Sonoma Valley County Sanitation District

2021 Local Hazard Mitigation Plan

Sonoma Water

Approved by FEMA
TBD

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ABS	Acrylonitrile Butadiene Styrene Pipe
AC, ACP	Asbestos Cement Pipe
ADWF	Average Dry Weather Flow
ALA	American Lifelines Alliance
ASK	Abrahamson-Silva-Kamai Model for ground motion
BSSA	Boore-Stewart-Seyhan-Atkinson Model for ground motion
CB	Campbell-Bozorgnia Model for ground motion
CI, CIP	Cast Iron Pipe
cm	Centimeters
CY	Chiou-Youngs Model for ground motion
DI, DIP	Ductile Iron Pipe
DSOD	Division of Safety of Dams
g	Acceleration of gravity (= 32.2 feet per second squared)
gpm	Gallons per Minute
FEMA	Federal Emergency Management Agency
FHSZ	Fire Hazard Severity Zones
FIRM	Flood Insurance Rate Maps
GIS	Geographic Information System
HDPE	High Density Polyethylene Pipe
I	Idriss Model for ground motion
IBC	International Building Code
m	Meters
mm	Millimeters
m/ sec	Meters per second
M	Magnitude (moment magnitude)
MG	Million Gallons
MGD	Million Gallons per Day

MH	Manhole
N.A.	Unknown Pipe Material
NEHRP	National Earthquake Hazards Reduction Program
NFIP	National Flood Insurance Program
NOAA	National Oceanic and Atmospheric Administration
PEP	Polyethylene Pipe
PGA	Peak Ground Acceleration (measured in g)
PGD	Permanent Ground Deformation (measured in cm)
PGV	Peak Ground Velocity (measured in cm/second)
PG&E	Pacific Gas and Electric
PVC	Polyvinyl Chloride Pipe
RAS	Return Activated Sludge
RC	Rodgers Creek Fault
RCP	Reinforced Concrete Pipe
SC	Steel Cased Pipe
SCWA	Sonoma County Water Agency
sec	Seconds
SVCSD	Sonoma Valley County Sanitation District
UBC	Uniform Building Code
VCP	Vitrified Clay Pipe
V, Vs	Seismic Base Shear Force
W	Weight
WAS	Waste Activated Sludge
WWTP	Wastewater Treatment Plant

APPENDICES

Appendix A: SVCSD Collection and Recycled Water System, Geology, Quaternary Deposits, Liquefaction, Flood Zone, Fire Hazard Zone, and Historic Wildfires Figures
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1. Introduction

On December 15, 2015, the Board of Directors of the Sonoma Valley County Sanitation District (District or SVCSD) adopted a local hazard mitigation plan (LHMP) with a vision to incrementally reduce its exposure to natural hazards and improve the reliability of its services to the public. The plan was developed in accordance with the federal Disaster Mitigation Act (DMA) 2000 (Public Law 106-390), Title 44 Code of Federal Regulations (CFR) Part 201, and subsequently approved by the Federal Emergency Management Agency (FEMA) on September 13, 2016. A FEMA-approved LHMP is a prerequisite for receiving pre-disaster mitigation grant funds and other federal assistance during declared emergencies.

FEMA requires LHMPs to be updated every five years. In September 2020, FEMA awarded SVCSD a grant to update its 2016 LHMP This 2021 LHMP update is intended to meet the requirements of DMA 2000 and Title 44 CFR Part 201. The update is based on a review of the present understanding of natural hazards that impact the SVCSD and an expanded assessment of the vulnerability of its infrastructure to these hazards. This update also documents the progress towards the mitigation actions identified in the 2016 LHMP and provides a vision for the next five years to help further reduce SVCSD's exposure to these hazards. Details regarding the 2021 LHMP update process are below in Chapter 1.

1.1 Purpose of the Plan

Hazard mitigation, as defined by the SVCSD, is a way to limit or eliminate damage to infrastructure and facilities that occur as a result of natural disasters. Hazard mitigation plans are often executed through developing short-term and long-term strategies, establishing a program to address potential hazards, and commencing a program or projects to mitigate the potential impacts of specific and identified hazards to infrastructure and facilities.

SVCSD is in an area impacted by multiple natural hazards. Historically the District has been subjected to floods, wildfires, landslides, and mudflows. Due to its proximity to the San Andreas Fault system, one of the major active fault systems in the world, Sonoma County also has a very high earthquake hazard.

Natural disasters can result in enormous cost to the public through loss of life, human suffering, property damage and economic loss. Lack of preparedness can make recovery a very long and arduous process, which can last for many months or years and can depress a region for a time long after the physical signs of the disaster have disappeared. Recognizing this, the Federal Government passed the Disaster Mitigation Act of 2000 (DMA 2000), which encourages and rewards pre-disaster planning at all levels of local, tribal, and state government. DMA 2000 was signed into law (Public Law 106-390) by the President on October 10, 2000.

The Disaster Mitigation Act (DMA) of 2000 (Public Law 106-390) requires state and local governments to develop hazard mitigation plans as a preliminary measure in order to receive federal disaster grant assistance. Prior to 2000, federal disaster funding was primarily appropriated towards disaster relief and recovery programs after an incident. Through the establishment of the DMA, there is now an increased emphasis on proactive planning for disasters before they occur; municipalities are encouraged to put mitigations in place in order to reduce damages due to hazards identified in a Natural Hazard Reliability Assessment and a Hazard Mitigation Plan.

The DMA encourages state and local authorities to work together on pre-disaster planning by identifying and developing mitigation actions to minimize damage from hazards. Mitigation actions are based on short-term and long-term activities and goals, which include reducing the cause or occurrence of hazards, reducing exposure to hazards, reducing the effects of hazards through preparedness, and reinforcing response and recovery activities. Through thoughtful planning and implementation of an effective plan, mitigation actions will effectively reduce the adverse impacts to infrastructure and facilities, which will therefore minimize the costs of rebuilding damaged structures should a disaster occur.

The SVCSD's wastewater collection, treatment, and disposal facilities, which also include recycled water storage and distribution facilities are distributed over a large geographical area and traverse zones of varying geology and potential hazards. A comprehensive LHMP is prepared in recognition of the SVCSD's responsibility to the community and its role in preserving the economic vitality of the region. The public places trust in the operators of wastewater systems to safely manage their operations in a manner that protects the health and safety of the public and the environment, even after a disaster. Uninterrupted collection and treatment of wastewater is essential for the health and safety of the community and to minimize the potential for loss of life and property damage following a major natural disaster.

1.2 Plan Organization

After the Introduction, the LHMP is organized into six chapters and includes all relevant documentation required to meet the necessary criteria for FEMA approval. Each chapter is briefly described below.

- **Chapter 2, Planning Process**, describes the LHMP Planning Process, and includes a list of meetings and public outreach activities that occurred to engage SVCSD stakeholders, County officials and staff, and the public.
- **Chapter 3, SVCSD Profile**, describes the SVCSD's history, geography, topography.
- **Chapter 4, Natural Hazard Risk Assessment**, identifies and prioritizes natural hazards affecting SVCSD, and assesses the SVCSD's vulnerability to these hazards.
- **Chapter 5, Mitigation Goals, Objectives, and Actions**, identifies mitigation goals, objectives and actions and prioritizes the actions.
- **Chapter 6, Plan Implementation**, discusses the LHMP's adoption and implementation
- **Chapter 7, Plan Maintenance**, discusses the SVCSD's plan to monitor, evaluate, update, and maintain the LHMP.
- **Chapter 8, Works Cited,** lists the references cited.

2. Planning Process

2.1 Implementation Progress of 2016 LHMP Actions

In the 2016 LHMP Update, the District identified a series of actions as part of its implementation strategy and has made progress towards these actions. Since FEMA approval of the 2016 LHMP in September 2016, the District has been actively engaged in furthering the goals and objectives laid out in the 2016 LHMP and the Natural Hazard Reliability Assessment. The District continues to work on these items; a summary of its progress toward the 2016 LHMP mitigation actions is provided in Appendix E. The District focused its efforts during 2016 to 2021 on the highest priority mitigation actions listed in Priority A1; however, it also made progress towards meeting other goals and objectives stated in the 2016 LHMP. Actions that are "In Progress" or for which there was "No Progress" are noted as such in Appendix E, as well as include the statement "Maintained in 2021 LHMP." These actions are included in the 2021 LHMP Mitigation Action lists in Chapters 4 and 5. For actions that were modified in the 2021 LHMP, this is noted as well in Appendix E. Goals, objectives and actions identified in the 2016 were incorporated into Sonoma Water's 2017 Strategic Plan, the Capital Improvement Plan, and the final Climate Adaptation Plan. The 2016 SVCSD LHMP was also reviewed when the City of Sonoma began updating their LHMP in 2020.

2.2 Growth and Development in the District (Element D1)

It is the District's responsibility to maintain reliable sanitation and recycled water services to its customers, and ensure the infrastructure is maintained and upgraded when needed. Development has not changed the District's overall vulnerability. The District's primary consideration is that our infrastructure remains resilient and is not affected by growth and development. In response to aging infrastructure, the SVCSD Private Sewer Lateral Ordinance requires property owners of homes and businesses that are 30 years or older to have their sewer laterals inspected and repaired, if necessary, in order to prevent sewer overflows that contribute to pollution and result in costly fines to the District. An estimated two-thirds of the sewer laterals in Sonoma Valley are at least 30 years old and likely in need of repair. The number of Equivalent Single-Family Dwellings (ESDs) and Assessor's Parcel Numbers (APNs) served by the District for each year since 2016 are listed below. During 2017 wildfires, the District experienced a reduction in the number of sewer connections. Those connections have then been restored and the District has experienced a growth in sewer connections since 2018. The assessments of newly sanitary sewer pipelines and manholes constructed since 2016 are included in this LHMP.

Table 1: Equivalent Single-Family Dwellings and Assessor's Parcel Numbers

Fiscal Year	Number of ESDs	Number of APNs
2016-17	17,447	10,439
2017-18	17,760	10,487
2018-2019	17,504	10,445
2019-2020	17,524	10,464

2020-2021	17,613	10,485

An expansion of the District's recycled water system was completed in 2017, which provides recycled water service to customers located north of the WWTP. These customers are served by the recently upgraded R5 Pump Station. Main features of recycled water pipelines and reclamation facilities are shown in Figure SV-1 (Appendix A). The assessments of the reclamation facilities built since 2016 are included in this LHMP. The District also applied for and received FEMA funding to seismically retrofit its existing clarifiers in order to make them more resilient during an earthquake. Design is complete and construction will begin in 2023.

2.3 2021 LHMP Update Process

The 2021 LHMP updates the District's Earthquake, Flood, and Fire hazard assessments, descriptions, and histories in Chapter 4, incorporating the significant natural hazard events that have occurred between 2016 and 2020. Updates to the District's systems and vulnerabilities are provided in Chapter 4. The updated GIS layers, as well as all reports and sources reviewed and integrated into this LHMP are listed in Chapter 8 and Appendix F. New information also includes the climate resiliency analysis provided in Chapter 4 from the draft *Water Agency Climate Adaptation Plan* and a description of the Water Agency's Existing Authorities, Policies, Plans, Programs, and Resources in Chapter 3.

During the last five years, the District has initiated several high priority projects identified in the 2016 LHMP to help reduce exposure to natural hazards and improve the reliability of its systems. The District has also reassessed some of the priorities associated with the mitigation actions and added additional actions for the 2021 LHMP mitigation strategy based upon the 2021 vulnerability assessment. A summary of progress made on the 2016 LHMP mitigation actions is provided in Appendix E, and the updated Mitigation Actions for the 2021 LHMP are in Chapters 5 & 6. The schedule of activities is included in Appendix B.

2.3.1 Planning Process: Agents in the Jurisdiction (Element A1c)

Three teams were created to complete the 2021 LHMP. Below is a list of the teams and their core functions.

The Core Planning Team (CPT) guided the direction of the 2021 LHMP and implemented the majority of the research and text updates. The CPT began meeting in September 2020 to plan the update process, outreach activities and timeline, and begin revisions, and met weekly. The team consisted of an engineer from the Design/Engineering department, technical writing staff from the Grants and Funded Projects department, and staff from Public Affairs & Outreach. See below for CPT members and their role(s).

Table 2: Core Planning Team

Name	Title	Meetings Attended	Items Reviewed
Parastou Hooshialsadat	W.A. Engineer III	• Weekly CPT meetings • TRT meetings • Meetings with consultant • Public and stakeholder meetings in Appendix B	• Survey results • Technical information and documents • Presentation material
Mollie Asay	WA Technical Writing Specialist	• Weekly CPT meetings • TRT meetings • Public and stakeholder meetings in Appendix B	• Chapters 1 -3 • Survey results • Revised mitigation actions
Devin Chatoian	WA Technical Writing Specialist	• Weekly CPT meetings • TRT meetings • Public and stakeholder meetings in Appendix B	• Chapters 1 -3 • Survey results • Meeting meetings
Barry Dugan	WA Principal Programs Specialist	• Weekly CPT meetings • TRT meetings • Public and stakeholder meetings in Appendix B	• Public outreach material • Presentation material • Survey results
Andrea Rodriguez	WA Senior Programs Specialist	• Weekly CPT meetings • Public and stakeholder meetings in Appendix B	• Public outreach material • Presentation material • Survey results
Cynthia DeLeon	WA Programs Specialist I	• Weekly CPT meetings • Public and stakeholder meetings in Appendix B	• Public outreach material • Presentation material • Survey results

The Technical Review Team (TRT) was created by the CPT in October 2020, and first met in January 2021. This team consisted of the District's technical experts, including Deputy Chief Engineer, Principal Engineers, Operations & Maintenance Coordinators, and Emergency Response staff. The TRT's primary responsibilities were to review specific technical information and conduct technical research and updates. The TRT only attended the Technical Review Meetings, and a list of attendees is included in Appendix D. Names and titles of the TRT are listed below.

