Crosswalk.***

Optional matrices for assisting in the review of sections on profiling hazards, assessing vulnerability, and identifying and analyzing mitigation actions are found at the end of the Plan Review Crosswalk.

Please Note: Prior to submission and as illustrated in the example below, jurisdiction(s) submitting the plan for review and approval are required to complete the 2nd column of the crosswalk titled "Location in the Plan".

**This example box is provided to illustrate how the local jurisdiction needs to complete the second column and further provides an example of how the FEMA review will be completed.** Assessing Vulnerability: Overview - ***Requirement §201.6(c)(2)(ii):*** *[The risk assessment **shall** include a] description of the jurisdiction's vulnerability to the hazards described in paragraph (c)(2)(i) of this section. This description **shall** include an overall summary of each hazard and its impact on the community.*

| Element | Location in the Plan (section or annex and page #) | Reviewer's Comments | SCORE N | SCORE S |
|---|---|---|---|---|
| A. Does the plan include an **overall summary** description of the jurisdiction's **vulnerability** to each hazard? | | The plan describes the types of assets that are located within geographically defined hazard areas as well as those that would be affected by winter storms. | | X |
| B. Does the plan address the **impact** of each hazard on the jurisdiction? | | The plan does not address the impact of two of the five hazards addressed in the plan.<br>**Required Revisions:**<br>• Include a description of the impact of floods and earthquakes on the assets.<br>**Recommended Revisions:** | X | |

| | | | | |
|---|---|---|---|---|
| | | This information can be presented in terms of dollar value or percentages of damage. | | |
| | | SUMMARY SCORE | X | |

## Single Jurisdiction, Local Hazard Mitigation Plan (LHMP) & Multi-Jurisdictional, LHMP Review and Approval Status

| **Single/Lead Jurisdiction:** | **Title of MJP Plan:** | **Date of Plan:** |
|---|---|---|
| MUNICIPAL WATER DISTRICT OF ORANGE COUNTY | ORANGE COUNTY WATER AND WASTEWATER REGIONAL MULTI HAZARD PLAN | 9-29-2006 |

| | |
|---|---|
| **Local Point of Contact:**<br>**KELLY HUBBARD** | **Address:**<br><br>**10500 ELLIS AVE**<br>**FOUNTAIN VALLEY, CA 29728** |
| **Title:**<br>**WEROC PROGRAMS MANAGER** | |
| **Agency:**<br>**MUNICIPAL WATER DISTRICT OF ORANGE COUNTY** | |
| **Phone Number:**<br>**714-593-5010** | **E-Mail:**<br>**KHUBBARD@MWDOC.COM** |

| **State Reviewer:** | **Title:** | **Date:** |
|---|---|---|
| | | |

| | | |
|---|---|---|
| **SECTION 1 FEMA REVIEWER:** | **Title:** | **Date:** |
| **SECTION 2 DATE RECEIVED IN FEMA REGION [INSERT #]** | | |
| **SECTION 3 PLAN NOT APPROVED** | | |
| **Plan Approved** | | |
| **Date Approved** | | |

| | |
|---|---|
| **List single jurisdiction or, If MJP, list Participating Jurisdictions, including the "Lead Jurisdiction":** | **SECTION 4 NFIP STATUS*** |

**FEMA Region IX – CA OES Local Hazard Mitigation Plan (LHMP) Crosswalk (includes Flood Mitigation Assistance {FMA} Requirements)**

**Jurisdiction:** **Date of Plan:**

| | Y | N | N/A | CRS Class |
|---|---|---|---|---|
| 1. SEE EXCEL SHEET | | | | |
| 2. | | | | |
| 3. | | | | |
| 4. [ATTACH PAGE(S) WITH ADDITIONAL JURISDICTIONS] | | | | |

*** Notes:** **Y = Participating** **N = Not Participating** **N/A = Not Mapped**

**FEMA Region IX – CA OES Local Hazard Mitigation Plan (LHMP) Crosswalk (includes Flood Mitigation Assistance {FMA} Requirements)**

**Jurisdiction:** **Date of Plan:**

## LOCAL MITIGATION PLAN REVIEW SUMMARY

**The plan cannot be approved if the plan has not formally been adopted.**

Each requirement includes separate elements. All elements of the requirement must be rated "Satisfactory" in order for the requirement to be fulfilled and receive a score of "Satisfactory." Elements of each requirement are listed on the following pages of the Plan Review Crosswalk.

***All planning elements must be included, however a "Needs Improvement" score in the gray shaded areas will not preclude the plan from being approved by FEMA.***

Reviewer's comments must be provided for requirements receiving a **"Needs Improvement"** score.

**SCORING SYSTEM** - Please check one of the following for each requirement.

**N – Needs Improvement:** The plan does not meet the minimum for the requirement. Reviewer's comments must be provided.

**S – Satisfactory:** The plan meets the minimum for the requirement. Reviewer's comments are encouraged, but not required.

| **1.0 Prerequisite(s) (Check Applicable Box)** | **LHMP** | | **FMA** | |
|---|---|---|---|---|
| | **NOT MET** | **MET** | **NOT MET** | **MET** |
| **1.1 Adoption by the Local Governing Body: §201.6(c)(5) & §78.5(f)** **OR** | | | | |
| **1.2 Multi-Jurisdictional Plan Adoption: §201.6(c)(5) &§ 78.5(f)** **AND** | | | | |
| **1.3 Multi-Jurisdictional Planning Participation: 201.6(a)(3) &§ 78.5(a)** | | | | |

| **2.0 Planning Process** | **N** | **S** | **N** | **S** |
|---|---|---|---|---|
| **2.1** Documentation of the Planning Process: §201.6(b) and §201.6(c)(1) &§ 78.5(a) | | | | |
| **2.2** Local Capabilities Assessment §201.4(c)(ii) and §201.6(c)(1) [This section is reviewed and scored by OES.] | | | | |

