

2024



Orange County Water and Wastewater Multi-Jurisdictional Hazard Mitigation Plan

Annex K: Serrano Water District



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SERRANO WATER DISTRICT ANNEX

Serrano Water District (Serrano Water®) is a participant (Member Agency [MA]) in the Orange County Water and Wastewater Multi-Jurisdictional Hazard Mitigation Plan (MJHMP). As a participant MA, Serrano Water representatives were part of the MJHMP planning process and served on the planning team responsible for the plan update; refer to **Section 2** of the MJHMP. The base plan, including the MJHMP procedural requirements and planning process apply to Serrano Water.

This annex details the hazard mitigation planning elements specific to Serrano Water and describes how Serrano Water’s risks vary from the planning area. This annex is not intended to be a standalone document but supplements the information contained in the base plan. All sections of the MJHMP, including the planning process and other procedural requirements, apply to and were met by Serrano Water. The base 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 Serrano Water with a focus on the risk assessment and mitigation strategies.

K.1 HAZARD MITIGATION PLAN POINT OF CONTACT AND DEVELOPMENT TEAM

The representative listed in **Exhibit K-1** lead the Serrano Water planning team, attended meetings, and coordinated the hazard mitigation planning efforts with Serrano Water staff and the consultant team supporting the effort.

Exhibit K-1. Planning Team Lead

Primary Point of Contact
Name: Jerry Vilander
Title: General Manager
Telephone: (714) 538-0079
Email: jerryv@serranowater.org

Serrano Water followed the planning process detailed in **Section 2** and formed an internal team to support and provide information for the plan update. The following staff served as Serrano Water’s internal hazard mitigation planning development team.

Exhibit K-2. Internal Hazard Mitigation Planning Development Team

Name	Title
Jennifer Westrum	Administrative Assistant

Outreach to the public within Serrano Water’s service area was performed to ensure residents could access information on this planning effort. To reach the largest number of people possible, Serrano Water published a webpage with information on the MJHMP process. The MJHMP survey was posted to their blog platforms on to increase engagement.

K.2 JURISDICTION PROFILE

Service Population: 6,500

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 Santiago Reservoir (Irvine Lake), and groundwater from three wells located within the City of Villa Park. Annually, Serrano provides about 3,000 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 Metropolitan through MWDOC.

Serrano owns a percentage of the capacity of Irvine Lake and the dam forming the lake; Irvine Ranch Water District owns the balance. 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-inch 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 4,000 gpm for a peak supply of about 7,000 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.

K.3 HAZARDS

This section is intended to profile the hazards and assess the vulnerabilities that Serrano Water faces, distinct from that of the county-wide planning area. The hazard profiles in the MJHMP discuss overall impacts to the planning area and describes the hazard problem description, hazard extent, magnitude/severity, previous occurrences of hazard events and the likelihood of future occurrences. For more information on risk assessment methodologies, see **Section 3**.

Serrano Water's service area is subject to most of the other hazards identified for the planning area. Many of these hazards are dispersed and may affect the entire region, including power outages, drought, seismic shaking, and windstorms. Based on the risk assessment, the Serrano Water development team discussed which hazards should or should not be profiled in the base plan. This discussion resulted in the identification of the following hazards that affect Serrano Water and summarized their probability of future occurrence, level of impact and significance as outlined in **Exhibit K-3**. Detailed hazard profiles for the planning area are provided in **Section 3** of the base plan.

Exhibit K-3. Serrano Hazard Identification

Hazard Type	Occurrence Probability*	Affected Area*	Primary Impact*	Secondary Impact*	Hazard Planning Consideration*	Significance to Serrano Water
Human-Caused Hazards: Power Outage	Highly Likely	Medium	Catastrophic	High	High	Medium
Wildfire	Highly Likely	Medium	Critical	High	High	Medium
Human-Caused Hazards: Terrorism (Cyber Threat)	Highly Likely	Medium	Critical	Limited	High	High
Seismic Hazards: Seismic Shaking	Likely	Medium	Catastrophic	High	High	Medium
Seismic Hazards: Seismic Liquefaction	Likely	Medium	Catastrophic	High	High	Low
Severe Weather: Windstorm	Highly Likely	Large	Limited	Negligible	Medium	Medium
Severe Weather: Extreme Heat	Likely	Medium	Critical	Moderate	Medium	Medium
Severe Weather: Drought	Highly Likely	Large	Negligible	Negligible	Medium	Medium
Dam/Reservoir Failure	Somewhat Likely	Medium	Catastrophic	High	Medium	High
Flood	Likely	Medium	Limited	Negligible	Medium	Low
Coastal Hazards: Coastal Storms	Likely	Small	Limited	Limited	Medium	N/A
Coastal Hazards: Coastal Erosion	Likely	Isolated	Limited	Limited	Medium	N/A
Seismic Hazards: Fault Rupture	Somewhat Likely	Isolated	Catastrophic	Limited	Medium	N/A
Geological Hazards: Landslide and Mudflow	Somewhat Likely	Small	Limited	Moderate	Medium	Low
Coastal Hazards: Sea Level Rise	Likely	Isolated	Limited	Negligible	Medium	N/A
Human-Caused Hazards: Contamination/ Saltwater Intrusion	Unlikely	Small	Critical	High	Low	Medium
Human-Caused Hazards: Terrorism (MCI)	Unlikely	Isolated	Critical	Moderate	Low	Medium
Human-Caused Hazards: Hazardous Materials	Unlikely	Isolated	Limited	Moderate	Low	Medium
Urban Fire	Unlikely	Isolated	Limited	Negligible	Low	Medium
Geological Hazards: Land Subsidence	Unlikely	Isolated	Negligible	Limited	Low	Low
Geological Hazards: Expansive Soils	Unlikely	Isolated	Negligible	Limited	Low	Low
Coastal Hazards: Tsunami	Unlikely	Isolated	Negligible	Negligible	Low	N/A