Table 3: Technical Review Team

Name(s)	Title	Items Reviewed
Kent Gylfe	Deputy Chief Engineer	• Updated vulnerability assessment and mitigation actions • Final Draft of LHMP
• Kevin Booker • Carlos Diaz • Steven Girard • Dale Roberts • Mike West	WA Principal Engineers	• Updated vulnerability assessment and mitigation actions • Final Draft of LHMP
David Royall	WA Operations & Maintenance Manager	• Updated vulnerability assessment and mitigation actions • Final Draft of LHMP
• Bret Beaudreau • Frank Mello • Ellen Simm • Mitchell Southard • Garett Walker • Heather Kelley (CAD/GIS)	WA Coordinators, WA CAD/GIS Coordinator	• Updated vulnerability assessment and mitigation actions • Final Draft of LHMP
Steven Hancock	Emergency Response Manager	• Updated vulnerability assessment and mitigation actions • Final Draft of LHMP

The Oversight Committee was also created by the CPT, with the purpose to provide high-level oversight of the draft plan. This team consists of the District/Water Agency's leaders, including the General Manager, Assistant General Managers, and Chief Engineer. The Oversight Committee's primary role was to review the final draft of the 2021 LHMP. Their secondary role will be to field any questions the Board of Directors may have when the District seeks Board approval and adoption of the updated LHMP. The Chief Engineer will also be responsible for maintaining the plan as stated in Chapter 7. See below for the list of Oversight Committee members and their roles.

Table 4: Oversight Committee

Name	Title	Items Reviewed

Grant Davis	General Manager	Final Draft of LHMP
Michael Thompson	Assistant General Manager of Maintenance	Final Draft of LHMP
Pam Jeane	Assistant General Manager of Water/Wastewater Operations	Final Draft of LHMP
Brad Sherwood	Assistant General Manager	Final Draft of LHMP
Jay Jasperse	Chief Engineer	Final Draft of LHMP

The TRT kickoff meeting was held on January 6, 2021, to initiate involvement of District's technical staff in the 2021 LHMP update process and solicit input from each division. The TRT convened again on February 22, 2021. During this meeting the consultant, InfraTerra was introduced and the TRT reviewed the vulnerability assessment and mitigation actions from 2016 and provided updates. The final TRT meeting was held on July 7, 2021, to review the revised and new mitigation actions. The meeting attendance lists and agendas are included in Appendix D. Because of the COVID-19 pandemic, all meetings were via Zoom and recorded. The PowerPoint presentations, meeting minutes, and recordings are available upon request. The final "administrative draft" of the 2021 LHMP was released for internal review in October 2021 and was sent out via email to the TRT, Oversight Committee, and all staff. This email provided the opportunity and means to be involved in the draft LHMP, and comments were considered and incorporated before the Public Comment draft was released.

2.3.2 Planning Process: How the Plan Was Prepared and Updated (Element A1a)

The District contracted the services of InfraTerra, Inc. a specialty engineering firm with expertise in the assessment of natural and man-made hazards and their impact on Sanitation services, to better evaluate the District's vulnerabilities to natural hazards. The InfraTerra team reviewed and edited the Natural Hazard Reliability Assessment (NHRA) (Chapter 4), Mitigation Goals, Objectives, and Actions (Chapter 5) and Plan Implementation (Chapter 6). Throughout the course of the update, key staff participated in meetings, and reviewed InfraTerra's proposed updates to the District's vulnerabilities and mitigation actions. Key staff included staff from the TRT and CPT. InfraTerra held biweekly meetings with key staff to review their progress and findings. See Appendix D for biweekly PowerPoint slides and attendee lists.

This plan has been developed through an extensive review of available information on hazards, Graphical Information Systems (GIS) databases, engineering drawings, reports for SVCSD's facilities, historic aerial photographs and available geotechnical and geologic data both from SVCSD and outside sources, Sonoma County Water Agency Local Hazard Mitigation Plan, Sonoma County Hazard Mitigation Plan, Association of Bay Area Governments Multi-Jurisdictional Local Hazard Mitigation Plan for the San Francisco Bay Area, and FEMA 386 series of documents (See Chapter 8, Works Cited).

2.3.3 Public and Local Stakeholder Involvement (Element A2)

Public and local Stakeholder participation allowed the SVCSD to obtain all relevant information necessary for identifying potential hazards, risks, and threats related to the SVCSD, prepare decision-makers and the community for potential future disasters, and provide critical input on what the communities priorities are during a natural disaster. The SVCSD has made an extensive effort to actively involve the Public and local Stakeholder in the planning and review of this Plan. The public meetings were held via Zoom, and the public was invited and encouraged to attend the meetings. The public also had an opportunity via the survey to sign up for updates regarding meetings and information related to the LHMP update. Efforts included:

October 2020 E-Newsletter sent out to inform public the LHMP update was beginning
February 2021 Survey launched
February 2021 E-Newsletter sent out to inform public of the survey
February 26, 2021 City of Sonoma Newsletter announcing LHMP update
March 11, 2021 Meeting with the District's Board of Directors, Supervisor Susan Gorin
March 24, 2021 Presentation at Sonoma Valley Citizen Advisory Commission (SVCAC)
May 19, 2021 Presentation at North Sonoma Valley Municipal Advisory Council (NVMAC)
July 27, 2021 Presentation at Springs Municipal Advisory Council
November 1, 2021 Public comment period opened
November 21, 2021 Public comment period closed

The District conducted a survey in February 2021 to ask the public and stakeholders various questions about natural hazard concerns in the service area. The District used social media and the stakeholder contact list to inform the public and stakeholders about information and presentations related to the survey and LHMP update. The District received 67 survey responses, which are documented in Appendix B. At the time of this update, the following social media platforms were used:

Nextdoor 12,210 subscribers
Instagram 1,263 followers
Facebook 2,750 followers
Twitter 4,536 followers

2.3.4 Public Involvement During Drafting (Element A3b)

The District provided the draft LHMP for public to review and comment from November 1, 2021 to November 21, 2021 through District's website. The District received two public comments from the public review process and changes were made as necessary to address the public comments to Chapter 4 of this LHMP. Documents related to Public and local Stakeholder involvement and District's responses to public comments are included in Appendix B. The stakeholder list includes elected officials and planning commission members, business leaders and large employers, regional, state and federal agencies, cultural institutions, nonprofit organizations, and neighborhood groups. A copy of the stakeholder list is in Appendix B.

2.3.5 Plan Adoption (Element E1)

Upon FEMA's conditional approval of the 2021 LHMP, the Sonoma Valley County Sanitation District's Board of Directors formally approved and adopted the LHMP on [Board date will be determined after FEMA reviews LHMP]. Formal FEMA approval of the District's LHMP was received on [Board date will be determined upon FEMA reviews LHMP]. See Appendix C for the Board Resolution adopting the 2021 LHMP.

3. SVCSD Profile

3.1 History

SVCSD began its operation in 1954. During a 1995 restructuring of the county government, the Sonoma County Water Agency (Sonoma Water or Water Agency) assumed responsibility for managing the county sanitation zones and districts, which provide wastewater treatment, reclamation, and disposal for residences and businesses. SVCSD operates under a permit from the California Regional Water Quality Control Board (San Francisco Bay region) that sets the requirements for operation. The SVCSD Board of Directors is composed of the three people who hold these elected positions: Mayor, City of Sonoma; First District Supervisor, Sonoma County; Chair of Sonoma County Board of Supervisors.

SVCSD now serves an area of about 4,500 acres. The service area extends from Glen Ellen in the north to Schellville in the south, and includes the City of Sonoma, and the nearby communities of Agua Caliente, Boyes Hot Springs, Eldridge, El Verano, Fetter Hot Springs, Vineburg, and Temelec. There are approximately 17,548 equivalent single family dwelling units in the sewer service area. Figure 1 shows an aerial view of the primary service area for the SVCSD. Figure SV-1 (Appendix A) contains an overall map with the SVCSD Boundaries.

The SVCSD provides wastewater collection and treatment, and recycled water distribution and disposal services to a population of approximately 42,000 and maintains more than 100 miles of sewer and recycled water pipeline (Figure SV-1). After treatment, tertiary recycled water is used for irrigation and environmental restoration purposes or discharged through Shell Slough which ultimately flows into the San Pablo Bay.

The average dry weather design flow and permitted capacity of the SVCSD wastewater treatment plant (WWTP) is 3.0 million gallons per day (MGD). Current average dry-weather flow (ADWF) is 2.7 MGD with a peak wet weather capacity of 16 MGD. The WWTP is the largest wastewater plant in the Sonoma County Water Agency's jurisdiction and includes primary, biological (secondary), and tertiary levels (filtration) of treatment, followed by chlorine disinfection.

The solids handling system includes a gravity thickener to process primary and waste activated sludge, and a screw press to dewater the solids before being transferred to a landfill.

The following sections provide more details on the SVCSD wastewater collection and recycled water pipeline systems, reclamation reservoirs and wastewater treatment facilities.

3.2 SVCSD's Existing Authorities, Policies, Plans, Programs and Resources

SVCSD is a County Sanitation District in Sonoma Valley. Its enabling legislation is Health & Safety Code Section 4700 *et seq.* SVCSD has the authority to construct and operate works of improvement for sanitation related purposes; to execute related contracts, incur debt, and issue bonds for works of improvement; to fix rates, collect charges, and levy assessments for such purposes; and to acquire real property and related property rights such as easements and rights of way, including eminent domain authority if necessary. These core authorities provide the SVCSD a fundamental basis upon which to implement its hazard mitigation plan.

The SVCSD's policies are predominantly represented in its adopted Sanitation Codes and Standards. These codes and standards set forth uniform requirements for contributors to the wastewater collection and treatment systems of the SVCSD and enable the SVCSD to comply with all applicable State and Federal laws including the Clean Water Act of 1977, as amended, and the General Pretreatment Regulations (40 CFR Part 403). More information regarding SVCSD's Sanitation Code Ordinance can be found at http://www.scwa.ca.gov/files//docs/sanitation/codes/sonoma-valley-sanitation-code-2013.pdf By ordinance, the SVCSD can establish regulations (codes) and standards and enforce compliance therewith for new improvements to be designed and constructed to withstand or be more resilient in responding to hazards.

The plans, programs and resources in Table 5 have been reviewed and incorporated in the LHMP. For example, the vulnerabilities and projects listed in the plans were evaluated by the CPT and TRT and incorporated into the LHMP as mitigation actions if they aligned with the goals and objectives of this plan. This is why you will see "CAP" next to some items. These vulnerabilities and actions came from the Climate Adaptation Plan. Likewise, the mitigation goals, objectives and actions in the updated LHMP will be reviewed by the plan, policy, and program managers when they are up for their annual review, and will help inform, expand and improve future updates to these policies, plans and programs, as well as the County of Sonoma's General Plan, Strategic Plan, and Multi-Jurisdictional Hazard Mitigation Plan. The updated SVCSD LHMP will be distributed to all plan, policy, and program managers during the public review comment period and the FEMA approved LHMP will be also be distributed. Their respective manager will be in charge of reviewing the updated SVCSD LHMP and incorporating pertinent information into their updated documents.

Table 5: Summary of District Resources to Support LHMP

Resource Name	Ability to Support LHMP
Capital Projects Plan	This 5-year plan includes a projection of the Water Agency's capital expenditures and required funding for planned capital projects from Fiscal Year 2021 to 2026 through completion of the projects.
Strategic Plan	This plan establishes a framework for the long-term management of Water Agency.
Emergency Operations Plan	This plan addresses the planned response to emergency situations associated with large-scale natural disasters, technological incidents, and national security emergencies in or affecting a Water Agency facility or facilities, and/or its service area. This plan supports the District's preparedness during and after natural disasters.
Continuity of Operations Plan	The purpose of this plan is to ensure that the capability exists to continue essential governmental functions across a wide range of potential emergencies.
Climate Adaptation Plan	The purpose of the plan is to guide the assessment of climate risks to water supply, flood management, wastewater systems infrastructure and operations, and to serve as a roadmap for developing, evaluating, and implementing adaptation strategies to improve the resilience of its systems. This plan supports the District's preparedness for climate related hazards.
National Flood Insurance Program (NFIP)	Special Districts are not eligible to participate in NFIP. However, the Water Agency participates in the NFIP under the umbrella of Sonoma County. The County's flood zones and mapping in the General Plan Safety Element and other documents are based on the 100-year flood zones and floodways shown in the FEMA Flood Insurance Rate Map. This plan supports the District's preparedness for flood.
Private Sewer Lateral Program	In this program, the District conducts free video inspections and smoke testing of sewer laterals to property owners to prevent sanitary sewer overflows. This plan supports the District's preparedness for sewer overflows.