| **3.0 Risk Assessment** | **N** | **S** | **N** | **S** |
|---|---|---|---|---|
| **3.1** Identifying Hazards: §201.6(c)(2)(i) & §78.5(b) | | | | |
| **3.2** Profiling Hazards: §201.6(c)(2)(i) & §78.5(b) | | | | |
| **3.3** Assessing Vulnerability: Overview: §201.6(c)(2)(ii) & §78.5(b) | | | | |
| **3.4** Assessing Vulnerability: Identifying Structures: 201.6(c)(2)(ii)(A) & §78.5(b) | | | | |
| **3.5** Assessing Vulnerability: Estimating Potential Losses: §201.6(c)(2)(ii)(B) | | | | |
| **3.6** Assessing Vulnerability: Analyzing Development Trends: §201.6(c)(2)(ii)(C) | | | | |
| **3.7** Multi-Jurisdictional Risk Assessment: §201.6(c)(2)(iii) & FEMA 299 | | | | |

| **4.0 Mitigation Strategy** | **N** | **S** | **N** | **S** |
|---|---|---|---|---|
| **4.1** Local Hazard Mitigation Goals: §201.6(c)(3)(i) & §78.5(c) | | | | |
| **4.2** Identification and Analysis of Mitigation Actions: §201.6(c)(3)(ii) & §78.5(d) | | | | |
| **4.3** Implementation of Mitigation Actions: §201.6(c)(3)(iii) & §78.5(d)(e) | | | | |
| **4.4** Multi-Jurisdictional Mitigation Actions: §201.6(c)(3)(iv) & FEMA 299 | | | | |

| **5.0 Plan Maintenance Process** | **N** | **S** | **N** | **S** |
|---|---|---|---|---|
| **5.1** Monitoring, Evaluating, and Updating the Plan: 201.6(c)(4)(i) & §78.5(e) | | | | |
| **5.2** Incorporation into Existing Planning Mechanisms: §201.6(c)(4)(ii) | | | | |
| **5.3** Continued Public Involvement: §201.6(c)(4)(iii) | | | | |

**STATE OES REVIEW STATUS OF THE LHMP OR FMP:**

STATE OES REVIEW COMPLETED on DATE: _____

FORWARDED TO FEMA FOR REVIEW/APPROVAL DATE: _____

**FEMA REVIEW STATUS OF THE LHMP OR FMP:**

FEMA REVIEW COMPLETE, PLAN RETURNED DATE: _____

FEMA REVIEW COMPLETE, PLAN APPROVED DATE: _____

## 4.1.1.1 1.0 PREREQUISITE(S)

### 1.1 Adoption by the Local Governing Body

***Requirement §201.6(c)(5)*:** *[The local hazard mitigation plan **shall** include] documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval of the plan (e.g., City Council, County Commissioner, Tribal Council).*
***FMA Requirement §78.5(f):*** *Documentation of formal plan adoption by the legal entity submitting the plan (e.g., Governor, Mayor, County Executive, etc.).*

| Element | Location in the Plan (section or annex and page #) [This column to be completed by the submitting jurisdiction(s)] | Reviewer's Comments | LHMP | | FMA | |
|---|---|---|---|---|---|---|
| | | | NOT MET | MET | NOT MET | MET |
| A. Has the local governing body adopted the plan? | YES | | | | | |
| B. Is supporting documentation, such as a resolution, included? | APPENDIX F | | | | | |
| | | SUMMARY SCORE | | | | |

### 1.2 Multi-Jurisdictional Plan Adoption

***Requirement §201.6(c)(5)*:** *For multi-jurisdictional plans, each jurisdiction requesting approval of the plan **must** document that it has been formally adopted.*
***FMA Requirement §78.5(f):*** *Documentation of formal plan adoption by the legal entity submitting the plan (e.g., Governor, Mayor, County Executive, etc.)*

| Element | Location in the Plan (section or annex and page #) | Reviewer's Comments | LHMP | | FMA | |
|---|---|---|---|---|---|---|
| | | | NOT MET | MET | NOT MET | MET |
| A. Does the plan indicate the specific jurisdictions represented in the plan? | SECTION 2 PAGES: 2-1 TO 2-11 | | | | | |
| B. For each jurisdiction, has the local governing body adopted the plan? | SCHEDULED FOR BOARD APPROVAL BY DECEMBER 2006 | | | | | |
| C. Is supporting documentation, such as a resolution, included for each participating jurisdiction? | LETTER OF ADOPTION TO BE ADDED | | | | | |
| | | SUMMARY SCORE | | | | |

### 1.3 Multi-Jurisdictional Planning Participation

***Requirement §201.6(a)(3):*** *Multi-jurisdictional plans (e.g., watershed plans) may be accepted, as appropriate, as long as each jurisdiction has participated in the process … Statewide plans will not be accepted as multi-jurisdictional plans.*
***FMA Requirement §78.5(a):*** *Description of the planning process and public involvement. Public involvement **may** include workshops, public meetings & hearings.*

| Element | Location in the Plan (section or annex and page #) | Reviewer's Comments | LHMP | | FMA | |
|---|---|---|---|---|---|---|
| | | | NOT MET | MET | NOT MET | MET |
| A. Does the plan describe **how** each jurisdiction participated in the plan's development? | SECTION 3 PAGES: 3-1 TO 3-8 | | | | | |
| | | SUMMARY SCORE | | | | |

## 2.0 PLANNING PROCESS: *§201.6(b): An open public involvement process is essential to the development of an effective plan.*

### 2.1 Documentation of the Planning Process

***Requirement §201.6(b):*** *In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process **shall** include:*
*(1) An opportunity for the public to comment on the plan during the drafting stage and prior to plan approval;*
*(2) An opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia and other private and non-profit interests to be involved in the planning process; and*
*(3) Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.*

***Requirement §201.6(c)(1):*** *[The plan **shall** document] the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.*
***FMA Requirement §78.5(a):*** *Description of the planning process and public involvement. Public involvement **may** include workshops, public meetings & hearings.*

| Element | Location in the Plan (section or annex and page #) | Reviewer's Comments | SCORE | | | |
|---|---|---|---|---|---|---|
| | | | LHMP | | FMA | |
| | | | N | S | N | S |
| A. Does the plan provide a narrative description of the process followed to prepare the plan? | SECTION 3 PAGES: 3-1 TO 3-8 | | | | | |
| B. Does the plan indicate who was involved in the planning process? (For example, who led the development at the staff level and were there any external contributors such as contractors? Who participated on the plan committee, provided information, reviewed drafts, etc.?) | SECTION 3 PAGES: 3-2 TO 3-4 | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| C. Does the plan indicate how the public was involved? (Was the public provided an opportunity to comment on the plan during the drafting stage and prior to the plan approval?) | SECTION 3<br>PAGES: 3-6 TO 3-7 | | | | | |
| D. Was there an opportunity for neighboring communities, agencies, businesses, academia, nonprofits, and other interested parties to be involved in the planning process? | SECTION 3<br>PAGES 3-6 TO 3-7 | ***Note: A "Needs Improvement" score on this requirement will not preclude the FMA plan from passing.*** | | | | |
| E. Does the planning process describe the review and incorporation, if appropriate, of existing plans, studies, reports, and technical information? | SECTOIN 3<br>PAGES 3-7 TO 3-8 | ***Note: A "Needs Improvement" score on this requirement will not preclude the FMA plan from passing.*** | | | | |
| | | SUMMARY SCORE | | | | |

