

TRABUCO CANYON WATER DISTRICT ANNEX

The Trabuco Canyon Water District (TCWD) is a participant (Member Agency [MA]) in the Orange County Water and Wastewater Multi-Jurisdictional Hazard Mitigation Plan (HMP or Plan). As a participant MA, TCWD representatives were part of the HMP Planning Process and served on the Planning Team responsible for the Plan Update; refer to Section 2 of the Plan. The primary Plan, including the hazard mitigation plan procedural requirements and planning process apply to TCWD.

This Annex supplements information contained in the primary Plan and describes how TCWD’s risks vary from the planning area. The Risk Assessment (Section 3) summarizes the hazards and risks that pose a threat to Orange County. The primary Plan treats the entire County as the planning area and identifies which MAs are subject to a profiled hazard. The purpose of this Annex is to provide additional information specific to TCWD with a focus on the risk assessment and mitigation strategy.

HAZARD MITIGATION PLAN POINT OF CONTACT AND DEVELOPMENT TEAM

The following representatives attended the Planning Team meetings on behalf of TCWD and coordinated the hazard mitigation planning efforts with TCWD staff:

Primary Point of Contact

Lorrie Lausten
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In addition to participating on the Planning Team, an internal team was also formed to support Planning Team representatives and provide information for the Plan update. The following staff served as TCWD’s internal hazard mitigation planning development team.

Representative	Title	How Participated
Michael Perea	Assistant General Manager	Reviewed Draft Plan

JURISDICTION PROFILE (Service Population: 12,700)

TCWD is a county water district organized and operating pursuant to Section 30,000 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.

TCWD 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 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. In addition, TCWD owns, operates and maintains water and sewer facilities outside of its service area and these vary in elevation from 575 feet (ARWTL) to 950 feet (El Toro Road Trunk Sewer) above mean sea level.

TCWD serves a 2015 estimated population of 12,700 in the Cities of Rancho Santa Margarita, Mission Viejo, and Lake Forest; and unincorporated areas of Orange County in Trabuco Canyon.

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 and Irvine Ranch Water District.

HAZARDS

Detailed hazard profiles for the planning area are provided in Section 3. TCWD is located inland and therefore is not subject to coastal hazards such as coastal storms/erosion and tsunamis. TCWD is subject to the other hazards identified in for the planning area. Many of these hazards are dispersed and may affect the entire region, including climate change, drought, ground shaking from earthquakes, geologic hazards, and high wind. Regarding the hazard of dam/reservoir failure, the District owns and operates two dams: Trabuco Dam/Reservoir and Dove Canyon and would be subject to inundation in the event of failure; refer to Section 3. In addition, much of the area is located within a very high fire hazard zone and the northernmost portion is susceptible to landslides. Human-caused hazards and power outages are also hazards that could impact the District. There are no hazards that are unique to TCWD.

Based on the risk assessment, the TCWD development team identified the following hazards that affect TCWD and summarized their geographic extent, probability of future occurrence, magnitude/severity and significance; refer to Table Q-1.