3.2.1 Plans

Capital Projects Plan

The Water Agency has a Capital Projects Plan. This plan describes the infrastructure projects that are planned over the next five years to meet the needs of the water system, the wastewater districts, and flood management facilities that the Agency manages. These projects can take the form of pipelines, storage tanks, treatment facilities, and flood management projects. The projects are designed to meet regulatory requirements and to replace aging facilities. The Capital Projects Plan is modified each year to reflect changes in regulatory requirements and budget constraints. A diverse group of sections in the Water Agency support Capital Projects: Design Engineering, Construction Management, CAD/GIS, Land Surveying & Right-of-Way, Technical Writing, and Environmental Resources. Together, these sections ensure that infrastructure projects are implemented in compliance with regulatory requirements and industry standards. More information on the Water Agency's Capital Projects Plan can be found at http://www.scwa.ca.gov/capital-projects/

Strategic Plan

In addition to the Capital Projects Plan, the Water Agency has a Strategic Plan listing strategic priorities and water policy statement. The strategic priorities identify key initiatives related to water supply, sustainability, sanitation and reclamation, flood control and organizational effectiveness. These priorities were developed with the intent to remain unchanged for a five-year period.

However, the actions identified to address these priorities are reviewed and updated annually. The 2017 Strategic Plan includes the following goals and strategies that support hazard mitigation:

Water Supply
- Increase the water supply reliability of Lake Mendocino and Lake Sonoma and continue Russian River Biological Opinion compliance
- Assess, maintain, and upgrade Water Transmission System infrastructure

Sanitation
- Assess, maintain, and upgrade wastewater treatment and water reuse systems
- Decrease overflows from wastewater collection systems

Flood Protection
- Provide efficient and effective flood protection programs
- Assess, maintain, and upgrade flood protection infrastructure

Energy
- Develop and utilize new renewable energy projects

Climate Change
- Continue improving our ability to respond and adapt to climate change
- Implement climate adaptation strategies
- Create a cost-effective energy resiliency plan for key facilities and equipment in the event of a catastrophic emergency
- Evaluate climate risk and vulnerabilities to our operations and infrastructure

Organizational
- Update LHMPs and implement natural hazard mitigation projects
- Update or create critical emergency preparedness planning documents
- Continue to improve emergency preparation and response to natural disasters

The Water Agency's Strategic Plan is available upon request.

Emergency Operations Plan

The Sonoma Water Emergency Operation Plan[i] (EOP) addresses the planned response to emergency situations associated with large-scale natural disasters, technological incidents, and national security emergencies in or affecting a Water Agency facility or facilities, and/or its service area. The purpose of the plan is to facilitate multi-agency and multi-jurisdictional coordination during emergency operations.

This plan describes the following:

- Water Agency's water and Wastewater operations and the hazards that threatens its infrastructure, systems, and staff.
- The Water Agency's emergency management organization required to assist in mitigating any significant emergency or disaster.
- Authorities, policies, responsibilities, and procedures required to protect the health and safety of customers, personnel, and facility property.
- Operational concepts and procedures associated with field response to emergencies, Emergency Operations Center (EOC) activities, and the recovery process.
- Implementation and integration of the Standardized Emergency Management System (SEMS), the National Incident Management System (NIMS), the National Incident Command System (NIMS), the Incident Command System (ICS), and the National Response Framework (NRF) for use within the Sonoma County Operational Area, regional, and California state systems.
- Multi-agency and multi-jurisdictional mutual aid and assistance program, particularly between the Water Agency and local, state, and federal agencies who can provide additional equipment and personnel to assist during emergency operations
- Pre-event emergency planning as well as emergency operations procedures.

The EOP has been designed for conformance with the National Incident Management Systems, SEMS (Government Code Section 8607), and to be used in conjunction with the State Emergency Plan and local emergency plans.

Continuity of Operations Plan

The purpose of the Water Agency's Continuity of Operations Plan[ii] (COOP) is to ensure that the capability exists to continue essential governmental functions across a wide range of potential emergencies.

The objectives of the Water Agency COOP include:

- Ensuring safety of employees and customers
- Ensuring the continuous performance of essential functions/operations during an emergency
- Protecting essential facilities, equipment, records, and other assets
- Reducing or mitigating disruptions to operations
- Achieving a timely and orderly recovery from an emergency and resumption of full service to customer
- Providing foundation for the continued survival of leadership
- Complying with legal and statutory requirements.

Climate Adaptation Plan

For this update, the draft climate change vulnerabilities identified in the Water Agency's Climate Vulnerability Assessment and Adaptation Plan (Climate Adaptation Plan) were incorporated into Chapter 4. When complete, the Climate Adaptation Plan will serve to guide the Water Agency in terms of prioritizing and allocating resources towards practices and projects that will improve resiliency of its operations and facilities to climate variability and change.

3.2.2 Programs

The following programs support SVCSD's hazard mitigation efforts.

National Flood Insurance Program (NFIP)

Special Districts are not eligible to participate in the NFIP. However, Sonoma County complies with the flood plain management requirements of the National Flood Insurance Program (NFIP) through the implementation of its Flood Damage Prevention Ordinance regulations set forth in chapter 7B of the County Code. These procedures have been in place since January 1982, when the county elected to participate in the NFIP and first received flood insurance rate maps, floodway maps and the attendant certification requirements. The ordinance provisions, definitions, and requirements were modeled after language recommended by the NFIP and were reviewed and found fully compliant by the NFIP. The County's flood zones and mapping in the General Plan Safety Element and other documents are based on the 100-year flood zones and floodways shown in the FEMA Flood Insurance Rate Map.

The Water Agency participates in the NFIP under the umbrella of Sonoma County. As the custodian of a sizeable portion of the flood control infrastructure in Sonoma County the Water Agency's role in flood protection and its impact on NFIP compliance is significant. All properties owned by the Water Agency are insured under the County of Sonoma Self-Insured Property Insurance Program. The Water Agency structures that have been damaged by floods are discussed in more detail in the Flood Protection Infrastructure and Vulnerability Assessment in Chapter 4.

Private Sewer Lateral Program

Leaking private building laterals are often one of the main sources of inflow and infiltration (I&I), which allow groundwater and storm water to seep into pipes, increasing the amount of water flowing to the wastewater treatment plant for treatment. In response to the aging infrastructure, The Private Sewer Lateral Ordinance requires owners of property that are 30 years or older to have their sewer laterals inspected and repaired, if necessary, in order to prevent sewer overflows that contribute to pollution and result in costly fines to the District. Currently, the District is conducting free video inspections and smoke testing of sewer laterals to property owners.

The smoke test identifies the sources of leaks and other problems in the sewer system, such as where storm water drainage is infiltrating the sewage pipes.

Property owners will be notified only if their laterals require repair/replacement following completion of the inspections. Where significant defects are identified, property owners will have one year from the report date to complete any necessary repairs identified in the report.

3.2.3 Resources

The Agency has a staff of over 250 professionals with a broad range of skills, all of whom work together to provide for the water supply, flood protection, sanitation and reclamation needs of Sonoma County residents, and to ensure the Agency's compliance with environmental regulations. The Agency is organized into five divisions under the direction of the General Manager: Operations, Maintenance, Engineering and Resource Planning, Environmental Resources and Public Affairs, and Administrative Services. Agency staff has successfully managed a wide range of projects and has an excellent relationship with the community it serves and the agencies it works with.

The Grants & Funded Projects department is responsible for all aspects related to grant management including proposals, awards, and compliance. In addition, the Grants & Funded Projects department is responsible for coordinating and facilitating the LHMP updates every five years.

Design Engineering provides design and project management services to implement capital construction projects associated with the Agency's water supply, flood management, wastewater collection and reclamation and treatment facilities. Principal functions revolve around the preparation of construction contract documents that depict and specify the work required to construct new or replacement infrastructure. Design Engineering also provides engineering support for long-range master planning, environmental compliance, and operations and maintenance. Additional functions include review of sanitation system improvements proposed as part of private development projects and establishing and maintaining design standards.

The primary mission of CAD staff is to support the Engineering Design Section with accurate and well-organized CAD documents for Capital Improvement Projects (CIP), including hazard mitigation projects, in addition to providing civil design support and analysis and clear mapping products for design and public communication. Staff also provide engineering record documentation management/research support and assist all Agency divisions and staff with similar services and products as needed. GIS staff provide project and program-based mapping and data analysis for all disciplines in the Agency, including assistance with providing the natural hazard data layer analyses.

Ensuring transparency and communications with our community is a priority for the Water Agency and the District. The Public Affairs Department manages the public outreach and information, governmental affairs, water education and water conservation functions for the Water Agency. Public Affairs staff are available to meet with our community to discuss Water Agency and District projects and initiatives and help provided education on all programs and projects that pertain to hazard mitigation. In addition, this team is responsible for public and stakeholder outreach utilizing a variety of communication strategies, including but not limited to public/community meetings, press releases, social media, and website postings.

Other resource groups within the Water Agency that support implementation, include environmental/natural resources, survey and right-of-way, construction management, and operations and maintenance. See Appendix G for Organization Chart.

The Water Agency has a public website at https://www.sonomawater.org/ , which provides information on all departments, resources, and programs. The District has its own webpage, https://www.sonomawater.org/svcsd , which provides information and content specific to SVCSD. There is also a link on both websites to the https://www.sonomawater.org/hazard-mitigation-projects webpage, which is specifically designated to inform the public on hazard mitigation projects, and also provides a link to this LHMP, along with contact information to submit questions or comments at any time.

3.3 Geography, Topography, and Climate

3.3.1 Geography

Sonoma Valley is in southeastern Sonoma County, California, 46 miles northeast of San Francisco and approximately 30 miles southeast of Santa Rosa, along Highway 12.

3.3.2 Topography

The topography of the SVCSD is varied and includes mountainous areas, rolling hills, broad flat river valleys, and bay flats. The valleys and foothills are predominantly devoted to agriculture but also contain most of the urbanized areas and population. The economic base of the unincorporated County is largely tourism and agriculture.

3.3.3 Climate

The Sonoma Valley has a “Mediterranean” climate. Temperatures in the Valley rarely drop below freezing during the rainy winter months; in the summertime, coastal fog, and breezes bring cool evenings even after very warm days.

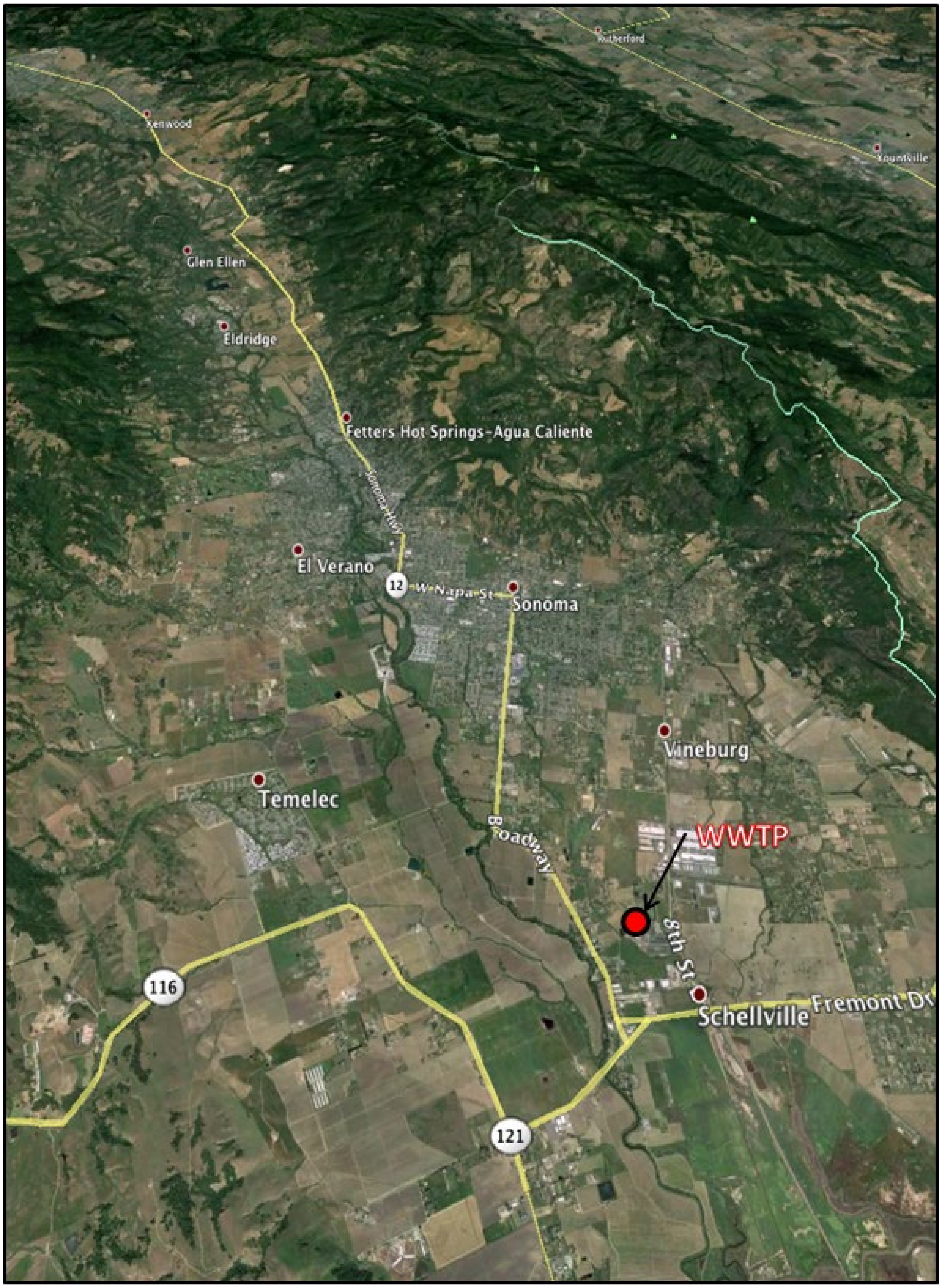

Figure 1: SVCSD Service Area Aerial View (Source: Sonoma Water CAD/GIS Application Gallery – September 2016)

3.4 SVCSD System

3.4.1 Sewer Collection System

Figure SV-1 (Appendix A) shows the SVCSD boundaries and highlights the main features of the collection and reclamation systems. Raw sewage is collected by a series of small diameter collection pipes (typically 4" to 8" diameter) up to 18" reinforced concrete pipe (RCP) and 42" PVC mains. Sewage then proceeds downslope and to the south, eventually reaching the wastewater treatment plant as shown in Figure SV-1.