## 2.2 Local Capabilities Assessment (State OES Requested Information)

***Requirement §201.4(c)(3)(ii):*** *– Of the Federal Register Interim Final Rule 44 CFR Parts 201 and 206 states, "[The **State** mitigation strategy **shall** include] a general description and analysis of the effectiveness of local mitigation policies, programs, and capabilities.*

***The following elements should be covered as they provide information that assists the State to meet the required planning element in the State's mitigation plan. More importantly, providing this information benefits the local community in their planning efforts. A "Needs Improvement" score will not preclude either plan from being recommended for approval by OES or approved by FEMA.***

| Element | Location in the Plan (section or annex and page #) | Reviewer's Comments | SCORE | | | |
|---|---|---|---|---|---|---|
| | | | LHMP | | FMA | |
| | | | N | S | N | S |
| A. Does the plan provide a description of the human and technical resources available within this jurisdiction to engage in a mitigation planning process and to develop a local hazard mitigation plan? | | | | | | |
| B. Does the plan list local mitigation financial resources and funding sources (such as taxes, fees, assessments or fines) which affect or promote mitigation within the reporting jurisdiction? | | | | | | |
| C. Does the plan list local ordinances which affect or promote disaster mitigation, preparedness, response or recovery within the reporting jurisdiction? | | | | | | |
| D. Does the plan describe the details of in-progress, ongoing or | | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| completed mitigation projects and programs within the reporting jurisdiction? | | | | | | |
| STATE OES SUMMARY SCORE | | | | | | |

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

## 3.1 Identifying Hazards

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

***FMA Requirement §78.5(b):*** *Description of the existing flood hazard and identification of the flood risk, including estimates of the number and type of structures at risk, repetitive loss properties, and the extent of flood depth and damage potential.*

| Element | Location in the Plan (section or annex and page #) | Reviewer's Comments | LHMP N | LHMP S | FMA N | FMA S |
|---|---|---|---|---|---|---|
| A. Does the plan include **a description** of the types of **all natural hazards** that affect the jurisdiction?<br>If the hazard identification omits (without explanation) any hazards commonly recognized as threats to the jurisdiction, this part of the plan cannot receive a Satisfactory score.<br>Consult with the State Hazard Mitigation Officer to identify applicable hazards that may occur in the planning area. | SECTION 4<br>PAGES: 4-1 TO 4-78 | | | | | |
| | | SUMMARY SCORE | | | | |

## 3.2 Profiling Hazards

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

***FMA Requirement §78.5(b):*** *Description of the existing flood hazard and identification of the flood risk, including estimates of the number and type of structures at risk, repetitive loss properties, and the extent of flood depth and damage potential.*

| Element | Location in the Plan (section or annex and page #) | Reviewer's Comments | SCORE N | SCORE S | N | S |
|---|---|---|---|---|---|---|
| A. Does the risk assessment identify the **location** (i.e., geographic area affected) of each natural hazard addressed in the plan? | SECTION 5<br>PAGES: 5-1 TO 5-191 & FIGURES: 4.31A TO 4.4.3.1-6 | | | | | |
| B. Does the risk assessment identify the **extent** (i.e., magnitude or severity) of each hazard addressed in the plan? | SECTION 5<br>PAGES: 5-1 TO 5-191 & SECTION 4<br>FIGURES: 4.31A TO 4.4.3.1-6 | | | | | |
| C. Does the plan provide information on **previous occurrences** of each hazard addressed in the plan? | SECTION 5<br>PAGES: 5-1 TO 5-191 & SECTION 4<br>FIGURES: 4.31A TO 4.4.3.1-6 | | | | | |
| D. Does the plan include the **probability of future events** (i.e., chance of occurrence) for each hazard addressed in the plan? | SECTION 5<br>PAGES: 5-1 TO 5-191 & SECTION 4<br>FIGURES: 4.31A TO 4.4.3.1-6 | | | | | |
| | | SUMMARY SCORE | | | | |

### 3.3 Assessing Vulnerability: Overview

***Requirement §201.6(c)(2)(ii):*** *[The risk assessment **shall** include a] description of the jurisdiction's vulnerability to the hazards described in paragraph (c)(2)(i) of this section. This description **shall** include an overall summary of each hazard and its impact on the community.*
***FMA Requirement §78.5(b):*** *Description of the existing flood hazard and identification of the flood risk, including estimates of the number and type of structures at risk, repetitive loss properties, and the extent of flood depth and damage potential.*

| Element | Location in the Plan (section or annex and page #) | Reviewer's Comments | LHMP | | FMA | |
|---|---|---|---|---|---|---|
| | | | N | S | N | S |
| A. Does the plan include an **overall summary** description of the jurisdiction's **vulnerability** to each hazard? | SECTION 4<br>PAGES: 4-1 TO 4-78 | | | | |
| B. Does the plan address the **impact** of each hazard on the jurisdiction? | SECTION 4<br>PAGES 4-1 TO 4-78 &<br>TABLES: 4.4.2-3 TO 4.4.2-13 | | | | | |
| | | SUMMARY SCORE | | | | |