*The values within these columns are representative of the entire planning area of Orange County and are not narrowed down to Serrano Water’s service area.

<p>Geographic Affected Area</p> <ul style="list-style-type: none"> ▪ Isolated: Less than 10% of planning area ▪ Small: 10-30% of planning area ▪ Medium: 30-60% of planning area ▪ Large: 60-100% of planning area 	<p>Significance</p> <ul style="list-style-type: none"> ▪ Low: Minimal potential impact ▪ Medium: Moderate potential impact ▪ High: Widespread potential impact
<p>Probability of Future Occurrences</p> <ul style="list-style-type: none"> ▪ 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 	<p>Magnitude/Severity</p> <ul style="list-style-type: none"> ▪ Catastrophic: More than 50% of property severely damaged; shutdown of facilities for more than 30 days; and/or multiple deaths. ▪ Critical: 25-50% 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% of property severely damaged; shutdown of facilities for more than a week; and/or injuries/illnesses treatable; does not result in permanent disability. ▪ Negligible: Less than 10% of property severely damaged, shutdown of facilities and services for less than 24 hours; and/or injuries/illnesses treatable with first aid

The FEMA Local Mitigation Planning Handbook requires each agency to identify the magnitude/severity of each hazard to their infrastructure. The identification of hazards provided in **Exhibit K-3** is highly dependent on the location of facilities within each agency’s 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 agency’s expertise and knowledge. The table was created with input from the Water Emergency Response Organization of Orange County (WEROOC), consultant staff, and Serrano Water.