There is a total of approximately 135 miles of pipe in the sewer collection system. Table 6 provides a breakdown of the pipe by diameter and material and highlights that the most common pipe materials are ACP (58 miles), VCP (38 miles), and PVC (23 miles). These pipe materials were likely chosen due to their corrosion resistance to sewage. The assessments of the sewer collection system infrastructures built since 2016 are included in this LHMP.

Table 6: Pipe Specifications in the Sewer Collection System

Pipe Material*	Length (Miles)	Diameters (in)
ABS	0.37	6
AC	52.86	4, 6, 8, 10, 12, 16, 18, 36
CIP	0.00	None
CP	0.52	6, 8, 24
DIP	2.54	4, 6, 8, 10, 12, 16, 18, 21, 42
N.A.	0.32	4, 6, 8, 21, 27
PE	3.02	6, 8, 10, 12, 24, 30
PVC	25.95	2, 4, 5, 6, 8, 10, 12, 15, 18, 21, 27, 30, 36, 42
RCP	11.04	6, 8, 10, 12, 15, 18, 21, 24, 27, 30
SP	0.02	30
VCP	36.92	6, 8, 10, 12, 15, 18, 21, 27
Total	**133.55**	

*ABS: Acrylonitrile Butadiene Styrene
ACP: Asbestos Cement Pipe
CIP: Cast Iron Pipe
CP: Concrete Pipe

DIP: Ductile Iron Pipe
N.A.: Unknown Pipe Material
PEP: Polyethylene Pipe
PVC: Polyvinyl Chloride Pipe
RCP: Reinforced Concrete Pipe
SC: Steel Cased Pipe
VCP: Vitrified Clay Pipe

3.4.2 Wastewater Treatment Plant

The SVCSD WWTP is located immediately north of Schell Creek on 22675 8th Street East in Sonoma and is currently rated to treat an average dry-weather daily design flow of 3.0 MGD. Construction of the WWTP began during the 1950s, and various modifications have been made to the buildings, tanks, and pipelines at the site over the past 50+ years. The WWTP and facilities are shown in the aerial view of Figure 2. The assessments of the infrastructures built at the WWTP since 2016 are included in this LHMP. The wastewater treatment process and the major facilities are described below:

Preliminary Treatment

- Preliminary treatment includes screening, grit removal and flow measurement.
- Headworks: Raw sewage from domestic and commercial sources, including wastewater from the septic waste holding tank and the scum tank, enters the WWTP at the Headworks Building. Wastewater from the aerated equalization basin also enters the Headworks Building, and flows are monitored with an equalization flow meter. At this point, large inorganic solids in the waste stream are removed via mechanical bar screens. During emergency conditions, such as may occur during periods of exceptionally high flows or mechanical failure of the screens, the influent wastewater can be directed through a bypass channel that is equipped with a bar screen. The wastewater is then pumped through another flow meter and into a vortex grit tank, where smaller solids, or grit, are removed from the wastewater. The grit passes through a grit pump, separator, and washer before it is removed for disposal in a landfill; the wastewater from the headworks and grit tank then flows through a control structure into the aeration basins. The flow control structure can divert wastewater to the aeration basins, or to the aerated equalization basin, depending on flow conditions.

Secondary Treatment

- Aeration basins. Four rectangular aeration basins provide biological treatment to reduce the quantity of organic material and nutrients contained in the wastewater. Air is injected into the wastewater to promote the growth of microorganisms that feed on organic materials in the sewage.

- Secondary clarifiers. The wastewater from the aeration basins is pumped through a flow-split structure and into the secondary clarifiers, where the wastewater is separated from the mixed liquor suspended solids. The two (2) secondary clarifiers, constructed as circular concrete tanks, allow the suspended heavier materials to settle to the bottom of the clarifiers as sludge. A portion of the settled solids is pumped to the Gravity Thickener as waste activated sludge (WAS), while the remaining portion is pumped back to the aeration tanks as return activated sludge (RAS). The secondary-treated water flows over the weirs of the clarifier and is then sent to the tertiary filters.

Tertiary Treatment

Tertiary filter. The secondary-treated water from the clarifiers is pumped into the tertiary filter complex to produce the effluent (tertiary-treated water, also called recycled water). This filtering process removes the remaining suspended solids in the effluent. To prevent clogging, the solids that accumulate in the filters are occasionally flushed out during a backwash cycle and returned to the aeration basins. Several bypass channels exist in order to maintain plant operations during maintenance of the tertiary filter complex.

- Disinfection: Chlorine Contact Basin. The clear effluent from the tertiary filters enters one of two twin reinforced concrete basins, called the chlorine contact basin. The flow path through the basin provides a long enough contact time for the chlorine to destroy pathogenic organisms. After disinfection, the remaining chlorine is neutralized with sulfur dioxide. The effluent then flows into the effluent wet well, where it is pumped to the reclamation system or discharged to the San Pablo Bay through the Schell Slough.
- Solids Handling: The excess sludge in the wastewater is pumped to a screw press where it is dewatered for disposal in a landfill. Filtrate water from the screw press is then sent back to the headworks for treatment.
- Storage Reservoirs: There are four off-site storage reservoirs. Three of the reservoirs are in use with a combined capacity of over 200 million gallons that are used to store the recycled water. There is a fifth storage reservoir, R5, which is located at the WWTP and has a storage capacity of 35 million gallons. The recycled water is used in the summer months for irrigation of local crops. Tertiary water that does not meet water-quality standards is diverted to equalization basins that can store up to 33 million gallons, where it is then pumped back to the headworks or to an aeration basin for subsequent treatment.
- Control Buildings: The WWTP Facility includes many buildings and structures including an administration building, a maintenance building, the Influent Pump Station, the RAS/WAS Pump Station, the Filter Control Building, the Blower Building, the Screw Press & Loadout Building, and a building that contains the chlorination facilities.

3.4.3 Reclamation System

The tertiary treated water is conveyed from the District's WWTP to users located to the south and north of the WWTP. Recycled water is also discharged to Wetland Management Units located adjacent to the R1 and R2 Reservoirs. The existing recycled water distribution system terminates at the Napa Salt Marsh.

Tertiary treated water, as No. 3 Water (3W), is pumped throughout the WWTP by the 3W Pump Station. No. 3 Water is provided for process water, truck fill, and residential fill customers.

Tertiary treated water that is discharged or recycled is pumped from the Effluent Pump Station into a 24-inch diameter outfall pipe. This pipe conveys the tertiary treated water to the B1 Pump Station junction vault, where it is either discharged to Schell Slough, or diverted and conveyed through an 18-inch diameter transmission main (T-1) to the R4 Reservoir. Recycled water is then pumped from the reservoir by the R4 Pump Station into the pressurized transmission mains. There are an additional five booster pump stations in the system: B1, B2, D1, G1, and J1. The B1, B2, and J1 Pump Stations are user-dedicated. The D1 and G1 Pump stations pump directly into pressurized transmission mains.

An expansion of the District's recycled water system was completed in 2017, which provides recycled water service to customers located north of the WWTP. These customers are served by the recently upgraded R5 Pump Station. Main features of recycled water pipelines and reclamation facilities are shown in Figure SV-1 (Appendix A). The assessments of the reclamation facilities built since 2016 are included in this LHMP.

Table 7: Pipe Specifications for Recycled Water System

Pipe Material*	Length (Miles)	Diameters (in)
PVC	17.7	2, 3, 4, 6, 8, 10, 12, 14, 15, 16, 18, 24
RCP	1.7	18, 24
DIP	0.5	6, 8, 14, 18, 24
HDPE	0.1	18
CMLCS	0.04	18
CMP	0.01	24
Total	**20.0**	

PVC: Polyvinyl Chloride Pipe
RCP: Reinforced Concrete Pipe
DIP: Ductile Iron Pipe
HDPE: High Density Polyethylene Pipe
CMLCS: Cement Lined and Cement Coated Steel Pipe
CMP: Corrugated Metal Pipe

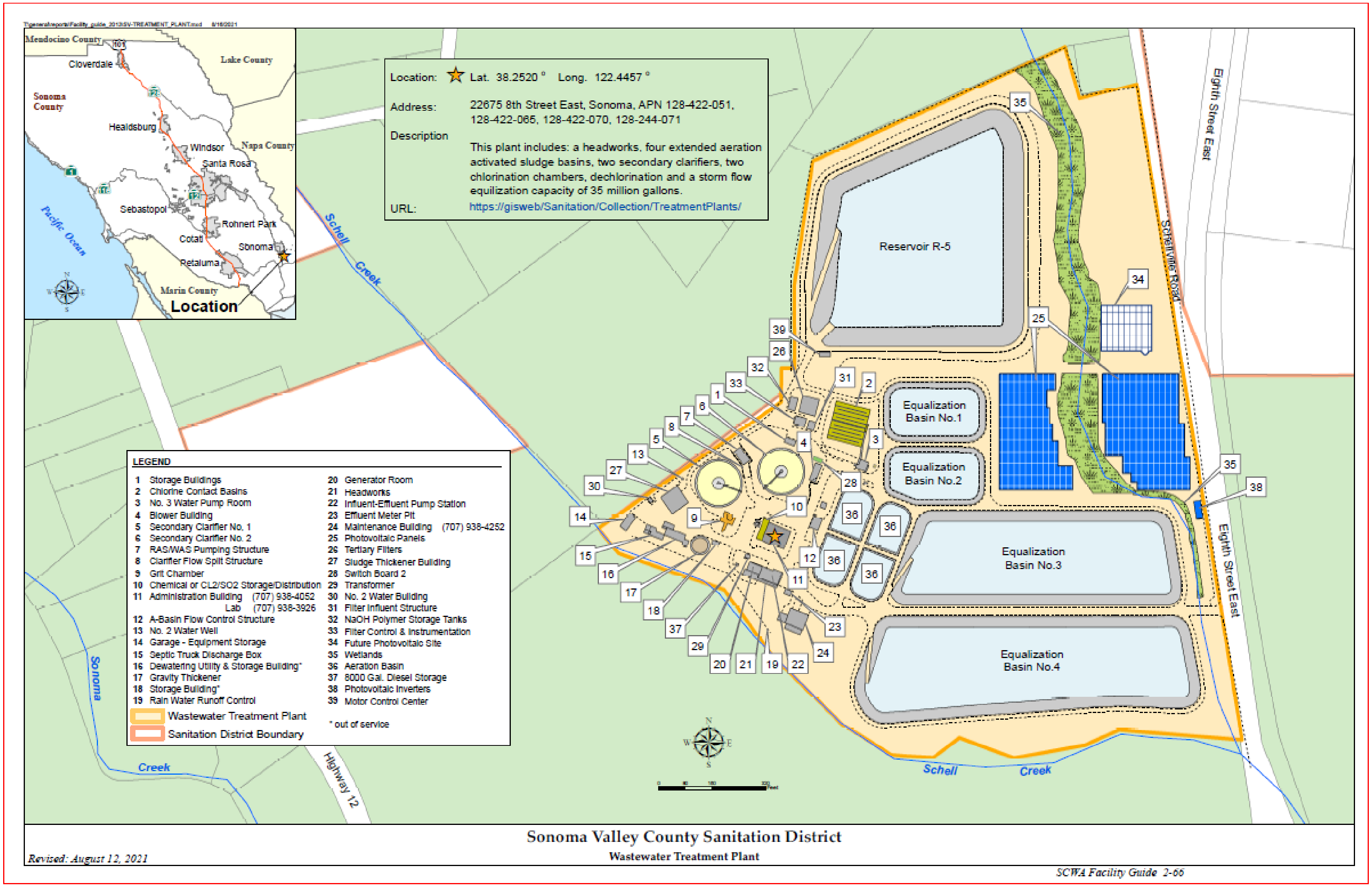

Figure 2: SVCSD Wastewater Treatment Plant Map - (Source: Sonoma Water CAD/GIS Application Gallery – August 2021)

4. Natural Hazard Risk Assessment

The District assessed all natural hazards and identified four high priority hazards that pose the most risk to the District. The detailed assessment for the high priority hazards includes a description of the hazard, location, previous events, frequency, probability, impacts to the District, and any secondary hazards. Lower risk or no risk hazards are included in Chapter 4.5. A vulnerability assessment was then completed to evaluate the extent to which the SVCSD system can withstand the high priority hazards and this assessment is in Chapter 4.6. This following four high priority hazards are:

- Earthquake hazard
- Flood hazard
- Fire hazard
- Climate change

National, state and District's geographic information system (GIS) data base are reviewed to locate available spatially based data relevant to this risk assessment effort. Figure 3 shows the overall risk to identified hazards in the Sonoma Valley area.