**Table Q-1
TCWD Hazard Identification**

Hazard	Geographic Extent	Probability of Future Occurrences	Magnitude/Severity	Significance
Climate Change	Extensive	Likely	Limited	Medium
Contamination/ Salt Water Intrusion	Limited	Unlikely	Negligible	Low
Dam/Reservoir Failure	Extensive	Unlikely	Catastrophic	High
Drought	Extensive	Likely	Catastrophic	High
Earthquake Fault Rupture & Seismic Hazards	Extensive	Likely	Catastrophic	High
Flood	Significant	Likely	Limited	Medium
Geologic Hazards	Limited	Unlikely	Limited	Low
High Winds/Santa Ana Winds	Extensive	Highly Likely	Limited	High
Landslide/Mudflow	Significant	Likely	Limited	Medium
Wildland/Urban Fire	Extensive	Likely	Critical	High
Human-Caused Hazards	Limited	Unlikely	Limited	Low
Power Outage	Significant	Significant	Limited	Medium
Geographic Extent Limited: Less than 10% of planning area Significant: 10-50% of planning area Extensive: 50-100% of planning area		Magnitude/Severity Catastrophic—More than 50 percent of property severely damaged; shutdown of facilities for more than 30 days; and/or multiple deaths. Critical—25-50 percent of property severely damaged; shutdown of facilities for at least two weeks; and/or injuries and/or illnesses result in permanent disability. Limited—10-25 percent of property severely damaged; shutdown of facilities for more than a week; and/or injuries/illnesses treatable do not result in permanent disability. Negligible—Less than 10 percent of property severely damaged, shutdown of facilities and services for less than 24 hours; and/or injuries/illnesses treatable with first aid.		
Probability of Future Occurrences Highly Likely: Near 100% chance of occurrence in next year or happens every year. Likely: Between 10 and 100% chance of occurrence in next year or has a recurrence interval of 10 years or less. Occasional: Between 1 and 10% chance of occurrence in the next year or has a recurrence interval of 11 to 100 years. Unlikely: Less than 1% chance of occurrence in next 100 years or has a recurrence interval of greater than every 100 years.		Significance Low: Minimal potential impact Medium: Moderate potential impact High: Widespread potential impact		

The identification of hazards provided in Table Q-1 is highly dependent on the location of facilities within each agencies jurisdiction and takes into consideration the history of the hazard and associated damage (if any), information provided by agencies specializing in a specific hazard (e.g., FEMA, California Geological Survey), and relies upon each agencies’ expertise and knowledge.

Hazard Maps

The following maps show the location of hazard zones within the jurisdiction relative to either potable water or wastewater systems, as applicable.

VULNERABILITY AND RISK ASSESSMENT

Assets Susceptible to Hazard Events

Table Q-2, TCWD Infrastructure and Exposure to Hazards, identifies TCWD’s water and wastewater infrastructure assets that are located within the mapped hazard zones, identified above.

**Table Q-2
TCWD Infrastructure and Exposure to Hazards**

Hazard		Infrastructure Type							
		Interties (#)	Pump Stations (#)	Reservoirs (#)	Wells (#)	Treatment Plants (#)	Lift Stations (#)	Potable Pipeline (miles)	Wastewater Pipeline (miles)
Fire Hazard Zone	Moderate	2	1	0	0	0	2	1.2	0
	High	0	0	0	0	1	0	2.8	0
	Very High	6	6	7	3	1	7	13.4	3.5
FEMA Flood Zone	100-Year	0	0	0	2	0	1	0.5	0.2
	500-Year	0	0	0	0	1	0	0	0
Alquist-Priolo Rupture Zone		0	0	0	0	0	0	0	0
Ground Shaking	Moderate	0	0	0	0	0	2	0.6	0.1
	High	8	10	7	2	2	6	16.5	3.4
	Extreme	0	0	0	0	0	0	0	0
Liquefaction	Moderate	0	0	0	0	0	0	0	0
	High	0	0	0	0	0	0	0	0
	Very High	0	0	0	0	0	0	0	0
	Unknown	1	2	0	3	1	1	2.0	0.5
Landslide Zone		0	2	5	0	0	5	1.2	0.5
Tsunami Zone		0	0	0	0	0	0	0	0

Much of TCWD’s service area and its associated infrastructure are in very high and high fire hazard areas and areas identified as having high or moderate risk for high ground shaking in the event of an earthquake. Several reservoirs and lift stations are located within landslide hazard areas. TCWD contains infrastructure or pipelines in all hazard areas except the Alquist-Priolo rupture and tsunami zones.