K.4 HAZARD MAPS

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

Exhibit K-4. Fire Hazard and Serrano Water District Potable Water Infrastructure

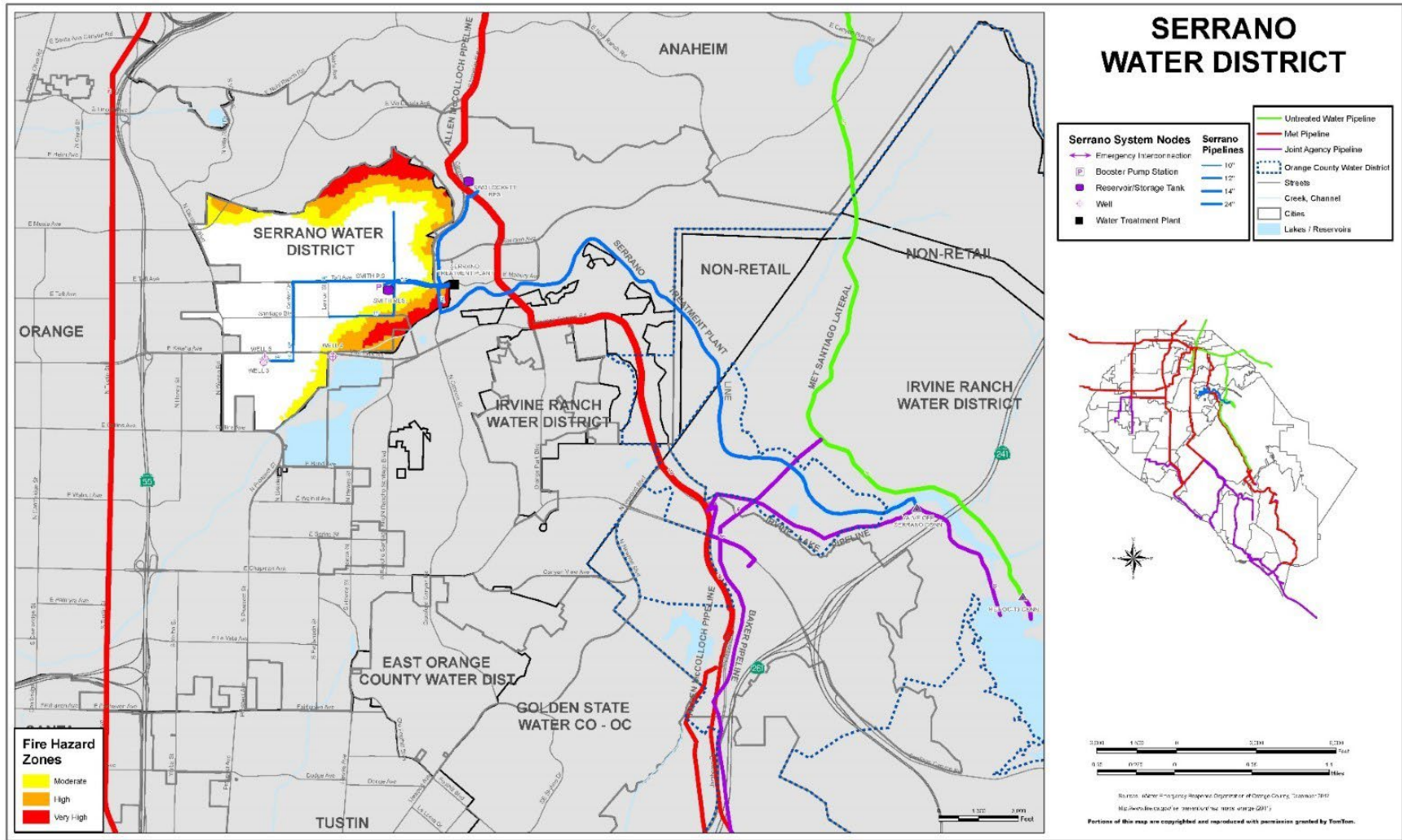


Exhibit K-5. Flood Hazard and Serrano Water District Potable Water Infrastructure

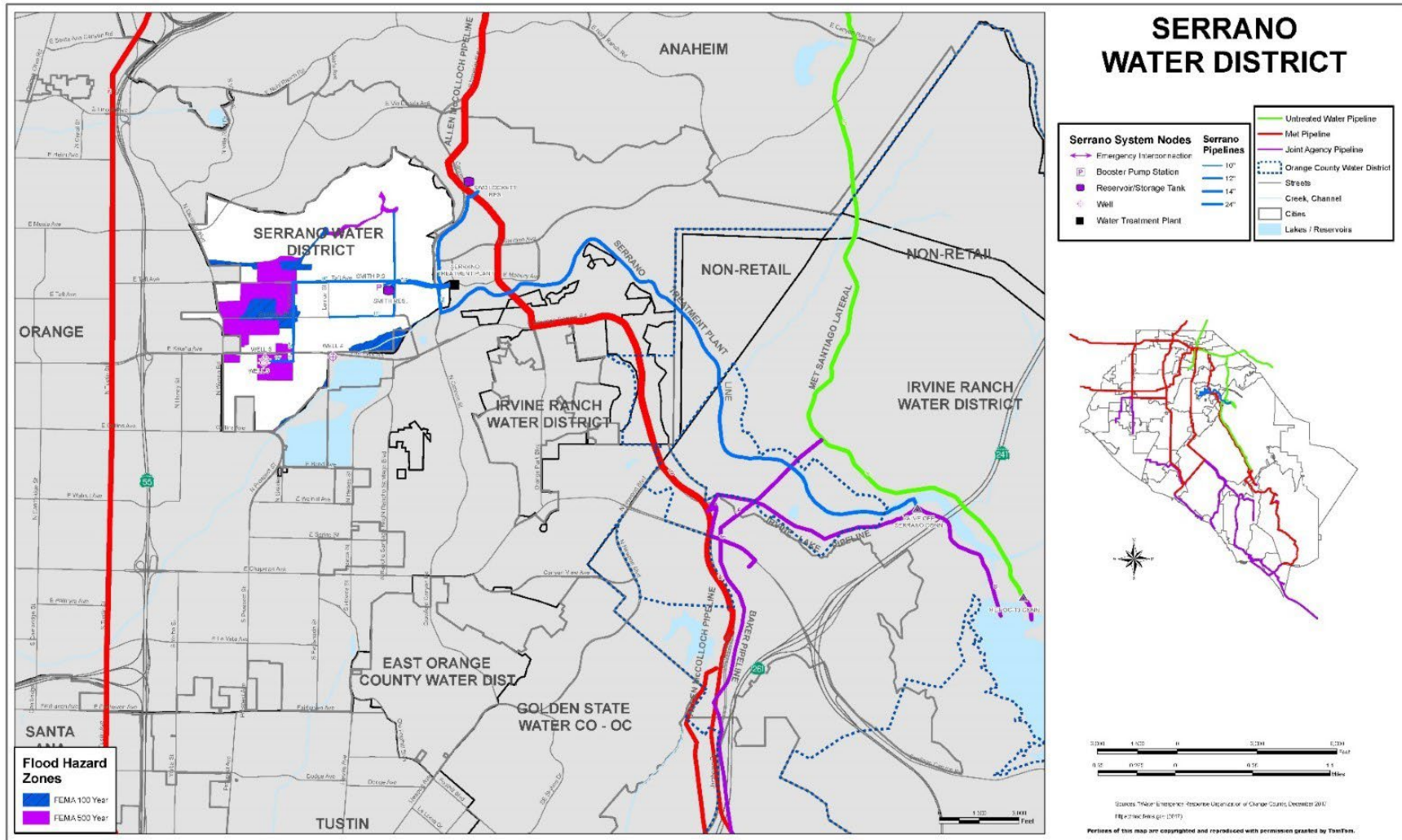


Exhibit K-7. Liquefaction Hazard and Serrano Water District Potable Water Infrastructure