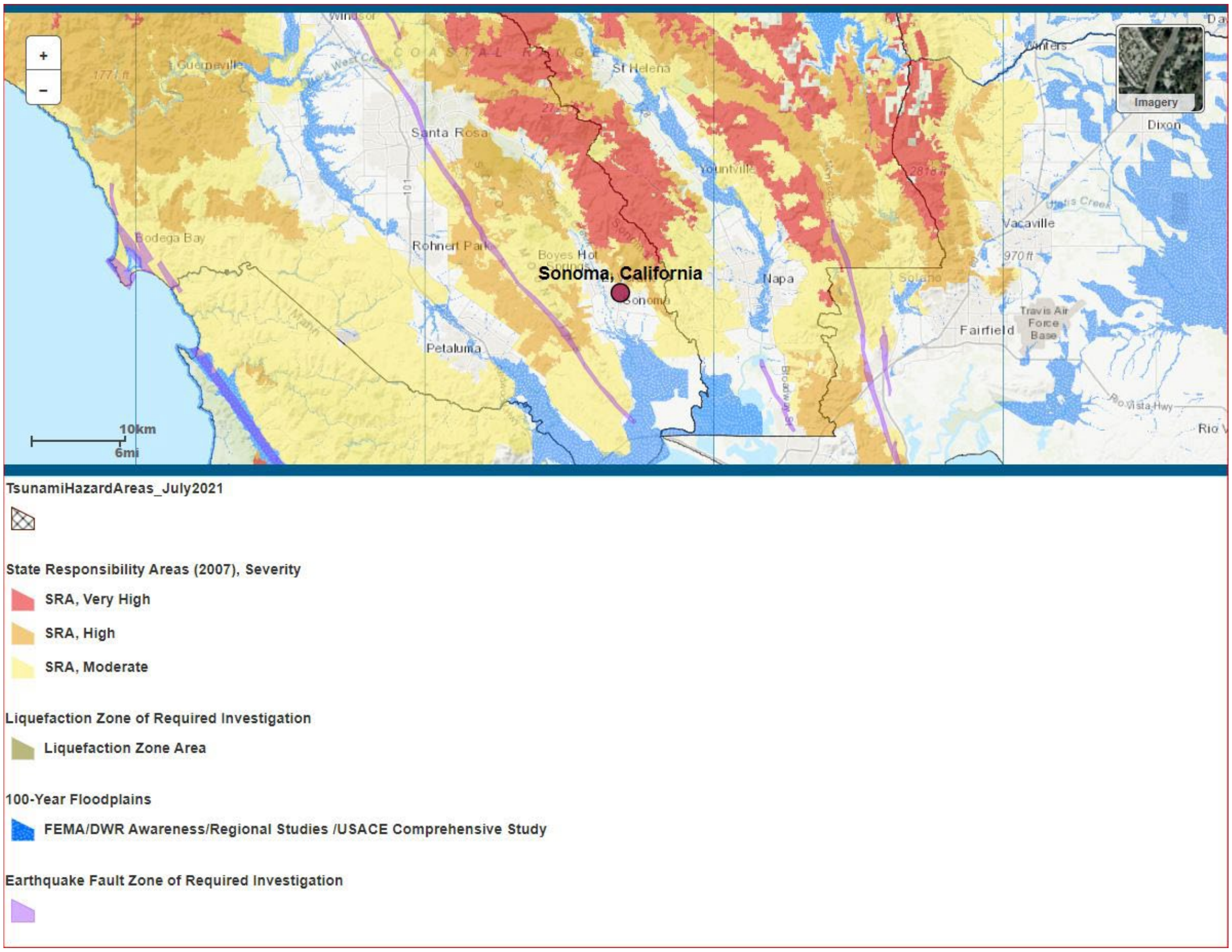

Figure 3: Hazards risk in Sonoma Valley - (Source: CalOES – MyHazards tool – October 2022)

Detailed figures representing SVCSD system risk with regards to each hazard are located in Appendix A as described in the following sub-sections.

4.1 Earthquake Hazard

4.1.1 Description of Earthquake Hazard

A literature review of published geologic and seismic literature and maps provided the basis for a region-wide, broad-scale assessment of potential geologic and seismic hazards, while a geologic reconnaissance, including aerial photographs, provided for location-specific identification of existing and potential geologic hazards along the wastewater collection pipeline system, recycled water pipeline system, reclamation reservoirs and the Wastewater Treatment Plant (WWTP).

Regional Geology

The SVCSD system is located within the Coast Range Geomorphic Province of Northern California. This province is generally characterized by northwest-trending mountain ranges and intervening valleys that reflect the dominant northwest structural trend of the bedrock in the region. In the northern portion of this province, the basement rock consists of the Great Valley Sequence, a Jurassic (200 to 145 million years old) volcanic ophiolite sequence with associated Jurassic to Cretaceous (200 to 65 million years old) sedimentary rocks and the Franciscan Complex, a subduction complex of diverse groups of igneous, sedimentary, and metamorphic rocks of late Jurassic to early Tertiary age (161 to 34 million years old). The Great Valley Sequence was tectonically juxtaposed with the Franciscan Complex most likely during subduction accretion of the Franciscan Complex, and these ancient fault boundaries are truncated by a modern right-lateral fault system that includes the San Andreas, Hayward-Rodgers Creek and Maacama and West Napa faults. The San Andreas Fault defines the westernmost boundary of the local bedrock and is located approximately 22 miles southwest of the SVCSD service area. In the site vicinity, the Franciscan Complex is overlain by Tertiary age continental and marine sedimentary and volcanic rocks. These Tertiary age rocks are locally overlain by younger Quaternary alluvial, colluvial, and landslide deposits.

Local Geology

The local geology has been mapped by Huffman and Armstrong (1980) and Graymer, et al. (2002, 2007). These references generally agree that the majority of the SVCSD system is underlain by Pleistocene and Holocene alluvium. In the northern and northeastern portion of the collection system, localized areas are underlain by bedrock . Geologic mapping by Graymer, et al. (2002, 2007) is provided as Figures SV-2 through SV-11. Landslide deposits have been mapped locally on slopes adjacent to the northern portion of the system. Portions of the system crossing hilly terrain along the valley margins have been designated by Huffman and Armstrong (1980) as having a high susceptibility to landsliding; however, the overwhelming majority of the system is located in the flat-lying valley floor is shown to have a low susceptibility to slope failure.
The alluvial deposits in the vicinity have been further separated into distinct Quaternary deposit designations by Witter, et al. (2006), provided in Figures SV-12 through SV-21.

The SVCSD system is most vulnerable to ground shaking, liquefaction, and creek crossings hazards. Landslides hazards are limited, and surface faulting poses very low to no hazard to the SVCSD system. For purposes of the Hazard Assessment, these hazards were evaluated as follows:

Ground Shaking

Section 4.1.2.2 describes how ground motion shaking will affect the wastewater treatment plant, reservoirs, pump stations and collection and recycled water pipelines. For structures, the ground shaking hazards are best quantified in terms of Peak Ground Acceleration (PGA) with accompanying response spectral shape. PGA is reported as a percentage, or decimal, of gravity (g). For the buried pipe network, the ground shaking hazard is best quantified in terms of Peak Ground Velocity (PGV).

Liquefaction
Section 4.1.2.3 describes how the strength and stiffness of soils are reduced by earthquake shaking, and how that affects the SVCSD sewer and recycled water system, in terms of liquefaction-induced settlement and lateral spreading. Areas at risk of liquefaction were identified from regional liquefaction susceptibility maps by others.

Creek Crossings
Section 4.1.2.4 describes how buried pipe at creek crossings can be damaged during earthquakes. Locations of main creek crossings were identified using high-resolution LiDAR and during the field reconnaissance.

Landslide
Section 4.1.2.5 describes the landslide hazard and quantifies how it is treated within context of this report.

Surface Faulting
Section 4.1.2.6 describes the potential for surface fault rupture. Based on geologic maps, no known active faults transverse the SVCSD, and the likelihood of surface rupture occurring within the SVCSD is very low to none.

4.1.2 Location of Earthquake Hazard

4.1.2.1 Seismology

Based on a long record of historic earthquakes and position astride the North American-Pacific plate boundary, the San Francisco Bay Area is one of the more seismically active regions of the world. During the historical period (approximately 170 years), faults within the region have produced 15 moderate to large magnitude ($M > 6$) as well as many significant smaller magnitude ($5 < M < 6$) earthquakes (Toppozada et al., 1979; Toppozada et al., 1981; and Real et al., 1978). Faults within the 100 km (62-mile) wide North American - Pacific plate boundary zone that may influence potential earthquake ground shaking and other earthquake-related hazards within the SVCSD area are illustrated in Figure 4.

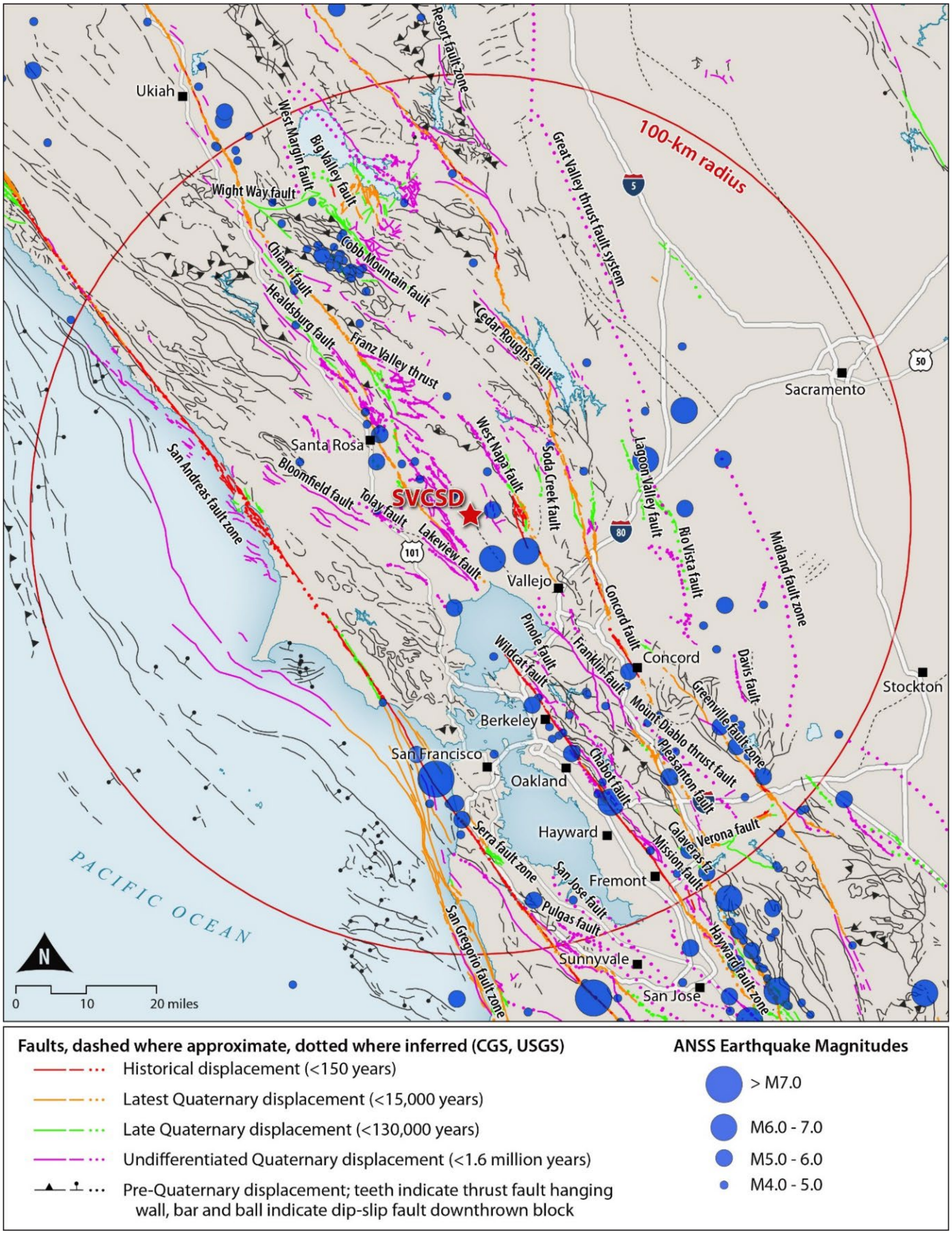

Figure 4: SVCSD Fault and Earthquake Epicenters (Source: USGS Web Page - Quaternary Fault and Fold Database of the United States – September 2016)

4.1.2.2 Ground Shaking Hazard

Among historically active regional faults in the Bay Area, those anticipated to have potential significance to the performance of the SVCSD facilities include:

- San Andreas Fault
- Rodgers Creek - Healdsburg Fault
- Hayward Fault
- Calaveras Fault

Detailed characterizations of these sources have been conducted during seismic evaluations of Caltrans bridges in the San Francisco Bay Area (e.g., Geomatrix, 1993). Brief discussions of each of these sources are presented in the following paragraphs. Unless otherwise noted, magnitude (M) refers to moment magnitude.

San Andreas Fault

There are no traces of the San Andreas Fault that traverse or bisect any of the SVCSD pipelines. The San Andreas Fault parallels the northwest trend of the SVCSD collection system, typically located about 22 miles southwest of the westerly side of the system, 24 miles to the WWTP, or about 26 miles southwest of the easterly side of the system.