CAPABILITIES ASSESSMENT

The capabilities assessment is designed to identify existing local agencies, personnel, planning tools, public policy and programs, technology, and funds that have the capability to support hazard mitigation activities and strategies outlined in this Plan. TCWD’s internal development team revised the capabilities identified in the 2012 plan and collaborated to identify current local capabilities and mechanisms available to the MA for reducing damage from future hazard events. Tables Q-3a through Q-3d assess the authorities, policies, programs, and resources that the jurisdiction has in place that are available to help with the long-term

reduction of risk through mitigation. These capabilities include planning and regulatory tools, administrative and technical resources, financial resources, and education and outreach programs.

**Table Q-3a
Planning and Regulatory Capabilities Summary**

Ordinance, Plan, Policy, Program	Responsible Agency or Department	Description/Comments
Building Code	Local Cities, CA Division of Dams, OCFA, AQMD	TCWD complies with applicable building codes and works with public agencies in the District service area.
Zoning Ordinance	County of Orange, City of Rancho Santa Margarita, City of Lake Forest, City of Mission Viejo	TCWD complies with applicable zoning ordinances and works with public agencies in the District service area.
Subdivision Ordinance or Regulations	Local cities, County of Orange	TCWD complies with applicable subdivision ordinances or regulations and works with public agencies in the District service area.
Special Purpose Ordinance	County of Orange, Army Corps of Engineers, USFWS/CDFG	TCWD complies with applicable special purpose ordinances and works with the cities within the District service area.
Growth Management Ordinances	Local cities, County of Orange, Foothill Specific Plan, LAFCO	TCWD complies with applicable growth management ordinances and works with the public agencies in the District service area.
Site Plan Review Requirements	Local Cities, County of Orange, Orange County Fire Authority, CA Legislative Bills and Propositions	TCWD complies with applicable site plan review requirements and works with public agencies within the District service area.
General Plan	TCWD Master Plan	TCWD Master Plan outlines the current and future conditions of the District. TCWD also complies with applicable General Plans for cities within the District service area.
Capital Improvements Plan	TCWD CIP	TCWD develops a 10-year CIP for water, waste-water, and recycled water.
Emergency Response Plan	CDHP, SEMS, NIMS, WEROC, MET	The district works with local agencies and WEROC for emergency response.
Disaster Recovery Plan	County of Orange	Adhere to County plan.
Post-Disaster Recovery Ordinance	Local cities, County of Orange, State of California, FEMA	Works with County on Post-Disaster Recovery Ordinance.
Water Discharge Requirements	RWQCB, SOCWA, EPA, County of Orange State Water Resources Control Board	Adhere to all Federal and State regulations.
Vulnerability Assessment	EPA, CA State Water Resources Control Board, Division of Drinking Water	The district works with State, local agencies to determine vulnerabilities.
Urban Water Management Plan	TCWD	The UWMP has been prepared consistent with the requirements under Water Code Sections 10610 through 10656 of the Urban Water Management Planning Act and is due to the California Department of Water Resources (DWR) by July 1, 2016.

**Table Q-3b
Administrative and Technical Capabilities Summary**

Staff/Personnel or Type of Resource	Responsible Agency or Department	Description/Comments
Planner(s) or Engineer(s) with Knowledge of Land Development and Land Management Practices	Outside consultants in coordination with the Engineering Department	District staff utilizes an outside consultant with input from staff.
Engineer(s) or Professional(s) Trained in Construction Practices Related to Buildings and/or Infrastructure	Outside consultants in coordination with the Engineering Department	District staff utilizes an outside consultant with input from staff.
Planners or Engineer(s) with an Understanding of Natural and/or Human - Caused Hazards	Outside consultants in coordination with the Engineering Department	District staff utilizes an outside consultant with input from staff.
Floodplain manager	County of Orange, Sheriff's Department	
Surveyors	Outside consultant in coordination with District staff	District staff utilizes an outside consultant with input from staff.
Staff with Education or Expertise to Assess the Community's Vulnerability to Hazards	County of Orange, Emergency Response Plan, Sheriff's Dept., OCFA	Work with the County and local agencies to assess vulnerabilities.
Personnel Skilled in GIS and/or HAZUS	MWDOC, Center for Demographics Research, Outside Consultant	Work with MWDOC and outside consultant.
Scientists Familiar with the Hazards of the Community	County, Orange County Fire Authority, Outside Consultants, Local University and Non-Profit Research Centers	Work with the County and local agencies who are familiar with community hazards.
Emergency Manager	MWDOC, WEROC, Emergency Coordinator	Coordinate with WEROC and the County.
Grant Writers	Engineering Department	Actively searches for Federal and State grants.
Lab Specialist	Contract Laboratories, Neighboring Water Districts	Coordinates with other agencies and outsider consultant.