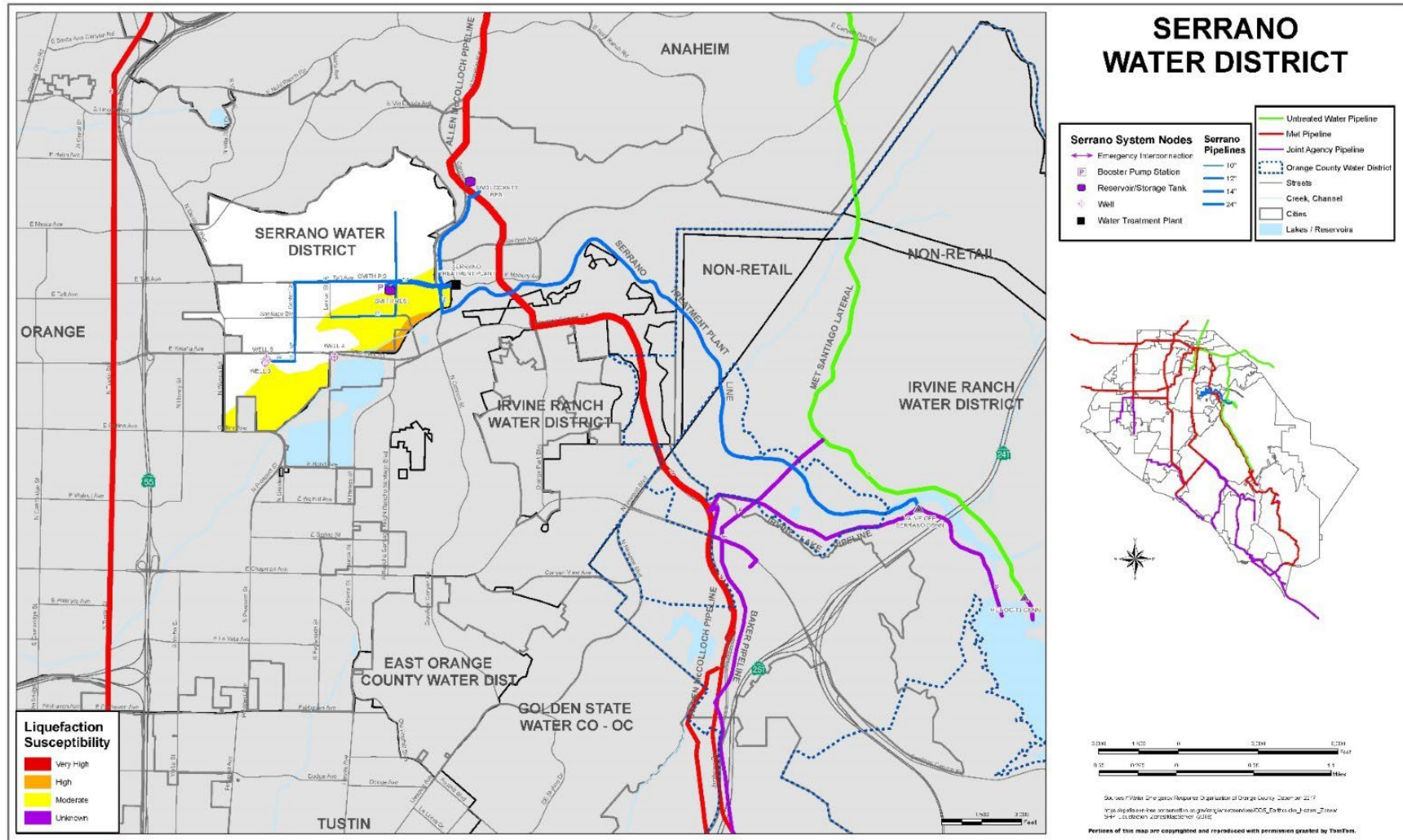
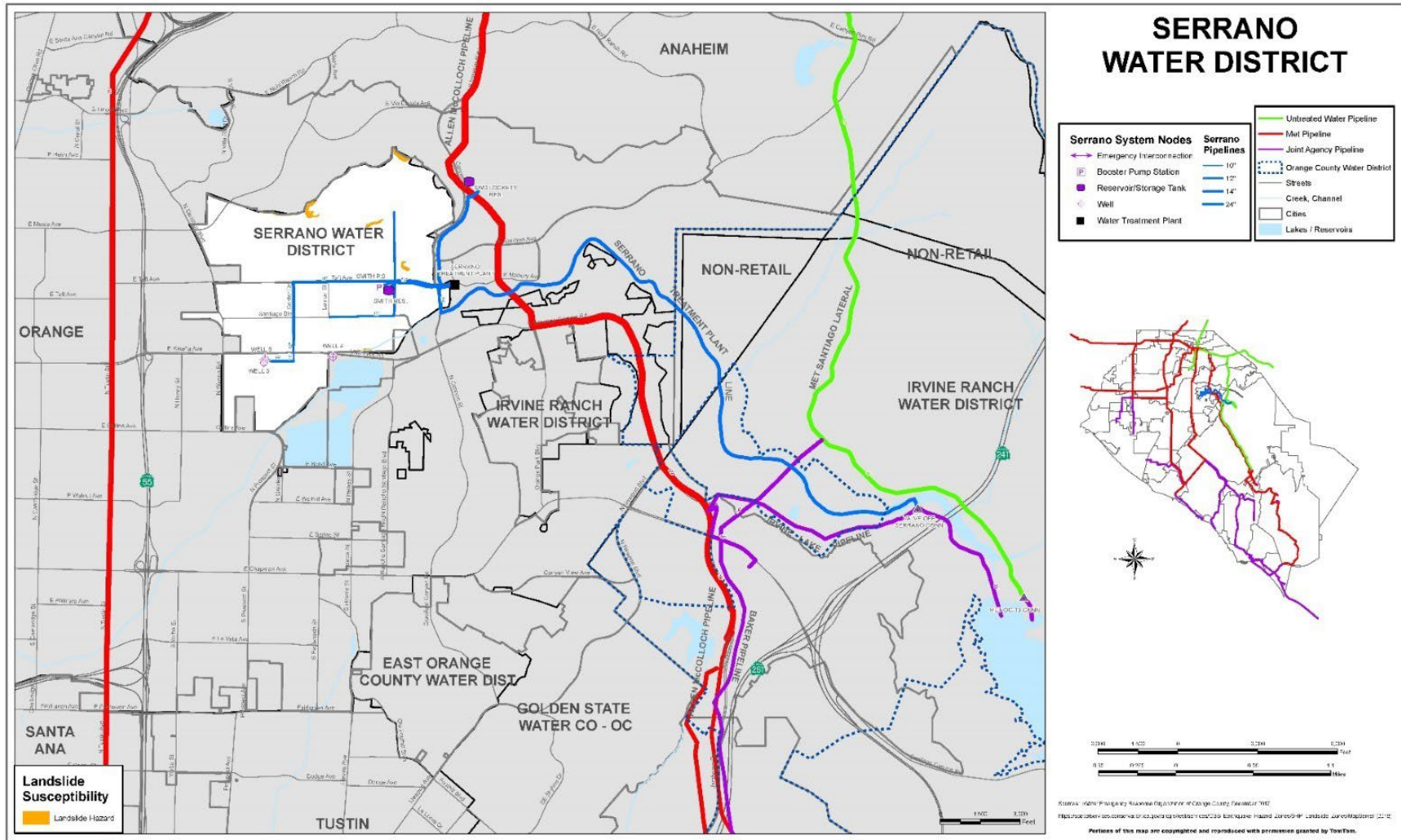