Rodgers Creek – Healdsburg Fault

The Rodgers Creek - Healdsburg fault is a major component of the San Andreas Fault system in the Bay Area and extends from San Pablo Bay in the south to the Healdsburg Fault in the north. It is well-defined locally by numerous sag ponds and linear trends in the topography. The Rodgers Creek - Healdsburg fault is interrupted in places by landslide topography and may consist of a zone of en echelon faults. The fault runs through the hills immediately west of the City of Sonoma. The fault is considered capable of producing earthquake as large as M7. Earthquake magnitudes as high as a M7.2 to M7.4+ can occur in case of a combined rupture of Rodgers Creek and Hayward Fault to the south. However, the combined rupture of Hayward and Rodgers Creek faults is considered less likely.

There are no traces of the Rodgers Creek Fault that are known to traverse or bisect any of the SVCSD pipelines. However, the fault parallels the northwest trend of the SVCSD system, which is typically located about 2.5 miles to the west of the westerly side of the system (about 4 miles to the WWTP, or about 5 miles west of the easterly side of the system). Any earthquake on the Rodgers Creek Fault with M6.25 or larger is likely to produce surface rupture in Sonoma County but is unlikely to occur within the SVCSD.

Hayward Fault

The Hayward Fault is situated about 15 miles to the south of the SVCSD WWTP. The Hayward Fault is a major component of the San Andreas Fault system in the Bay Area and extends approximately 71 miles from its intersection with the Calaveras Fault southeast of San Jose and northward through and along the East Bay hills to San Pablo Bay. It has been suggested based on micro-seismicity data that the Hayward Fault may connect with the Rodgers Creek- Healdsburg Fault beneath San Pablo Bay (Ellsworth et al, 1982), although such a connection requires an en echelon jump between the faults. It is commonly postulated that there are two potential rupture segments for the Hayward Fault: a southern segment extending from Warm Springs (Fremont) to the San Leandro-Mills College area (or perhaps as far north as northern Oakland), and a northern segment extending from the transition point to San Pablo Bay.

Calaveras Fault

The northern end of the Calaveras Fault is situated about 37 miles southeast of the SVCSD WWTP. The approximately 75-miles-long Calaveras Fault extends from south of Hollister to near Danville in Contra Costa County.

4.1.2.3 Liquefaction Hazards

Liquefaction describes a process where strong ground shaking during an earthquake transforms saturated granular soils from a solid state into a nearly fluid-like state, resulting in a reduced ability to support overlying soil layers and structures. Ground shaking during an earthquake can cause the pore water pressure to increase if the shaking is strong enough or repeated long enough. When the excess pore pressure builds to an extent that it exceeds the contact stresses between the soil particles, it results in a loss of soil structure and frictional resistance between particles, causing the soil to lose its strength, and flow like a liquid (hence the term "liquefaction"). Factors known to influence liquefaction include soil type, structure, grain size, relative density, confining pressure, depth to groundwater and the intensity and duration of ground shaking. Soils most susceptible to liquefaction are saturated, loose sandy soils, and low plasticity clays and silts. If liquefaction occurs, pipelines above the liquefiable layers may undergo settlement.

Permanent ground deformation including settlement and lateral spread can occur because of liquefaction. Within liquefiable soils, a pipeline can become buoyant or lose support and settle if it is not buoyant. The degree of buoyancy or settlement will be affected by the fines content of the soil. More fines generally result in less susceptibility to buoyancy and settlement due to the residual soil strength that may be present. Lateral spreading is a term describing the permanent deformation of sloping ground that occurs during earthquake shaking because of soil liquefaction. Depending on depth to liquefiable layers and slope geometry (free-face gradient and height), deformations can range from inches to tens of feet, with the greatest displacements usually occurring near free-faces, such as creek banks. Therefore, structures and pipelines adjacent to bodies of water are usually at the greatest risk of experiencing damage from lateral spreading.

Sonoma Valley is a northwesterly trending syncline bounded on the northeast by the Mayacamas Mountains and on the southwest by the Sonoma Mountains. The valley is underlain by unconsolidated alluvial deposits of gravel and clay mantled by soil cover. The alluvial deposits are underlain by claystones and siltstones. The majority of the SVCSD collection system is located within older alluvial deposits or bedrock that has been categorized as having a very low liquefaction potential. The central portion of the system, from Glen Ellen to Sonoma, has been regionally categorized as having a moderate to high liquefaction susceptibility. Several pipeline segments cross through relatively narrow zones along Sonoma Creek and its tributaries, which have been regionally mapped as having very high liquefaction susceptibility.

Areas that are regionally categorized as having high or very high liquefaction susceptibility and that are located adjacent to creek banks should also be considered to have a high susceptibility for lateral spreading. Because lateral spreading is dependent on the liquefaction susceptibility as well as the distance from, and the height of a particular creek bank, the lateral extent of lateral spreading is difficult to predict. For preliminary vulnerability assessment, segments/improvements of the system within 200 feet of creek banks with high or very high liquefaction susceptibility (and underlain by such deposits as shown on the liquefaction mapping in Appendix A), is considered to have a high lateral spread susceptibility.

There is also an increased vulnerability for pipeline segments that cross boundaries of geologic deposits/materials to have drastically different liquefaction susceptibilities. This is mainly due to the differential movements that would occur near the boundaries of such deposits. As such, segments that cross from very low susceptibility zones into very high susceptibility zones would have the greatest risk for differential settlement from liquefaction, and hence potential for pipeline damage or rupture.

Witter, et al. (2006) have produced a liquefaction susceptibility map that includes the SVCSD system; the information from the Witter (2006) map was extracted and presented as Figures SV-22 through SV-31, with the SVCSD system overlain. Areas in red have been mapped as having "Very high" liquefaction susceptibility; orange areas have "High" liquefaction susceptibility; yellow areas have "Moderate" liquefaction susceptibility; green areas have "Low" liquefaction susceptibility; and transparent areas have "Very low” or “not mapped" liquefaction susceptibility. The map shows that the "High" and "Very High" zones are in the vicinity of active creeks, including the main Sonoma Creek and its tributaries. For the pipelines, the main issues are:

- Pipes in the red (Very High) and orange (High) zones. These zones can liquefy locally when PGA > 0.15g or liquefy over major areas when PGA > 0.5g.

- Non-seismically-designed pipes in the liquefied zones that are located within 200 feet of an open cut/slope, where lateral spread is possible, may suffer great amounts of damage.
- Pipes outside of the shaded zones (transparent) and marked VL are generally not susceptible to liquefaction.
- Pipes in the yellow zones might be locally susceptible to ground settlements under very strong ground shaking (PGA > 0.3g), but damage will be sporadic.

For purposes of evaluating the seismic performance of the system, it is recommended to use the local soil characterizations first, and then the regional liquefaction maps.

As shown in the Figures SV-22 through SV-31 it can generally be seen that:

- Most pipes within the vicinity of the creeks are in zones with moderate liquefaction susceptibility with some pipes in areas of high susceptibility.
- Pipes crossing and running parallel to Sonoma Creek are in zones of moderate and high liquefaction susceptibility.
- Most pipes west of Sonoma Creek are in zones with moderate liquefaction susceptibility.
- Liquefaction susceptibility for the recycled water system is generally moderate or less.

The SVCSD WWTP, located on 8th Street East at the south end of the system, is underlain by late and early Pleistocene age, older alluvium which has been mapped as having very low liquefaction susceptibility. Several subsurface investigations and studies have been conducted at the WWTP through the last several decades. These studies generally agree with a designation of low liquefaction potential; however, thin isolated lenses of potential liquefiable sand deposits have been identified locally at the WWTP. The consensus is that there could be isolated cases of liquefaction, generally resulting in settlements of less than ½ inch.

A zone of high liquefaction susceptibility has been mapped immediately adjacent to the southwest boundary of the WWTP along Schell Creek. The recycled water and trunk main lines cross Schell Creek, which is characterized by very high liquefaction hazard. Liquefaction and/or lateral spreading in this area could adversely affect structures and pipelines in this corner of the WWTP. Historic geotechnical investigations by others show that while most of the subsurface consists of predominantly clayey materials that are likely not susceptible to liquefaction, limited borings show thin lenses of clayey and/or silty sand layers that may be susceptible to some liquefaction. This is consistent with the site conditions observed on the banks of the creek during the May 2021 field reconnaissance performed for this study. Most investigations at this site have demonstrated a relatively high (seasonal) groundwater table, varying between 1.5 to 15 feet below existing ground surface.

The reclamation reservoirs and pump stations are in areas characterized by moderate and lower liquefaction hazard. A short segment (approximately 350 feet) of the WWTP to Outfall Slough pipeline is located adjacent to an area mapped as very high liquefaction hazard. Geotechnical investigations and evaluations by others for the recycled water pipe from the WWTP to the Napa Slough show that a few borings encountered soils that may be susceptible to liquefaction. Studies by other show that the estimated deformations due to liquefaction are relatively small (less than two inches) and localized.

4.1.2.4 Creek Crossings

As previously described, the creek crossings pose hazards to the system pipelines because of their propensity to have softer soils inset into more consolidated material including bedrock and loose sands prone to liquefaction. Failure of pipelines at these locations may have other consequences such as release of raw sewage into a sensitive environment. Figures SV-2 through SV-11 show the locations of the main creek crossings. In these figures, the thin blue lines represent the mapped locations of the creek centerlines, green lines represent the SVCSD non-trunk sewer mains, orange lines represent the SVCSD trunk sewer mains, thick aqua lines represent the I&I mains, and purple lines represent the recycled water pipes. The blue diamonds indicate areas where segments of the system cross a creek. It can be seen in the figures that there are numerous creek crossings within the SVCSD collection system whereas within the recycled water system, there are relatively few creek crossings.

Geologic reconnaissance was completed in 2016 and 2021 along the SVCSD system to identify location-specific geologic hazards in addition to assessing regional seismic-related liquefaction hazards. Location-specific hazards include areas of static or seismically-induced landsliding/creek bank failures, erosion or drainage flow debris impact hazards, differing structural connection and support issues at creek crossings, and potential for significant liquefaction-induced lateral spreading hazards. Twenty-two hazard reconnaissance points have been identified and are shown on Figures SV-2, SV-4, and SV-6. Generally, the geologic hazards identified include areas where:

- Creek bank failures were observed where static and embankment failure (landslide) potential exists with possible damage to pipelines, manholes and laterals.
- Sewer mains and recycled water pipes suspended from bridges have potential for damage in a seismic event due to shaking and/or differential settlement of the structure.
- Sewer mains and recycled water pipes extended through culverts, bridge abutments or located near thalweg of creeks where the potential for debris build up during high creek flows and damage to the main.
- Significant creek crossings where lateral spreading may be a hazard.

4.1.2.5 Landslide Hazards

Earthquakes can trigger landslides. Landslides of most concern to the SVCSD system are deep-seated slides that cause rotation slumps within the top 5 to 30 feet. These movements can result in inches to several feet of downslope movements of streets. Pipes in these streets will be highly stressed. Unless specifically designed for large lateral movements, most pipelines will break under lateral movements of more than a few inches.

Existing records do not indicate landslide movements in and near the hillside portions of the SVCSD system. During a site visit to the WWTP in August 2013, the SVCSD staff reported that they do not know of any pipelines affected by landslides, however, it is possible that damages to unpressurized sewer pipelines due to landslides may have gone unnoticed.

If an earthquake occurs when the ground is saturated/high ground water table, there will be more triggered landslides and liquefaction. In the SVCSD service area, soils become saturated on an annual basis, once there have been sufficient winter rains. In a typical winter season, soils become saturated near the end of December, and remain saturated until April.

Regional-scale landslide maps, including Wills et al., 2011, prepared using slope and regional geologic parameters, are not considered sufficiently accurate or otherwise adequate to establish landslides at any specific SVCSD pipeline location. Morphology related to landslides were not observed in the review of 1-meter bare earth hill shade derived from LiDAR (Sonoma County, 2016). No site specific geologic or geotechnical investigations have been performed as part of this effort; however, such investigations can be implemented in the future to provide improved estimates of landslide susceptibilities and probabilities.

4.1.2.6 Surface Faulting

Surface faulting, also known as surface fault rupture, occurs if fault rupture manifests itself on the ground surface. Not all faults intersect Earth's surface, and most earthquakes do not cause a rupture that extends to the surface. When a fault does intersect the surface, objects may be offset or the ground may become cracked, or raised, or lowered. Because there are no active faults that traverse the SVCSD system, surface faulting is not a likely hazard to the system.

4.1.3 Previous Earthquake Hazard Events

San Andreas Fault

The San Andreas Fault, which extends over 750 miles from the Gulf of California to Cape Mendocino, is the major fault within the region. It has generated four moderate to large earthquakes during the historical period (approximately 170 years): a M7 event in June 1838, the great M8 earthquake in April 1906, a M6.3 event in October 1965, and the recent M6.9 Loma Prieta earthquake on October 17, 1989. The Southern Santa Cruz Mountains segment of the San Andreas Fault, the likely source of the Loma Prieta earthquake, is situated about 62 miles south of the SVCSD.

Hayward Fault

The southern segment has been the source of a large (M6.8) earthquake during the historical period (October 1868).

Calaveras Fault

The fault has been associated with the historical earthquakes of M5.6 (July 1861), M5.6 (March 1866), M6.2 (June 1897), M5.8 (July 1899), M6.6 (July 1911), M5.8 (August 1979), M6.2 (April 1984) and M5.1 (February 1988).