### 3.4 Assessing Vulnerability: Identifying Structures

***Requirement §201.6(c)(2)(ii)(A):*** *The plan **should** describe vulnerability in terms of the types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard area … .*
***FMA Requirement §78.5(b):*** *Description of the existing flood hazard and identification of the flood risk, including estimates of the number and type of structures at risk, repetitive loss properties, and the extent of flood depth and damage potential.*

| Element | Location in the Plan (section or annex and page #) | Reviewer's Comments | LHMP | | FMA | |
|---|---|---|---|---|---|---|
| | | | N | S | N | S |
| A. Does the plan describe vulnerability in terms of the **types and numbers** of **existing** buildings (including repetitive loss structures), infrastructure, and critical facilities located in the identified hazard areas? | SECTION 4<br>PAGES 4-1 TO 4-78<br>&<br>TABLES: 4.4.2-3 TO 4.4.2-13 | ***Note: A "Needs Improvement" score on this requirement will not preclude the LHMP plan from passing.*** | | | | |
| B. Does the plan describe vulnerability in terms of the **types and numbers** of **future** buildings, infrastructure, and critical facilities located in the identified hazard areas? | SECTION 4<br>PAGES 4-1 TO 4-78<br>&<br>TABLES: 4.4.2-3 TO 4.4.2-13 | ***Note: A "Needs Improvement" score on this requirement will not preclude either plan from passing.*** | | | | |

| | | |
|---|---|---|
| SUMMARY SCORE | | |

3.5 Assessing Vulnerability: Estimating Potential Losses

***Requirement §201.6(c)(2)(ii)(B):*** *[The plan **should** describe vulnerability in terms of an] estimate of the potential dollar losses to vulnerable structures identified in paragraph (c)(2)(i)(A) of this section and a description of the methodology used to prepare the estimate … .*
***[The information in the following planning elements must be included, however a "Needs Improvement" score will not preclude either plan from being approved by FEMA.]***

| Element | Location in the Plan (section or annex and page #) | Reviewer's Comments | LHMP | | FMA | |
|---|---|---|---|---|---|---|
| | | | N | S | N | S |
| A. Does the plan estimate **potential dollar losses** to vulnerable structures? | SECTION 4<br>PAGES 4-1 TO 4-78 &<br>TABLES: 4.4.2-3 TO 4.4.2-13 | | | | |
| B. Does the plan describe the **methodology** used to prepare the estimate? | SECTION 4<br>PAGES: 4-1 TO 4-2<br>SECTION 3<br>PAGES: 3-5 TO 3-6 | | | | | |
| | | SUMMARY SCORE | | | | |

3.6 Assessing Vulnerability: Analyzing Development Trends

***Requirement §201.6(c)(2)(ii)(C):*** *[The plan **should** describe vulnerability in terms of] providing a general description of land uses and development trends within the community so that mitigation options can be considered in future land use decisions.*
***[The information in the following planning element must be included, however a "Needs Improvement" score will not preclude either plan from being approved by FEMA.]***

| Element | Location in the Plan (section or annex and page #) | Reviewer's Comments | LHMP | | FMA | |
|---|---|---|---|---|---|---|
| | | | N | S | N | S |
| A. Does the plan describe land uses and development trends? | SECTION 4<br>PAGES: 4-58 TO 4-59<br>SECTION 2<br>PAGES: 2-1 TO 2-11 | | | | | |
| | | SUMMARY SCORE | | | | |

3.7 Multi-Jurisdictional Risk Assessment - ***Requirement §201.6(c)(2)(iii):*** *For multi-jurisdictional plans, the risk assessment **must** assess each jurisdiction's risks where they vary from the risks facing the entire planning area*

***FMA FEMA 299 Guidance:*** *The Plan should be coordinated with, and ideally developed in cooperation with, all of the local jurisdictions within the geographical area.*

| Element | Location in the Plan (section or annex and page #) | Reviewer's Comments | LHMP | | FMA | |
|---|---|---|---|---|---|---|
| | | | N | S | N | S |
| A. Does the plan include a risk assessment for each participating jurisdiction as needed to reflect unique or varied risks? | SECTION 4<br>PAGES 4-1 TO 4-78 &<br>TABLES: 4.4.2-3 TO 4.4.2-13<br>SECTION 5<br>PAGES 5-1 TO 5-191 | ***Note: A "Needs Improvement" score on this requirement will not preclude the FMA plan from passing.*** | | | | |
| | | SUMMARY SCORE | | | | |

4.0 MITIGATION STRATEGY: *§201.6(c)(3): The plan **shall** include a mitigation strategy that provides the jurisdiction's blueprint for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs and resources, and its ability to expand on and improve these existing tools.*

4.1 Local Hazard Mitigation Goals

***Requirement §201.6(c)(3)(i):*** *[The hazard mitigation strategy **shall** include a] description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards*
***FMA Requirement §78.5(c):*** *The applicant's floodplain management goals for the area covered by the plan.*

| Element | Location in the Plan (section or annex and page #) | Reviewer's Comments | LHMP | | FMA | |
|---|---|---|---|---|---|---|
| | | | N | S | N | S |
| A Does the plan include a description of mitigation **goals** to reduce or avoid long-term vulnerabilities to the identified hazards? (**GOALS** are long-term; represent what the community wants to achieve, such as "eliminate flood damage"; and are based on the risk assessment findings.) | SECTION 5<br>PAGES: 5-1 TO 5-191 | | | | | |
| | | SUMMARY SCORE | | | | |

4.2 Identification and Analysis of Mitigation Actions

***Requirement §201.6(c)(3)(ii):*** *[The mitigation strategy **shall** include a] section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure.*

***FMA Requirement §78.5(d):*** *Identification and evaluation of cost-effective and technically feasible mitigation actions considered.*

| Element | Location in the Plan (section or | Reviewer's Comments | LHMP | FMA |
|---|---|---|---|---|

| | annex and page #) | | N | S | N | S |
|---|---|---|---|---|---|---|
| A. Does the plan identify and analyze a **comprehensive range** of specific mitigation actions and projects for each hazard? | SECTION 5<br>PAGES: 5-1 TO 5-191 | | | | | |
| B Do the identified actions and projects address reducing the effects of hazards on **new** buildings and infrastructure? | SECTION 5<br>PAGES: 5-1 TO 5-191 | ***Note: A "Needs Improvement" score on this requirement will not preclude the FMA plan from passing.*** | | | | |
| C. Do the identified actions and projects address reducing the effects of hazards on **existing** buildings and infrastructure? | SECTION 5<br>PAGES: 5-1 TO 5-191 | | | | | |
| | | SUMMARY SCORE | | | | |