Exhibit K-8. Landslide Hazard and Serrano Water District Potable Water Infrastructure



K.5 VULNERABILITY AND RISK ASSESSMENT

Assessing vulnerabilities shows the unique characteristics of individual hazards and begins the process of narrowing down locations within Serrano Water’s service area that are vulnerable to specific hazard events. The vulnerability assessment considered unique local knowledge of hazards and impacts and a GIS overlaying method for examining such vulnerabilities more in depth. Using these methods vulnerable populations, infrastructure, and potential losses from hazards can be estimated.

Assets Susceptible to Hazard Events

Serrano Water’s infrastructure is outlined in **Exhibit K-9**, which lists the number of Serrano Water’s infrastructure assets are located within the mapped hazard zones identified above.

Exhibit K-9. Serrano Water Infrastructure and Exposure to Hazards

Hazard		Infrastructure Type				
		Pump Stations (#)	Treatment Plants (#)	Reservoirs (#)	Wells (#)	Potable Pipelines
Fire Hazard Zone	Moderate	0	0	0	0	1.5
	High	0	0	0	1	2.5
	Very High	0	1	1	0	2.8
FEMA Flood Zone	100-Year	0	0	0	0	4.9
	500-Year	0	0	0	2	0.5
Alquist-Priolo Rupture Zone		0	0	0	0	0
Seismic Shaking	Moderate	0	0	0	0	0
	High	1	0	1	3	3.3
	Extreme	0	1	1	0	5.3
Liquefaction	Moderate	0	1	0	1	4.7
	High	0	0	0	0	1.4
	Very High	0	0	0	0	0
	Unknown	0	0	0	0	0.4
Landslide Zone		0	0	0	0	0
Tsunami Zone		0	0	0	0	0

Serrano Water has a treatment plant and reservoir within a very high fire hazard zone and an extreme seismic shaking zone. Several miles of potable pipeline and two wells are located in the 500-year FEMA flood zone. Serrano Water has infrastructure or pipelines in all hazard areas except the Alquist-Priolo Rupture Zone, any landslide zones, or the tsunami zone.