Other Faults

As shown in Figure 4, other faults in the San Francisco Bay Area could potentially impact the SVCSD. Of those not already mentioned above, the Green Valley, Concord, and Napa Faults are a few of the more active and capable of large magnitude earthquakes. The Green Valley Fault is located about 12 miles to the east. The West Napa Fault is located about 6 miles to the east and is thought to be the source for the 2000 Yountville earthquake that produced PGA of about 0.2g in the City of Napa, damaged chimneys in Napa, and damaged more than 20 buried water pipes in Napa (Eidinger, 2000). The recent 2014 M6.0 earthquake occurred on the West Napa Fault and resulted in extensive surface rupture and building and infrastructure damage in the Napa area, including damaging about 240 buried water mains in Napa (Eidinger, 2017). However, relatively minor damage was observed in the Sonoma Valley.

4.1.4 Frequency of Earthquake Hazard Events

Sonoma County has experienced numerous earthquakes over the past 170 years. A summary of earthquake effects experienced in Sonoma County are highlighted below (note that both the terms “intensity” and “magnitude M” were used to describe ground motions [*]). It should be recognized that the modern Sonoma Valley wastewater system was only put in place after 1957.

- 1865 March 8, 6:00 a.m. Intensity VIII at Santa Rosa and upper Bennett Valley. Plaster cracked, clocks stopped, and chimneys fell.
- 1868 October 21, 7:53 a.m. The Hayward Earthquake. Estimated M7.0, with maximum intensity X at Hayward. Surface breakage was observed on the Hayward fault from Warm Springs to San Leandro. The shock was perceptible over an area of roughly 100,000 square miles. At Santa Rosa, the earthquake was reported as the "severest shock yet felt." Nearly all brick buildings in town were damaged and many chimneys demolished.

[*] In reviewing the historical record of ground motions, the terms Intensity (MMI scale), Magnitude (Moment magnitude unless otherwise noted) and PGA (Peak Ground Acceleration) are used. Instrumentation to measure PGA was generally non-existent prior to about 1940. Intensity scales were commonly used for earthquakes pre-1960. Intensity is a measure of observed damage; PGA is a measured value of ground motion. It is not straightforward to assign PGA values to older earthquakes, as there is no precise conversion from PGA to MMI.

- 1888 February 29, 2:50 p.m. Intensity VII at Petaluma, where walls cracked; VI at Santa Rosa, where the shock was violent, and people reportedly ran out of houses.
- 1891 October 11, 10:28 p.m. Maximum intensity VIII to IX at Napa and at Sonoma, where people were shaken out of their beds, chimneys demolished, windows broken, and considerable damage to plaster occurred. At Santa Rosa, one observer reported the shock as the "severest in four years" (presumably a recollection of February 29, 1888); the oscillations lasted 45 seconds; slight trembling perceptible for 3 or 4 minutes. It is estimated to be comparable in size to the 1969 M5.7 Santa Rosa earthquake.
- 1892 April 19, 2:50 a.m. Intensity IX to X at Vacaville, Dixon, and Winters. The Holden catalogue (1898) estimated the intensity was VII at Santa Rosa, where many windows were broken, some plaster was damaged, and "panic prevailed at hotels."
- 1892 April 21, 9:43 a.m. Large aftershock of the foregoing earthquake on April 19, 1892. Maximum intensity IX at Winters. At Santa Rosa (VII) many brick buildings were cracked, more plaster damage occurred, two brick walls slightly bulged out, iron columns shifted, and in some parts of town, chimneys were wrecked.
- 1893 August 9, 1:15 a.m. Sonoma County, VII to VIII at Santa Rosa, where this was said to have been the most severe shock since 1868. Chimneys fell and windows were broken. The plaster in the courthouse was extensively damaged. It is estimated to be comparable to the 1969 Santa Rosa M5.7 earthquake.
- 1898 March 30, 11:43 p.m. The Mare Island Earthquake (intensity VIII). At Santa Rosa, the vibrations lasted fully one and three-quarters minutes. Heavy plate glass windows in many business houses were broken; throughout the city, plaster was shaken from walls and ceilings. Houses were knocked from their foundations and extensive ground cracks were reported at Schellville.
- 1899 October 12, 9:00 p.m. Maximum intensity VII to VIII at Santa Rosa, where plaster was knocked from walls and some chimneys fell.
- 1906 April 18, 5:12 a.m. Moment Magnitude 7.8. One of the greatest shocks on record in California; caused by movement of the San Andreas Fault from San Benito County to Humboldt County. Maximum fault offset was a 21-foot horizontal shift near the head of Tamales Bay. Extensive damage at San Francisco, Santa Rosa, San Jose, Sebastopol, and many other places. In the opinion of Townley and Allen, Santa Rosa, 20 miles from the San Andreas Fault, sustained more damage, in proportion to its size, than any other city in the state. The duration of strong ground shaking was about 45 to 60 seconds. This earthquake exposed the then small city of Santa Rosa water system to strong ground shaking. There was one fire ignition reported in Santa Rosa. Mercalli Intensity X (intense ground shaking with some ground failure) was noted in Santa Rosa. Simulation models by the USGS for a repeat of the 1906 event show additional intensity in Santa Rosa than would otherwise be predicted using common attenuation models, owing to the basin and other effects.
- 1906 to 1968. Many smaller earthquakes felt in Santa Rosa, the strongest being in 1919, 1929, and 1956. With the possible exception of the earthquake at 2:39 p.m. on February 25, 1919 (intensity VI), none was as severe as the earlier shocks in this tabulation. Seismic

activity of interest to the residents of Santa Rosa was clearly at a much lower level throughout the 62 years following the major shock of April 18, 1906, than it had been in the 41 years preceding that event.

- 1968 April 25, 11:49 a.m. Epicenter 36° 28'N, 122° 40'W. Magnitude 4.6. This earthquake, with the epicenter just north or northwest of Santa Rosa, damaged some chimneys, broke windows, and rotated or overturned several tombstones. Maximum intensity VIII, at Santa Rosa.
- 1969 October 1, 9:56 p.m. and 11:20 p.m. Two earthquakes, magnitudes 5.6 and 5.7, respectively. Epicenters 38° 28'N, 122° 41.5'W, and 38° 27.3'N, 122° 41.5'W, respectively. Extensive light damage in the Santa Rosa area, where some chimneys fell, many windows broken, and a half-dozen frame houses with shifted or overturned foundations. Partial collapse of several brick building walls occurred, and minor structural damage was noted in one reinforced concrete building. There was damage to the Santa Rosa water system, and cracks in the Lake Raphine Dam. Some minor ground cracking occurred on the northeast edge of Santa Rosa. One fire ignition occurred in Santa Rosa. The fault is thought to have occurred in a step-over between the Rodgers Creek and Healdsburg Faults.
- Between 1969 and 2013, ground shaking in Sonoma County was relatively quiescent, with light levels of shaking in the 1989 Loma Prieta M6.9 earthquake, and the 2000 Yountville M5.2 earthquake, located about 9 miles northwest of Napa. In Napa, the 2000 earthquake damaged more than 20 buried water pipes and knocked down many chimneys (see Eidinger, 2001, for a complete report on the Napa 2000 earthquake).
- On August 24, 2014, a M6.0 earthquake occurred on the West Napa fault. This earthquake was located about 12 miles east of Sonoma Valley. PGA in most of Napa was recorded to be greater than 0.2g. In the immediate vicinity of the fault, PGAs were greater than 0.6g. Preliminary reconnaissance identified more than 160 water pipe failures (about 0.4 repairs per mile of water distribution pipe) for the City of Napa. However, by January 2015, the total number of pipe repairs were about 240 (about 0.7 repairs per mile) because additional downstream pipe breaks were identified as pipes were being repaired and re-pressurized (Eidinger, 2017). Very few instances of liquefaction were observed (Eidinger, 2017; GEER, 2014), and the observed damages are inferred to be primarily due to transient ground deformations caused by ground shaking.

The Napa Sanitation District reported 11 breaks in its sewer mains, (about 0.04 breaks per mile), all of which occurred in asbestos cement pipes. As noted by Eidinger, 2017, the much lower repair rate of the sewer mains may not necessarily be due to “better” sewer mains. It is possible that because the sewer mains are not pressure pipes, leaks may go undetected, as flow would be into the ground and not apparent at the surface. Furthermore, only the largest pipes, which constituted a few percent of the system, were videoed following the earthquake, and the condition of most sewer pipes was not directly observed (Eidinger, 2017).

The Napa Sanitation District service sanitation system was disrupted for two days due to an inflow of wine spilled from damaged barrels, which disrupted the biological processes in the treatment plant’s digestors

(Eidinger, 2017). There was no known damage in SVCSD WWTP, where PGA was estimated to be less than 0.10g. On firm soils in eastern Sonoma Valley, PGA values were about 0.15g, generally not damaging to buried pipe.

4.1.5 Probability of Earthquake Hazard Events

San Andreas Fault

The Working Group on California Earthquake Probabilities (Working Group 2014) has estimated that during the 30-year time period between 2014 and 2044, there is a 9 percent probability of a M6.7 or larger earthquake occurring on the Peninsula segment of the San Andreas Fault (extending from the Loma Prieta rupture segment to Mill Valley), and a 13 percent probability of a M6.7 or larger earthquake occurring on the North Coast segment of the San Andreas Fault (extending from Petaluma to Ukiah). There is a 5 percent and 6 percent probability of a M7.7 or larger occurring on the Peninsula and North Coast segments, respectively. The maximum earthquake on the San Andreas Fault is judged to be in the range of M7.75 to M8. Recent work (Niemi and Hall, 1992) indicates that on the average, an event of such magnitude can be expected to occur approximately every 200 to 300 years.

There are no traces of the San Andreas Fault that traverse or bisect any of the SVCSD pipelines. The San Andreas Fault more or less parallels the northwest trend of the SVCSD collection system, typically located about 22 miles southwest of the westerly side of the system, 24 miles to the WWTP, or about 26 miles southwest of the easterly side of the system.

Rodgers Creek - Healdsburg Fault

The Rodgers Creek - Healdsburg fault is a major component of the San Andreas Fault system in the Bay Area and extends from San Pablo Bay in the south to the Healdsburg Fault in the north. It is well-defined locally by numerous sag ponds and linear trends in the topography. The Rodgers Creek - Healdsburg fault is interrupted in places by landslide topography and may consist of a zone of en echelon faults. The fault runs through the hills immediately west of the City of Sonoma. The fault is considered capable of producing earthquake as large as M7. Earthquake magnitudes as high as a M7.2 to M7.4+ can occur in case of a combined rupture of Rodgers Creek and Hayward Fault to the south. However, the combined rupture of Hayward and Rodgers Creek faults is considered less likely.

There are no traces of the Rodgers Creek Fault that are known to traverse or bisect any of the SVCSD pipelines. However, the fault more or less parallels the northwest trend of the SVCSD system, which is typically located about 2.5 miles to the west of the westerly side of the system (about 4 miles to the WWTP, or about 5 miles west of the easterly side of the system). Any earthquake on the Rodgers Creek Fault with M6.25 or larger is likely to produce surface rupture in Sonoma County but is unlikely to occur within the SVCSD.

The Working Group on California Earthquake Probabilities (Working Group 2014) has estimated that during a 30-year period following 2014, there is a 14.5 percent probability of a M6.7 or larger earthquake occurring along the Rodgers Creek - Healdsburg Fault. For preliminary planning purposes, a Rodgers Creek M7 might reasonably be assumed to occur within the next 100 years. Even higher magnitude events (M7.4 and greater) are considered possible, especially if the Rodgers Creek - Healdsburg and Hayward faults break in the same event, which has an approximately 4% probability of occurring over the next 30 years. Due to its proximity and probability of an earthquake occurrence, the Rodgers Creek event is the controlling seismic event for the SVCSD system.

Hayward Fault

The Hayward Fault is situated about 15 miles to the south of the SVCSD WWTP. The Hayward Fault is a major component of the San Andreas Fault system in the Bay Area and extends approximately 71 miles from its intersection with the Calaveras Fault southeast of San Jose and northward through and along the East Bay hills to San Pablo Bay. It has been suggested based on micro-seismicity data that the Hayward Fault may connect with the Rodgers Creek- Healdsburg Fault beneath San Pablo Bay (Ellsworth et al, 1982), although such a connection requires an en echelon jump between the faults. It is commonly postulated that there are two potential rupture segments for the Hayward Fault: a southern segment extending from Warm Springs (Fremont) to the San Leandro-Mills College area (or perhaps as far north as northern Oakland), and a northern segment extending from the transition point to San Pablo Bay.

The Working Group (2014) has estimated that during the 30-year period from 2014 to 2044, there is an 18 percent probability of a M6.7 (or larger) earthquake occurring on the Hayward Fault Northern section. As shown in Figure 5, there is a 33 percent probability of a M6.7 (or larger) earthquake occurring anywhere on the Hayward Fault Northern section or Rodgers Creek fault.

Calaveras Fault

The northern end of the Calaveras Fault is situated about 37 miles southeast of the SVCSD WWTP. The approximately 75-miles-long Calaveras Fault extends from south of Hollister to near Danville in Contra Costa County. The Working Group on California Earthquake Probabilities (Working Group 2014) has estimated that during the 30-year period between 2014 and 2044, there is an 8 percent probability of a M6.7 or larger earthquake occurring on the northern segment of the Calaveras Fault, which extends northward from Milpitas to just north of San Ramon.