4.3 Implementation of Mitigation Actions

***Requirement: §201.6(c)(3)(iii):*** *[The mitigation strategy section **shall** include] an action plan describing how the actions identified in section (c)(3)(ii) will be prioritized, implemented, and administered by the local jurisdiction. Prioritization **shall** include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.*
***FMA Requirement: §78.5(d):*** *Identification and evaluation of cost-effective and technically feasible mitigation actions considered*
***FMA Requirement: §78.5(e):*** *Presentation of the strategy for reducing flood risks and continued compliance with the NFIP, and procedures for ensuring implementation, reviewing progress, and recommending revisions to the plan.*

| Element | Location in the Plan (section or annex and page #) | Reviewer's Comments | LHMP | | FMA | |
|---|---|---|---|---|---|---|
| | | | N | S | N | S |
| A. Does the mitigation strategy include how the actions are **prioritized**? (For example, is there a discussion of the process and criteria used?) | SECTION 5<br>PAGES 5-1 TO 5-2 | ***Note: A "Needs Improvement" score on this requirement will not preclude the FMA plan from passing.*** | | | | |
| B. Does the mitigation strategy address how the actions will be **implemented and administered**? (For example, does it identify the responsible department, existing and potential resources, and timeframe?) | SECTION 5<br>PAGE: 5-2<br>SECTION 5.1.4 &<br>PAGE: 5-10<br>SECTION 5.5 | | | | | |
| B1 Does the mitigation strategy address continued compliance with the NFIP? | | ***Note: A "Needs Improvement" score on this requirement will not preclude the LHMP plan from passing.*** | | | | |
| C. Does the prioritization process include an emphasis on the use of a **cost-benefit review** (see page 3-36 of *Multi-Hazard Mitigation Planning Guidance*) to maximize | SECTION 5<br>PAGES: 5-1 TO 5-10 | ***Note: A "Needs Improvement" score on this requirement will not preclude the FMA plan from passing.*** | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| benefits? | | | | | | |
| C1 Does the mitigation strategy emphasize cost-effective and technically feasible mitigation actions? | SECTION 5 PAGES: 5-1 TO 5-10 | ***Note: A "Needs Improvement" score on this requirement will not preclude the LHMP plan from passing.*** | | | | |
| | | | SUMMARY SCORE | | | |

4.4 Multi-Jurisdictional Mitigation Actions

***Requirement §201.6(c)(3)(iv):*** *For multi-jurisdictional plans, there* ***must*** *be identifiable action items specific to the jurisdiction requesting FEMA approval or credit of the plan.*

***FMA FEMA 299 Guidance:*** *The Plan should be coordinated with, and ideally developed in cooperation with, all of the local jurisdictions, within the geographical area.*

| Element | Location in the Plan (section or annex and page #) | Reviewer's Comments | LHMP | | FMA | |
|---|---|---|---|---|---|---|
| | | | N | S | N | S |
| A Does the plan include at least one identifiable **action item** for each jurisdiction requesting FEMA approval of the plan? | SECTION 5 PAGES: 5-1 TO 5-191 | | | | |
| | | SUMMARY SCORE | | | | |

5.0 PLAN MAINTENANCE PROCESS

5.1 Monitoring, Evaluating, and Updating the Plan

***Requirement §201.6(c)(4)(i):*** *[The plan maintenance process* ***shall*** *include a] section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle.*

***FMA Requirement §78.5(e):*** *Presentation of the strategy for reducing flood risks and continued compliance with the NFIP, and procedures for ensuring implementation, reviewing progress, and recommending revisions to the plan.*

| Element | Location in the Plan (section or annex and page #) | Reviewer's Comments | LHMP | | FMA | |
|---|---|---|---|---|---|---|
| | | | N | S | N | S |
| A. Does the plan describe the method and schedule for **monitoring** the plan? (For example, does it identify the party responsible for monitoring and include a schedule for reports, site visits, phone calls, and meetings?) | SECTION 6 PAGES 6-1 TO 6-2 | | | | |
| B. Does the plan describe the method and schedule for | SECTION 6 | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| **evaluating** the plan? (For example, does it identify the party responsible for evaluating the plan and include the criteria used to evaluate the plan?) | PAGES 6-1 TO 6-2 | | | | | |
| C. Does the plan describe the method and schedule for **updating** the plan within the five-year cycle? | SECTION 6<br>PAGES 6-1 TO 6-2 | ***Note: A "Needs Improvement" score on this requirement will not preclude the FMA plan from passing.*** | | | | |
| | | SUMMARY SCORE | | | | |

## 5.2 Incorporation into Existing Planning Mechanisms

***Requirement §201.6(c)(4)(ii):*** *[The plan **shall** include a] process by which local governments incorporate the requirements of the mitigation plan into other planning mechanisms such as comprehensive or capital improvement plans, when appropriate.*

| | Location in the Plan (section or annex and page #) | | LHMP | | FMA | |
|---|---|---|---|---|---|---|
| | | | N | S | N | S |
| A. Does the plan identify other local planning mechanisms available for incorporating the requirements of the mitigation plan? | SECTION 6<br>PAGES 6-1 TO 6-2<br>SECTION 6.1.4 &<br>SECTION 5<br>PAGE: 5-2<br>SECTION 5.1.4 &<br>PAGE: 5-10<br>SECTION 5.5 | ***Note: A "Needs Improvement" score on this requirement will not preclude the FMA plan from passing.*** | | | | |
| B. Does the plan include a process by which the local government will incorporate the requirements in other plans, when appropriate? | SECTION 6<br>PAGES 6-1 TO 6-2<br>SECTION 6.1.4 &<br>SECTION 5<br>PAGE: 5-2<br>SECTION 5.1.4 &<br>PAGE: 5-10<br>SECTION 5.5 | ***Note: A "Needs Improvement" score on this requirement will not preclude the FMA plan from passing.*** | | | | |
| | | SUMMARY SCORE | | | | |

## 5.3 Continued Public Involvement

***Requirement §201.6(c)(4)(iii):*** *[The plan maintenance process **shall** include a] discussion on how the community will continue public participation in the*

*plan maintenance process.*

| | Location in the Plan (section or annex and page)] | | LHMP | | FMA | |
|---|---|---|---|---|---|---|
| | | | N | S | N | S |
| A. Does the plan explain how **continued public participation** will be obtained? (For example, will there be public notices, an on-going mitigation plan committee, or annual review meetings with stakeholders?) | SECTION 6<br>PAGE 6-2<br>SECTION 6.1.5 | ***Note: A "Needs Improvement" score on this requirement will not preclude the FMA plan from passing.*** | | | | |
| | | SUMMARY SCORE | | | | |