Changes in Land Use and Development

Serrano Water serves the City of Villa Park and a small portion of the City of Orange over a 4.7 square mile service area. The land within this service area is largely built out with single family homes and retail locations. Remaining vacant land is expected to be developed into additional dwelling units but is projected to have a minor impact on service demand. Despite the low estimated change in service demand, Serrano Water has pursued updates to the Santiago Creek Dam in shared effort with Irvine Ranch Water District by updating the outlet tower and improving the dam spillway in 2023. These updates ensure the dam meets current state regulatory requirements, satisfy operational requirements, and extent the lift and reliability of the facilities.

Vulnerabilities Associated with Climate Change

Hazard	Climate Change Vulnerabilities
Hazards of High Concern	
Dam/Reservoir Failure	There are no direct climate change impacts anticipated on dam/reservoir failure, however fluctuations in the amount of precipitation and intensity of events could cause stress on dam/reservoir facilities not previously anticipated during initial design could increase the vulnerability of Santiago Creek Dam, causing potential issues for Serrano Water.
Human-Caused Hazards: Terrorism (Cyber Threat)	Connections between climate change and cyber based terrorism have not been identified.
Hazards of Medium Concern	
Human-Caused Hazards: Contamination/ Saltwater Intrusion	Changes in contamination and saltwater intrusion vulnerability due to climate change are expected to follow the changes outlined in the base plan.
Human-Caused Hazard: Power Outage	Climate change will likely increase Serrano Water’s vulnerability to power outages as local electric companies implement protocols such as rolling blackouts or targeted shutoffs that may impact Serrano Water facilities.
Human-Caused Hazards: Terrorism (MCI)	Climate change has no direct link to human-caused hazards and is expected to follow the impacts described in the base plan.
Human-Caused Hazards: Hazardous Materials	Climate change has the potential of increasing hazardous materials releases resulting from transportation crashes or damage to storage vessels.
Seismic Hazards: Seismic Shaking	Climate change is not expected to cause any changes to the frequency or intensity of seismic shaking occurring within Serrano Water’s service area.
Severe Weather: Drought	Droughts are expected to increase in length and frequency due to climate change and impact Serrano Water as described in the base plan.
Severe Weather: Extreme Heat	Temperatures are expected to increase due to climate change and impact Serrano Water’s service area similarly to the impacts described in the base plan.
Severe Weather: Windstorm	The challenges to Serrano Water from climate change’s impacts on windstorms is expected to follow the impacts described in the base plan.
Urban Fire	There is no anticipated impact to how climate change could influence the ignition or behavior of urban fires.
Wildfire	Climate change may increase wildfires on the outskirts of Serrano Water’s service area, however is not expected to increase wildfires within the majority of the service area due to the lack of vacant or undeveloped area.
Hazards of Low Concern	
Flood	Climate change is not expected to cause much impact on Serrano Water due to the lack of creeks or rivers running through the service area. Some flood waters may be seen around the Santiago Creek Recharge Basin on a more frequent basis.
Geological Hazards: Expansive Soils	Climate change is not expected to impact expansive soils within Serrano Water’s service area. The vulnerability follows that described in the Base Plan.
Geological Hazards: Land Subsidence	Serrano Water’s vulnerability to land subsidence is not expected to change due to climate change and is anticipated to be similar to those described in the base plan.
Geological Hazards: Landslide and Mudflow	Climate change could indirectly affect the conditions for landslides across Serrano Water’s service area as increased precipitation and storm intensities may cause more moisture-induced landslides.

Hazard	Climate Change Vulnerabilities
Seismic Hazards: Seismic Liquefaction	Climate change is anticipated to impact liquefaction potential within the Serrano Water service area as periods of both intense rain and drought could potentially increase or decrease groundwater elevations affecting the risk of liquefaction, depending on the circumstances.

K.6 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 MJHMP. Serrano Water’s internal development team revised the capabilities identified in the 2019 plan and collaborated to identify current local capabilities and mechanisms available to the MA for reducing damage from future hazard events. **Exhibits K-10a through K-10d** 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. Serrano Water has the ability to expand on and improve existing emergency management policies and programs to implement mitigation programs. In some instances, methods of expansion and improvement have been identified within a specific capability, while a majority of these capabilities are anticipated to be expanded and improved upon through additional projects/initiatives underway by the Agency. These have been included at the bottom of each table.