**Table Q-3c
Financial Capabilities Summary**

Financial Resources	Agency or Department	Description/Comments
Capital Improvements Project Funding	Administrative Services Department	Annual review of capital requirements and forecasting future cap needs.
Fees for Water, Sewer, Gas, or Electric Service	Administrative Services Department	The district is able to charge customers fees for water and sewer services.
Incur Debt Through General Obligation Bonds	Administrative Services Department	Through a general election, the district can incur debt through general obligation bonds.
Incur Debt Through Special Tax and Revenue Bonds	Administrative Services Department	The district may incur special tax or revenue bonds as needed through the appropriate legal process.

**Table Q-3d
Education and Outreach Capability Summary**

Resource/Programs	Agency or Department	Description/Comments
AlertOC	County of Orange	Residents are encouraged to sign up for emergency alerts with the City.
Emergency Preparedness Information	Municipal Water District of Orange County, Federal, State	The district directs the public the website for emergency preparedness resources.

MITIGATION STRATEGY

Mitigation Goals

TCWD adopts the hazard mitigation goals developed by the Planning Team; refer to Section 4.

Mitigation Actions

The internal development team reviewed the mitigation actions identified in the 2012 plan and the updated risk assessment to determine if the mitigation actions were completed, require modification, should be removed because they are no longer relevant, and/or should remain in the Plan Update. New mitigation actions to address the updated risk assessment and capabilities identified above were also considered and added. Table Q-4, TCWD Mitigation Actions, identifies the mitigation actions, including the priority, hazard addressed, risk, timeframe, and potential funding sources.

**Table Q-4
TCWD Mitigation Actions**

Priority (High, Medium, or Low)	Action/Task/Project Description	Location/Facility	Risk (High, Medium, or Low)	Cost	Timeframe (Immediate, Short Term, or Long Term)	Possible Funding Sources	Status/Progress (New, Existing, Modified)	Status Rationale
Medium	Evaluate water tanks for structural stability and seismic activity and install flexible coupling and seismic valves where recommended.	Water storage tanks	Low	\$2,000,000	Immediate	General Fund	Existing	Assessments, evaluations, and implementations in progress.
Medium	Implement erosion control and slope stabilization measures at Wastewater Treatment Plant and service roads to the facility.	Wastewater treatment plant and service road	Medium to Low	> \$1,000,000	Long Term	Grants, General Fund	Completed	Completed slope improvement from 2017 failure. Add. Work unfunded.
Medium	Construct new storage tanks: -Saddleast = 0.6 MG -Harris= 1.5 MG	New water storage tank(s)	Medium	\$2,000,000	Short Term	Restricted Reserves	Existing On going	Engineering feasibility study completed. Tank Construction Budgeted in FY 18-19 & FY 19-20.
High	Implement erosion control and slope stabilization measures at existing Transmission Mains. Install new structural supports and reinforce or replace unstable foundations and soils and bridge crossings.	System Wide, including 16-inch water main bridge crossings on old El Toro Road.	Medium to High	>5,000,000	Short to Long Term	Grants, General Fund	Existing	Budgetary constraints, unfunded.
High	Conduct structural, geotechnical, and/or erosion control studies to determine site specific mitigation measures to protect existing transmission mains. Mitigation measures may include: rip-rap, drainage structures/pipes, asphalt paving, and recompaction/fill of slopes and unpaved areas at or above existing transmission mains. If more feasible, relocate sections of piping and valves.	System Wide, including Rose Canyon water mains in unpaved areas, various treated water mains at and near Trabuco Creek, adjacent hill sides, and unpaved areas on Plano Trabuco Road	Medium to High	> \$10,000,000	Short to Long Term	Grants, General Fund	Existing On going	Budget constraints, unfunded.