**Additional FEMA planning guidance may be accessed on the following web sites:**

**FEMA Planning Resource Center**
http://www.fema.gov/fima/resources.shtm

**Multi-Hazard Mitigation Planning guidance Under the Disaster Mitigation Act of 2000**
http://www.fema.gov/fima/guidance.shtm

## SECTION 5 HOW-TO GUIDE #1

5.1.1 Getting Started: Building Support for Mitigation Planning

http://www.fema.gov/fima/howto1.shtm

## SECTION 6 HOW-TO GUIDE #2

6.1.1 Understanding Your Risks: Identifying Hazards and Estimating Losses

http://www.fema.gov/fima/howto2.shtm

## SECTION 7 HOW-TO GUIDE #3

7.1.1 Developing the Mitigation Plan: Identifying Mitigation Actions and Implementation Strategies

http://www.fema.gov/fima/howto3.shtm

## SECTION 8 HOW-TO GUIDE #4

8.1.1 Bringing the Plan To Life: Implementing the Hazard Mitigation Plan

http://www.fema.gov/fima/howto4.shtm

**Flood Mitigation Assistance (FMA) Program Guidelines and Forms**
http://www.fema.gov/fima/fma.shtm

**Explanation of the numbering system used in this document.**

The numbering system used in this document is not tied to any other document(s) or numbering system(s). The Stafford Act and/or DMA 2000 planning requirements are indicated as 1.0, 2.0, 3.0, etc. The Interim Final Rule [(IFR), requirements are numbered 1.1, 1.2, 1.3; 2.1, 2.2, 2.3; 3.1, 3.2, 3.3, etc. The FEMA planning guidance and crosswalk element requirements are listed as A., B., C., etc.

The numbering system was simply created so that users of this document can more easily cross-reference information within the document without having to repeat information throughout.

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**LEGEND**
**FOR NUMBERING SYSTEM USED IN THIS DOCUMENT**

***Local* or *Multi-Jurisdictional Sub Grantee* Hazard Mitigation Plan**

## 1.0 Prerequisite(s)

**1.1** Adoption by the Local Governing Body: §201.6(c)(5) **OR**
**1.2** Multi-Jurisdictional Plan Adoption: §201.6(c)(5)

**AND**

**1.3** Multi-Jurisdictional Planning Participation: §201.6(a)(3)

## 2.0 Planning Process

**2.1** Documentation of the Planning Process: §201.6(b) and §201.6(c)(1)
**2.2** Local Capabilities Assessment §201.4©(ii) and §201.6 c)(1)

## 3.0 Risk Assessment

**3.1** Identifying Hazards: §201.6(c)(2)(i)
**3.2** Profiling Hazards: §201.6(c)(2)(i)
**3.3** Assessing Vulnerability: Overview: §201.6(c)(2)(ii)
**3.4** Assessing Vulnerability: Identifying Structures: §201.6(c)(2)(ii)(A)
**3.5** Assessing Vulnerability: Estimating Potential Losses: §201.6(c)(2)(ii)(B)
**3.6** Assessing Vulnerability: Analyzing Development Trends: §201.6(c)(2)(ii)(C)
**3.7** Multi-Jurisdictional Risk Assessment: §201.6(c)(2)(iii)

## 4.0 Mitigation Strategy

**4.1** Local Hazard Mitigation Goals: §201.6(c)(3)(i)
**4.2** Identification and Analysis of Mitigation Actions: §201.6(c)(3)(ii)
**4.3** Implementation of Mitigation Actions: §201.6(c)(3)(iii)
**4.4** Multi-Jurisdictional Mitigation Actions: §201.6(c)(3)(iv)

| **LEGEND**<br>**FOR NUMBERING SYSTEM USED IN THIS DOCUMENT**<br><br>***Local* or *Multi-Jurisdictional Sub Grantee* Hazard Mitigation Plan** |
|---|
| |
| **5.0 Plan Maintenance Process** |
| |
| **5.1** Monitoring, Evaluating, and Updating the Plan: §201.6(c)(4)(i) |
| **5.2** Incorporation into Existing Planning Mechanisms: §201.6(c)(4)(ii) |
| **5.3** Continued Public Involvement: §201.6(c)(4)(iii) |

## Matrix A: Profiling Hazards

This matrix can assist FEMA and the State in scoring each hazard. Local jurisdictions may find the matrix useful to ensure that their plan addresses each natural hazard that can affect the jurisdiction. **Completing the matrix is not required**.

***Note: First, check which hazards are identified in requirement §201.6(c)(2)(i). Then, place a checkmark in either the N or S box for each** applicable **hazard. An "N" for any element of any identified hazard will result in a "Needs Improvement" score for this requirement. List the hazard and its related shortcoming in the comments section of the Plan Review Crosswalk.***