Exhibit K-10a. Planning and Regulatory Capabilities Summary

Ordinance, Plan, Policy, Program	Responsible Agency or Department	Description/Comments
Building Code	City of Villa Park/City of Orange	Serrano Water complies with applicable building codes and works with cities within the service areas. Expansion and Improvement: As retrofits and replacement projects are identified Serrano Water will anticipate meeting or exceeding the latest building codes to ensure greater resilience is incorporated into their infrastructure.
Zoning Ordinance	City of Villa Park/City of Orange	Serrano Water complies with applicable zoning codes and works with cities within the service areas.
Subdivision Ordinance or Regulations	City of Villa Park/City of Orange	Serrano Water complies with subdivision ordinances and regulations and works with cities within the service areas.
Special Purpose Ordinance	City of Villa Park/City of Orange	Serrano Water complies with special purpose ordinances and works with cities within the service areas.
Growth Management Ordinances	City of Villa Park/City of Orange	Serrano Water complies with growth management ordinances and works with cities within the service areas. Expansion and Improvement: Growth management ordinances need to take into account water needs and available supplies for existing and future populations. Working closely with the Cities and County in the region, Serrano Water can help better

Ordinance, Plan, Policy, Program	Responsible Agency or Department	Description/Comments
		understand how growth management ordinances could impact these resources.
Site Plan Review Requirements	Serrano Water looks at this for placement of gutter	Serrano Water performs site plan reviews as needed. Expansion and Improvement: Developing better methods and techniques to support site plan reviews within Orange County can help ensure adequate planning, design, and engineering analysis is available to Cities and the County when new subdivisions are proposed.
General Plan	City of Villa Park/City of Orange	Serrano Water complies with the city’s general plan.

How can these capabilities be expanded and improved to reduce risk?

- Conduct a risk and resilience assessment (RRA) and create corresponding Emergency Response Plan (ERP) per the America’s Water Infrastructure Act of 2018 (AWIA). Consider this plan as a resource to meet the AWIA requirements.
- Conduct disaster response fuel analysis and contingency planning with WEROC as a component of the Southern California Catastrophic Plan.
- Evaluate ability to contract with local fuel distributors and gas stations for emergency backup supply.
- Incorporate hazard information into the next General Plan Update. Ensure that new regulations are incorporated as needed.
- Implement a process to ensure mitigation actions identified in the hazard mitigation plan are reviewed as part of the update to the Capital Improvements Program, Water Master Plan, and Emergency Operations Plan

Exhibit K-10b. 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	City and Serrano Water (additional staff would be hired on as needed contract)	Serrano Water does not have in-house engineers- all engineer work hired as needed; work with MWPOC staff on regional level.
Engineer(s) or Professional(s) Trained in Construction Practices Related to Buildings and/or Infrastructure	City and Serrano Water (additional staff would be hired on as needed contract)	Serrano Water does not have in-house engineers- all engineer work hired as needed; work with MWPOC staff on regional level.
Planners or Engineer(s) with an Understanding of Natural and/or Human - Caused Hazards	City of Villa Park and City of Orange	City, county, and agency has planners with expertise in land development practices.
Staff with Education or Expertise to Assess the Community’s Vulnerability to Hazards	Serrano Water	Staff attend hazard mitigation meetings and expect additional training; attend training.
Emergency Manager	Management	General Manager of Serrano Water.
Grant Writers	Consultant	Serrano Water District Outsource.

How can these capabilities be expanded and improved to reduce risk?
<ul style="list-style-type: none"> ▪ Evaluate participation in MWDOC Water Loss Control Program, including meter testing and leak detection through training of internal staff or through MWDOC’s Choice program. ▪ Have all agency-registered engineers and other qualified individuals attend California Governor’s Office of Emergency Services (CalOES) Safety Assessment Program (SAP) training for building inspections. ▪ Coordinate with department managers to review the MJHMP and progress towards implementation. ▪ Identify information that should be included in future MJHMP updates.

Exhibit K-10c. Financial Capabilities Summary

Financial Resources	Agency or Department	Description/Comments
Capital Improvements Project Funding	Serrano Water District/Finance	Annual review of capital requirements and forecasting future cap needs. Expansion and Improvement: During annual budgeting Serrano Water can highlight HMP strategies that support funding needs for the CIP.
Authority to Levy Taxes for Specific Purposes	Do not do	The district typically levies taxes for 1) special assessment tax obligation debt service and 2) general obligation debt service payments.
Fees for Water, Sewer, Gas, or Electric Service	Set rates SWD	The district, through the Prop 218 process, is able to charge customers fees for water and sewer services. Expansion and Improvement: Analysis of future fees for services should analyze potential mitigation funding support opportunities to capture funding for these projects.
Impact Fees for Homebuyers or Developers for New Developments/Homes	Serrano Water + City	Through a general election, the district can incur debt through general obligation bonds.
Incur Debt Through General Obligation Bonds	Serrano Water District/Administration and Board of Directors	Serrano Water may incur special tax or revenue bonds as needed through the appropriate legal process.

How can these capabilities be expanded and improved to reduce risk?
<ul style="list-style-type: none"> ▪ Learn about how to utilize post-disaster mitigation grants (Section 406) and incorporate it into the utility’s disaster recovery strategy. ▪ Coordinate with other organizations, and agencies to identify potential assets and resources that may not currently be considered.

Exhibit K-10d. Education and Outreach Capability Summary

Resource/ Programs	Agency or Department	Description/Comments
Various; as needed	In house and as needed consultants	Information outreach is conducted for specific programs or projects as necessary.
Newsletter	Serrano Water District	Serrano Water publishes a newsletter to provide information to its customers. Expansion and Improvement: Incorporate mitigation information and analysis into newsletters to continue sharing information with customers.