**Table Q-4 [continued]
TCWD Mitigation Actions**

Priority (High, Medium, or Low)	Action/Task/Project Description	Location/Facility	Risk (High, Medium, or Low)	Cost	Timeframe (Immediate, Short Term, or Long Term)	Possible Funding Sources	Status/Progress (New, Existing, Modified)	Status Rationale
Medium	Install emergency standby generators	Water treatment plant, Ridgeline booster pump station, high altitude pressure zones (Canyon Creek, Rose Reservoir)	Medium	\$2,000,000	Short Term	Grant, General Fund	Existing On going	Ridgeline PS upgrade budgeted in FY 18-19.
Low	Install surveillance and lighting equipment.	Water Treatment Plants and System Storage Tanks	Medium	\$250,000	Long Term	Grants	Existing	Budgetary constraints, unfunded.
Low	Expand SCADA system monitoring.	Water and Wastewater Facilities	Low	\$3,000,000	Short Term	General Fund, Restricted Reserves	Existing On going	Study & Design Completed in FY 17-18. Final design and communication. Budgeted in FY 18-19.
Low	Add laboratory sampling and analyses for unregulated compounds related to potential terrorist threat or vandalism.	Water Treatment Plants and System Storage Tanks	Medium	Cost estimate not available	Long Term	Grants, General Fund	Existing	Waiting for EPA or AWWA to issue clear direction for compounds, test method, and cost.

Notes:

Timeframe to Completion of Project: "Immediate" is up to 1 year; "Short Term" is 1 to 3 years; "Long Term" is 3 years or longer.

Status: "New" refers to a mitigation initiative newly created as part of the plan update process; "Existing" refers to an unfinished initiative that is carried over from the 2012 plan;

"Modified" refers to an existing initiative that carried over from the previous plan, but has changed to limit or expand its scope of activities.

Status Rationale: A statement of justification as to why the project is currently in the status it is in.

Completed or Removed Mitigation Initiatives

The following mitigation actions from the 2012 plan have been completed or are in progress and therefore are removed from the Plan update.

Mitigation: 16-inch Serrano Creek raw water main crossing relocation, 16-inch treated water creek crossing

Status: Complete.

Mitigation: One slope stability improvement.

Status: Complete.

Mitigation: Expand SCADA system monitoring.

Status: Completed study and design; ongoing.

Mitigation: Replace existing 10' with 16' looped water transmission line at Live Oak Canyon Road.

Status: Removed. Budgetary constraints; unfunded. System-wide study is needed to identify and prioritize area for loops. Varying pressure zones makes this task complex.

Mitigation: Implement Vulnerability Risk Assessment recommendations.

Status: Complete.

Mitigation: Install razor or barbed wire around site perimeter at water treatment/storage sites.

Status: Complete.

Mitigation: Install additional security measures/alarms at facility access points, including intrusion alarms.

Status: Complete.

Mitigation: Improve lock system.

Status: Complete.

Mitigation: Keep emergency response plan up to date and coordinate with local fire and sheriff authorities.

Status: Complete.

Mitigation: Coordinate with IRWD and perform studies for treatment of Irvine Lake Water.

Status: Complete.

Mitigation: Install new software and hardware for accessing system infrastructure and manuals.

Status: Complete.

Mitigation: Procure new computer hardware for field emergency use.

Status: Complete.

PLAN INTEGRATION

TCWD's capital budget, Water, Reclaimed Water, and Wastewater Master Plan are all used to implement mitigation initiatives identified in this annex. After adoption of the HMP, the District will continue to integrate mitigation priorities into these documents.

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