| Hazard Type | Hazards Identified Per Requirement §201.6(c)(2)(i) | A. Location | | B. Extent | | C. Previous Occurrences | | D. Probability of Future Events | |
|---|---|---|---|---|---|---|---|---|---|
| | Yes | N | S | N | S | N | S | N | S |
| Avalanche | ☒ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| Coastal Erosion | ☒ | ☐ | ☒ | ☐ | ☒ | ☐ | ☒ | ☐ | ☒ |
| Coastal Storm | ☒ | ☐ | ☒ | ☐ | ☒ | ☐ | ☒ | ☐ | ☒ |
| Dam Failure | ☒ | ☐ | ☒ | ☐ | ☒ | ☐ | ☒ | ☐ | ☒ |
| Drought | ☒ | ☐ | ☒ | ☐ | ☒ | ☐ | ☒ | ☐ | ☒ |
| Earthquake | ☒ | ☐ | ☒ | ☐ | ☒ | ☐ | ☒ | ☐ | ☒ |
| Expansive Soils | ☒ | ☐ | ☒ | ☐ | ☒ | ☐ | ☒ | ☐ | ☒ |
| Extreme Heat | ☒ | ☐ | ☒ | ☐ | ☒ | ☐ | ☒ | ☐ | ☒ |
| Flood | ☒ | ☐ | ☒ | ☐ | ☒ | ☐ | ☒ | ☐ | ☒ |
| Hailstorm | ☒ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| Hurricane | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| Land Subsidence | ☒ | ☐ | ☒ | ☐ | ☒ | ☐ | ☒ | ☐ | ☒ |
| Landslide | ☒ | ☐ | ☒ | ☐ | ☒ | ☐ | ☒ | ☐ | ☒ |
| Severe Winter Storm | ☒ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| Tornado | ☒ | ☐ | ☒ | ☐ | ☒ | ☐ | ☒ | ☐ | ☒ |
| Tsunami | ☒ | ☐ | ☒ | ☐ | ☒ | ☐ | ☒ | ☐ | ☒ |
| Volcano | ☒ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| Wildfire | ☒ | ☐ | ☒ | ☐ | ☒ | ☐ | ☒ | ☐ | ☒ |
| Windstorm | ☒ | ☐ | ☒ | ☐ | ☒ | ☐ | ☒ | ☐ | ☒ |
| **Other** GROUND WATER CONTAMINATION/ SALT WATER INTRUSION_____ | ☒ | ☐ | ☒ | ☐ | ☒ | ☐ | ☒ | ☐ | ☒ |
| **Other** LIQUEFACTION__ | ☒ | ☐ | ☒ | ☐ | ☒ | ☐ | ☒ | ☐ | ☒ |
| Other _____ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

To check boxes, double click on the box and change the default value to "checked."

Legend:

§201.6(c)(2)(i) Profiling Hazards
A. Does the risk assessment identify the location (i.e., geographic area affected) of each hazard addressed in the plan?
B. Does the risk assessment identify the extent (i.e., magnitude or severity) of each hazard addressed in the plan?
C. Does the plan provide information on previous occurrences of each natural hazard addressed in the plan?
D. Does the plan include the probability of future events (i.e., chance of occurrence) for each hazard addressed in the plan?

## Matrix B: Assessing Vulnerability

This matrix can assist FEMA and the State in scoring each hazard. Local jurisdictions may find the matrix useful to ensure that their plan addresses each requirement. **Completing the matrix is not required**.

*Note: First, check which hazards are identified in requirement §201.6(c)(2)(i). Then, place a checkmark in either the N or S box for each* ***applicable*** *hazard. An "N" for any element of any identified hazard will result in a "Needs Improvement" score for this requirement. List the hazard and its related shortcoming in the comments section of the Plan Review Crosswalk.*

*Note: Receiving an N in the shaded columns will not preclude the plan from passing.*

To check boxes, double click on the box and change the default value to "checked."

| Hazard Type | Hazards Identified Per Requirement §201.6(c)(2)(i) | §201.6(c)(2)(ii) Assessing Vulnerability: Overview | A. Overall Summary Description of Vulnerability | | B. Hazard Impact | | §201.6(c)(2)(ii) Assessing Vulnerability: Identifying Structures | A. Types and Number of Existing Structures in Hazard Area (Estimate) | | B. Types and Number of Future Structures in Hazard Area (Estimate) | | §201.6(c)(2)(ii) Assessing Vulnerability: Estimating Potential Losses | A. Loss Estimate | | B. Methodology | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Yes | | N | S | N | S | | N | S | N | S | | N | S | N | S |
| Avalanche | ☐ | | ☐ | ☐ | ☐ | ☐ | | ☐ | ☐ | ☐ | ☐ | | ☐ | ☐ | ☐ | ☐ |
| Coastal Erosion | ☒ | | ☐ | ☒ | ☐ | ☒ | | ☐ | ☒ | ☐ | ☒ | | ☐ | ☒ | ☐ | ☒ |
| Coastal Storm | ☒ | | ☐ | ☒ | ☐ | ☒ | | ☐ | ☒ | ☐ | ☒ | | ☐ | ☒ | ☐ | ☒ |
| Dam Failure | ☒ | | ☐ | ☒ | ☐ | ☒ | | ☐ | ☒ | ☐ | ☒ | | ☐ | ☒ | ☐ | ☒ |
| Drought | ☒ | | ☐ | ☒ | ☐ | ☒ | | ☐ | ☒ | ☐ | ☒ | | ☐ | ☒ | ☐ | ☒ |
| Earthquake | ☒ | | ☐ | ☒ | ☐ | ☒ | | ☐ | ☒ | ☐ | ☒ | | ☐ | ☒ | ☐ | ☒ |
| Expansive Soils | ☒ | | ☐ | ☒ | ☐ | ☒ | | ☐ | ☒ | ☐ | ☒ | | ☐ | ☒ | ☐ | ☒ |
| Extreme Heat | ☒ | | ☐ | ☒ | ☐ | ☒ | | ☐ | ☒ | ☐ | ☒ | | ☐ | ☒ | ☐ | ☒ |
| Flood | ☒ | | ☐ | ☒ | ☐ | ☒ | | ☐ | ☒ | ☐ | ☒ | | ☐ | ☒ | ☐ | ☒ |
| Hailstorm | ☒ | | ☐ | ☐ | ☐ | ☐ | | ☐ | ☐ | ☐ | ☐ | | ☐ | ☐ | ☐ | ☐ |
| Hurricane | ☐ | | ☐ | ☐ | ☐ | ☐ | | ☐ | ☐ | ☐ | ☐ | | ☐ | ☐ | ☐ | ☐ |
| Land Subsidence | ☒ | | ☐ | ☒ | ☐ | ☒ | | ☐ | ☒ | ☐ | ☒ | | ☐ | ☒ | ☐ | ☒ |
| Landslide | ☒ | | ☐ | ☒ | ☐ | ☒ | | ☐ | ☒ | ☐ | ☒ | | ☐ | ☒ | ☐ | ☒ |
| Severe Winter Storm | ☒ | | ☐ | ☐ | ☐ | ☐ | | ☐ | ☐ | ☐ | ☐ | | ☐ | ☐ | ☐ | ☐ |
| Tornado | ☒ | | ☐ | ☒ | ☐ | ☒ | | ☐ | ☒ | ☐ | ☒ | | ☐ | ☒ | ☐ | ☒ |
| Tsunami | ☒ | | ☐ | ☒ | ☐ | ☒ | | ☐ | ☒ | ☐ | ☒ | | ☐ | ☒ | ☐ | ☒ |
| Volcano | ☒ | | ☐ | ☐ | ☐ | ☐ | | ☐ | ☐ | ☐ | ☐ | | ☐ | ☐ | ☐ | ☐ |
| Wildfire | ☒ | | ☐ | ☒ | ☐ | ☒ | | ☐ | ☒ | ☐ | ☒ | | ☐ | ☒ | ☐ | ☒ |
| Windstorm | ☒ | | ☐ | ☒ | ☐ | ☒ | | ☐ | ☐ | ☐ | ☒ | | ☐ | ☒ | ☐ | ☒ |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Other** GROUND WATER CONTAMINATION/ SALT WATER INTRUSION_____ | ☒ | | ☐ | ☒ | ☐ | ☒ | | ☐ | ☒ | ☐ | ☒ | | ☐ | ☒ | ☐ | ☒ |
| **Other** LIQUEFACTION___ | ☒ | | ☐ | ☒ | ☐ | ☒ | | ☐ | ☒ | ☐ | ☒ | | ☐ | ☒ | ☐ | ☒ |
| Other _____ | ☐ | | ☐ | ☐ | ☐ | ☐ | | ☐ | ☐ | ☐ | ☐ | | ☐ | ☐ | ☐ | ☐ |