Resource/ Programs	Agency or Department	Description/Comments
Press Release	Serrano Water District	Press releases are used to inform customers of essential information.
Brochures	Serrano Water District	Brochures are used to inform and educate customers on specific water topics.
Website	Serrano Water District	Serrano Water’s website is updated regularly and used to provide information.
Town Hall Meetings	Serrano Water District	Meetings held to discuss important water topics affecting customers, such as drought.

How can these capabilities be expanded and improved to reduce risk?
<ul style="list-style-type: none"> ▪ Participation in WEROC-led efforts to develop standardized messaging for water outages, dam events, and general disaster response. Ensure that messaging will work for the general community, as well as the Access, Disability, and Functional Needs community specific to Serrano Water. ▪ Identify a variety of opportunities to provide hazard information to the community and ways to minimize impacts associated with a disaster event.

K.7 MITIGATION STRATEGY

K.7.1 Mitigation Goals

Serrano Water adopts the hazard mitigation goals developed by the planning team; refer to **Section 4**.

K.7.2 Mitigation Actions

The internal development team reviewed the mitigation actions identified in the 2019 plan and the updated risk assessment to determine if the mitigation actions were completed, required modification, should be removed because they are no longer relevant, and/or should remain in the MJHMP update. New mitigation actions to address the updated risk assessment and capabilities identified above were also considered and added. **Exhibit K-11**, Serrano Water’s Mitigation Actions, identifies the mitigation actions, including the priority, hazard addressed, risk, timeframe, and potential funding sources.

Exhibit K-11. Serrano Water Mitigation Actions

Action/Task/Project Description	Location/ Facility	Hazard	Cost	Responsible	Timeframe	Possible Funding Sources	Status
HIGH PRIORITY							
Improve structural characteristics of reservoirs and pump stations; consider flexible connections at reservoirs for seismic activity. Replace water tank and upgrade pump station to meet current seismic requirements.	All facilities	Seismic Hazards: Seismic Shaking	\$9 Million	Engineering	Long Term	Budget	Existing, Ongoing
MEDIUM PRIORITY							
Coordinate with Irvine Ranch Water District on dam inundation mapping, training, and exercises.	Santiago Creek Dam	Dam/Reservoir Failure	Unknown			Budget	New
LOW PRIORITY							
Secure above ground assets in all buildings, booster stations, reservoirs, pressure reducing stations, emergency interties, water systems, water reclamation plant, lift station, pipelines, and bridge crossings.	All Facilities	Seismic Hazards: Seismic Shaking	\$50 Million	Operations /Engineering	Long Term	Capital Improvement Fund	Existing, Ongoing

K.7.3 Completed or Removed Mitigation Initiatives

The following mitigation actions from the 2019 plan have been completed or are in progress and therefore are removed from this plan update.

- **Mitigation:** Identify all major fuel pipelines, rail transportation corridors, manufacturing facilities, and their vulnerability relative to hazardous materials releases.
 - **Status:** Completed. Serrano Water does not own any assets of concern in these areas.
- **Mitigation:** Protect facilities within flood plain area around Irvine Lake
 - **Status:** Removed in 2024. Facilities were transferred to Irvine Ranch Water District.
- **Mitigation:** Place protective measures in rivers and creeks or relocate facilities out of flood harm's way.
 - **Status:** Removed in 2024. Facilities were transferred to Irvine Ranch Water District.
- **Mitigation:** Install jointless pipelines in all creek crossings.
 - **Status:** Removed in 2024. No creek crossings in Serrano Water's service area.
- **Mitigation:** Develop a comprehensive approach to reducing the possibility of damage and losses due to structural fire/wildfires.
 - **Status:** Removed in 2024. Facilities were transferred to Irvine Ranch Water District.
- **Mitigation:** Create a fire management plan outlining various impacted facilities and vulnerabilities,
 - **Status:** Removed in 2024. Facilities were transferred to Irvine Ranch Water District.
- **Mitigation:** Share all infrastructure/building information with local, county, and state fire agencies.
 - **Status:** Removed in 2024. Facilities were transferred to Irvine Ranch Water District.

K.8 PLAN INTEGRATION

Serrano Water's capital budget, Water Master Plan, and Emergency Response Plan are all used to implement mitigation initiatives identified in this annex. Serrano Water will update its Emergency Response Plan that will establish protocol and incorporate applicable areas of the MJHMP. After adoption of the MJHMP, the District will continue to integrate mitigation priorities into these documents.

Since the previous Plan Update, Serrano Water incorporated information from the MJHMP in its CIP, in addition to the following planning mechanisms:

- The risk assessment and mitigation actions were used to inform Serrano Water's Master Plan and Urban Water Management Plan.
- The Capital Budget was used to implement mitigation initiatives identified in the previous Plan.
- The risk assessment informed the need for additional studies, such as dam inundation.