**Legend:**

§201.6(c)(2)(ii) Assessing Vulnerability: Overview

A. Does the plan include an overall summary description of the jurisdiction's vulnerability to each hazard?

B. Does the plan address the impact of each hazard on the jurisdiction?

§201.6(c)(2)(ii)(A) Assessing Vulnerability: Identifying Structures

A. Does the plan describe vulnerability in terms of the types and numbers of existing buildings, infrastructure, and critical facilities located in the identified hazard areas?

B. Does the plan describe vulnerability in terms of the types and numbers of future buildings, infrastructure, and critical facilities located in the identified hazard areas?

§201.6(c)(2)(ii)(B) Assessing Vulnerability: Estimating Potential Losses

A. Does the plan estimate potential dollar losses to vulnerable structures?

B. Does the plan describe the methodology used to prepare the estimate?

## Matrix C: Identification and Analysis of Mitigation Actions

This matrix can assist FEMA and the State in scoring each hazard. Local jurisdictions may find the matrix useful to ensure consideration of a range of actions for each hazard. **Completing the matrix is not required.**

*Note: First, check which hazards are identified in requirement §201.6(c)(2)(i). Then, place a checkmark in either the N or S box for each* ***applicable*** *hazard. An "N" for any identified hazard will result in a "Needs Improvement" score for this requirement. List the hazard and its related shortcoming in the comments section of the Plan Review Crosswalk.*

| Hazard Type | Hazards Identified Per Requirement §201.6(c)(2)(i) | A. Comprehensive Range of Actions and Projects | |
|---|---|---|---|
| | Yes | N | S |
| Avalanche | ☒ | ☐ | ☐ |
| Coastal Erosion | ☒ | ☐ | ☒ |
| Coastal Storm | ☒ | ☐ | ☒ |
| Dam Failure | ☒ | ☐ | ☒ |
| Drought | ☒ | ☐ | ☒ |
| Earthquake | ☒ | ☐ | ☒ |
| Expansive Soils | ☒ | ☐ | ☒ |
| Extreme Heat | ☒ | ☐ | ☒ |
| Flood | ☒ | ☐ | ☒ |
| Hailstorm | ☒ | ☐ | ☐ |
| Hurricane | ☐ | ☐ | ☐ |
| Land Subsidence | ☒ | ☐ | ☒ |
| Landslide | ☒ | ☐ | ☒ |

To check boxes, double click on the box and change the default value to "checked."

**FEMA Region IX – CA OES Local Hazard Mitigation Plan (LHMP) Crosswalk (includes Flood Mitigation Assistance {FMA} Requirements)**
**Jurisdiction:** **Date of Plan:**

| Hazard Type | Hazards Identified Per Requirement §201.6(c)(2)(i) | A. Comprehensive Range of Actions and Projects | |
|---|---|---|---|
| | Yes | N | S |
| Severe Winter Storm | ☒ | ☐ | ☐ |
| Tornado | ☒ | ☐ | ☒ |
| Tsunami | ☒ | ☐ | ☒ |
| Volcano | ☒ | ☐ | ☐ |
| Wildfire | ☒ | ☐ | ☒ |
| Windstorm | ☒ | ☐ | ☒ |
| **Other** GROUND WATER CONTAMINATION/ SALTWATER INTRUSION_____ | ☒ | ☐ | ☒ |
| **Other** LIQUEFACTION. | ☒ | ☐ | ☒ |
| Other _____ | ☐ | ☐ | ☐ |

**Legend:**
§201.6(c)(3)(ii) Identification and Analysis of Mitigation Actions
A. Does the plan identify and analyze a comprehensive range of specific mitigation actions and projects for each hazard?

| List single jurisdiction or, if MJP, list Participating Jurisdictions, including the "Lead Jurisdiction": | NFIP STATUS | | | |
|---|---|---|---|---|
| | Y | N | N/A | CRS CLASS |
| CITY OF BUENA PARK | | | | |
| EL TORO WATER DISTRICT | | | | |
| CITY OF GARDEN GROVE | | | | |
| LAGUNA BEACH COUNTY WATER DISTRICT | | | | |
| CITY OF LA HABRA | | | | |
| MESA CONSOLIDATED WATER DISTRICT | | | | |
| MOULTON NIGUEL WATER DISTRICT | | | | |
| MUNICIPAL WATER DISTRICT OF ORANGE COUNTY | | | | |
| CITY OF NEWPORT BEACH | | | | |
| ORANGE COUNTY SANITATION DISTRICT | | | | |
| ORANGE COUNTY WATER DISTRICT | | | | |
| CITY OF ORANGE | | | | |
| SANTA MARGARITA WATER DISTRICT | | | | |
| SERRANO WATER DISTRICT | | | | |
| SOUTH COAST WATER DISTRICT | | | | |
| SOUTH ORANGE COUNTY WASTEWATER AUTHORITY | | | | |
| TRABUCO CANYON WATER DISTRICT | | | | |
| CITY OF TUSTIN | | | | |
| CITY OF WESTMINSTER | | | | |
| YORBA LINDA WATER DISTRICT | | | | |