Controlling Event

Given the location and potential magnitudes possible from these faults, it is apparent that an M7 event on the nearby Rodgers Creek - Healdsburg Fault will produce the highest levels of ground shaking in the SVCSD system. Deaggregation of total seismic hazard shows that the Rodgers Creek Fault contributes about 60 to 70 percent of total seismic hazard in the SVCSD region (Petersen et al., 2014; USGS, 2021). Due to its distance, an M8 event on the San Andreas Fault will produce lower levels of shaking in the SVCSD, but the duration of strong shaking is likely to be longer than that from a Magnitude 7.0 Rodgers Creek event (M7 RC). Although the duration of an event may be important for liquefaction, the higher expected ground shaking from the Rodgers Creek Fault will still result in more liquefaction in SVCSD than an M8 event on the more distant San Andreas Fault.

Figure 5 shows a map of the major faults in the San Francisco Bay area with associated probabilities of occurrence between the years 2014 and 2043.

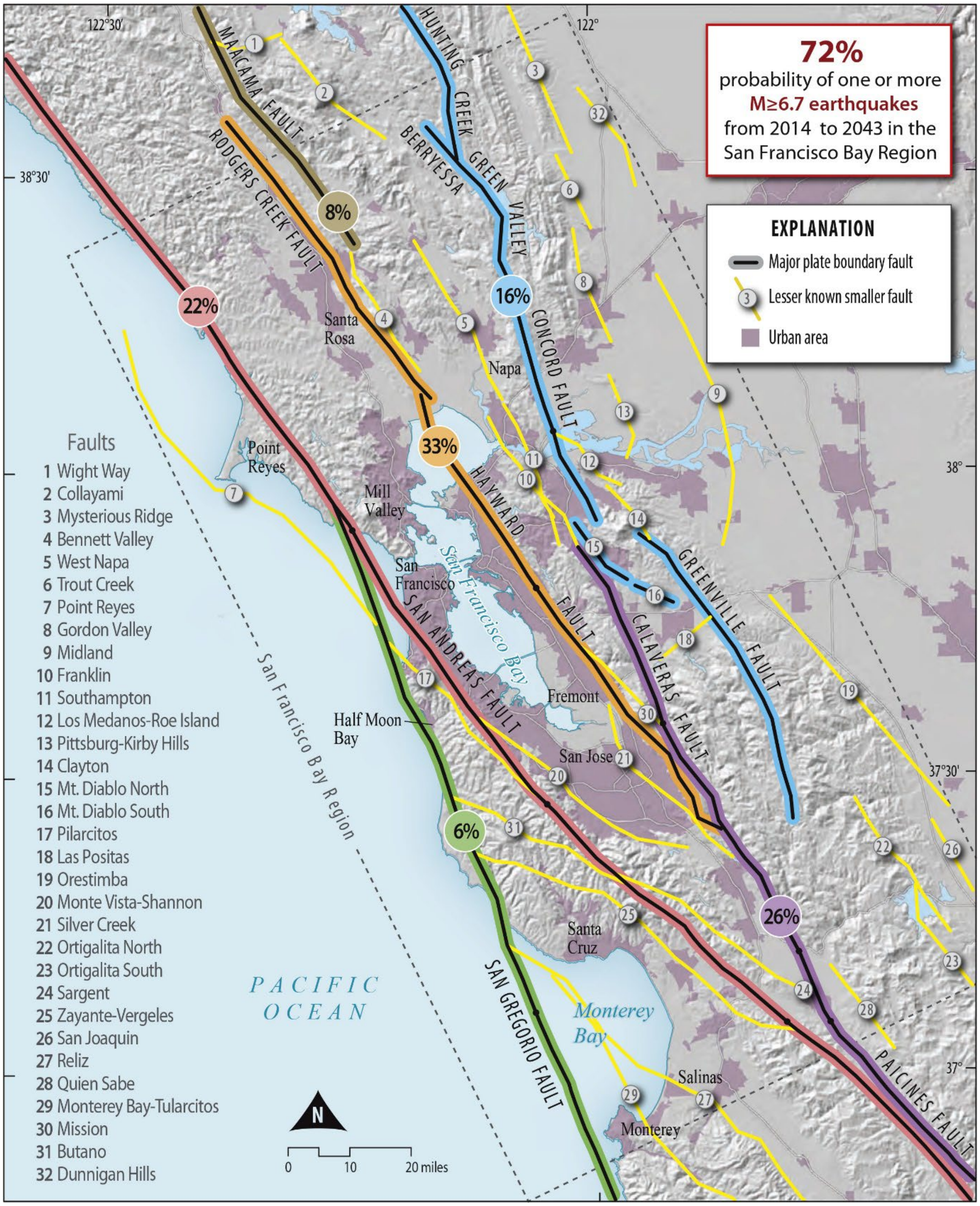

Figure 5: SVCSD Earthquake Probabilities - (Source: The American Geosciences Institute Web Page - Map of earthquake probabilities across the United States – September 2016)

There are two approaches for characterizing seismic hazard: probabilistic and deterministic. The deterministic approach estimates ground shaking based on an earthquake occurring on a specific fault and commonly considers the 50th (median) and 84th (median plus one standard deviation) percentiles. The probabilistic approach estimates ground shaking based on contributions from all potential seismic sources in the region. Fault activity rates, potential range of earthquake magnitudes, distances to the site of interest, and uncertainty in estimation of ground shaking in an earthquake are all factored into the total probabilistic seismic hazard.

The probabilistic approach estimates the probability that various levels of ground motions will be exceeded in a year, which is extrapolated to future time periods.

Whether one approach is more conservative than another depends on the site and surrounding seismic activity. For the SVCSD region, the major driver of the probabilistic seismic hazard is the Rodgers Creek Fault. Deterministic ground motions calculated for the median Rodgers Creek Fault scenario are about equivalent to those estimated for the 20% in 50 years probability of exceedance (225-year return period) probabilistic approach, and ground motions from the 84th percentile Rodgers Creek Fault scenario are roughly equivalent to the 5% in 50 years probability of exceedance (975-year return period) probabilistic approach. The deterministic approach was utilized in assessing hazards to the SVCSD system: (1) to maintain consistency with other studies conducted by Sonoma Water, (2) as it is the controlling event for probabilistic hazard at all return periods, and (3) in order to conduct analyses that require earthquake magnitude as an input.

The Vs30 of a site represents the shear wave velocity in the upper 30 meters (approximately 100 feet) and is used as an index for estimating a site's earthquake response based on the subsurface conditions. The regional Vs30 within the SVCSD region ranges from about 176 m/s near the southern portions of the system closer to bay fringes and marshes to 518 m/s at the base of the stiffer foothills between Sonoma and Napa counties. In the general area around Sonoma Creek, regional mapping shows a Vs30 of 293 m/s. East of Sonoma Creek and at the WWTP, regional mapping shows a Vs30 of 447 m/s (Thompson, 2018).

The median and 84th percentile ground motions for a M7 Rodgers Creek scenario were considered in the evaluation of the SVCSD system. Tables 3 through 6 provide the calculated median and 84th percentile horizontal ground motion at the ground surface for sites represented with Vs30 = 447 m/sec or Vs30 = 293 m/s. Ground motion estimates vary based on the distance between the site and the fault. In general, ground shaking decreases with increasing distance from the fault. The SVCSD system is nearly parallel to the Rodgers Creek Fault, and the values in Tables 3 through 6 represent the site response at a distance of 6 km (3.7 mi), the approximate average distance between the collection system and the fault. As shown, a PGA of about 0.40g is estimated for the median M7 Rodgers Creek event (Table 3 and Table 5) for the two Vs30 values considered and a PGA of about 0.70g and 0.67g is estimated for the 84th percentile M7 Rodgers Creek event (Table 4 and Table 6) for Vs30 of 447 m/s and 293 m/s respectively.

Table 8: Deterministic Motions, Vs30 = 447 m/sec, Median

Seismic Parameter	ASK14	CY14	CB14	BSSA14	Geometric Average
PGA (g)	0.38	0.42	0.40	0.40	**0.40**
PGV (cm/sec)	42.2	42.9	53.0	44.9	**45.5**

Table 9: Deterministic Motions, Vs30 = 447 m/sec, 84th Percentile

Seismic Parameter	ASK14	CY14	CB14	BSSA14	Geometric Average
PGA (g)	0.69	0.73	0.67	0.74	**0.70**
PGV (cm/sec)	79.7	73.2	94.2	86.1	**83.0**

Table 10: Deterministic Motions, Vs30 = 293 m/sec, Median

Seismic Parameter	ASK14	CY14	CB14	BSSA14	Geometric Average
PGA (g)	0.38	0.43	0.37	0.41	**0.40**
PGV (cm/sec)	55.9	51.9	59.1	53.3	**55.0**

Table 11: Deterministic Motions, Vs30 = 293 m/sec, 84th Percentile

Seismic Parameter	ASK13	CY13	CB13	BSSA13	Geometric Average
PGA (g)	0.65	0.72	0.59	0.75	**0.67**
PGV (cm/sec)	105.4	86.4	101.9	101.7	**98.5**

The geometric average of both the median and 84th percentile ground motions for an M7 Rodgers Creek event was considered for the evaluation of the system.

4.1.6 Impacts of Earthquake Hazard and Vulnerabilities

Based on the data review and field reconnaissance, the following geologic and seismic related issues relevant to the service area should be considered:

- The primary geologic hazards to the SVCSD system are ground shaking, liquefaction, and creek crossing hazards, which present risks that could result in damage to SVCSD facilities, including the WWTP, collection system and pump stations, recycled water pipelines and reclamation reservoirs with the potential of sewage spills and loss of use of the WWTP.
- Many pipes within the SVCSD system are in broad areas of moderate to high liquefaction areas, which poses the potential for loss of use of a portion of the collection and recycled system or the potential for sewage spills.
- Geologic hazards, including potential for damage from landslides/bank failures, flooding, or creek related hazards were identified for specific locations within the SVCSD system.

Seismic Performance Goals

Seismic performance goals reflect an acceptable level of service following an earthquake and balance the needs to provide service at a reasonable cost. All components of the SVCSD system, including the WWTP, the collection system, and the recycled water system, were assessed for an M7 earthquake on the Rodgers Creek fault as described in this chapter.

- Seismic performance objectives for SVCSD facilities were established using the methodology presented in the ASCE 41-17 – Seismic Evaluation and Retrofit of Existing Buildings standard. ASCE 41-17 is the current United States consensus standard for the seismic evaluation and retrofit of existing buildings. ASCE 41-17 uses a performance-based approach that pairs seismic hazard levels and selected target structural and nonstructural performance levels to obtain an overall Performance Objective. ASCE 41-17 uses two seismic hazard levels with different probabilities of exceedance referred to as the Basic Safety Earthquake 1 for existing structures (BSE-1E) and the Basic Safety Earthquake 2 for existing structures (BSE-2E). For SVCSD facilities, 84th percentile and median ground motions from an M7 earthquake on the Rodgers Creek fault were selected as BSE-2E and BSE-1E levels, respectively.
- The BSE-1E and BSE-2E hazard levels are paired with one of the structural performance levels S-1 to S-5. The structural performance levels S-1 through S-5 are shown schematically in Figure 6 and described in Table 7. The pairing is a function of the structure's Risk Category as defined in ASCE 7-16 – Minimum Design Loads and Associated Criteria for Buildings and Other Structures. These Risk Categories range from I through IV, with I used for buildings and structures that represent low risk to human life and IV used for essential facilities, the failure of which could pose a substantial hazard to the community. ASCE 41-17 provides a similar pairing for nonstructural performance levels, which are described in Table 8.

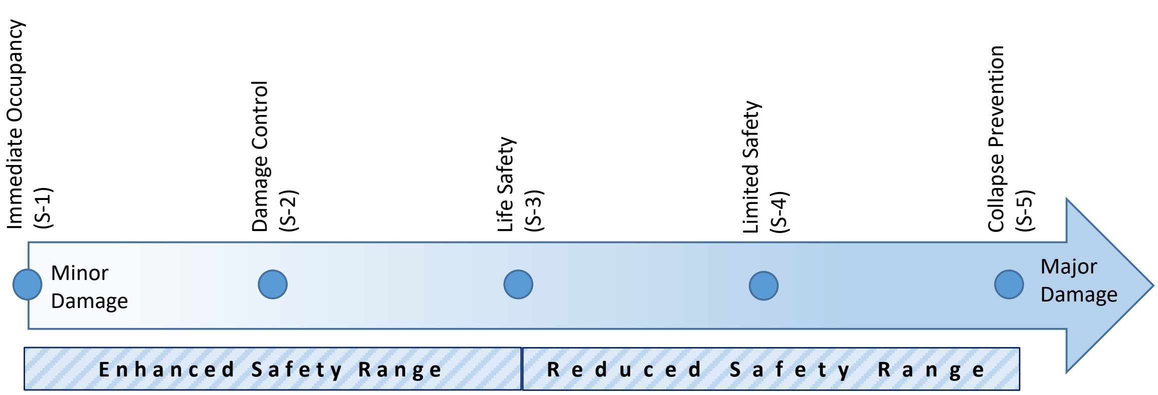

Figure 6: ASCE 41-17 Structural Performance Levels – (Source: ASCE/SEI 41-17: Performance Objectives and Seismic Hazard Changes – February 2019)

Table 12: Structural Performance Levels (ASCE 41-17)

Structural Performance Level (ASCE 41-17)	Description
Immediate Occupancy (S-1)	Very limited structural damage. Very low risk of life-threatening injury. Some minor structural repairs might be appropriate.
Damage Control (S-2)	Midway point between Immediate Occupancy (S-1) and Life Safety (S-3). Greater reliability of resisting collapse and being less damaged than a typical structure, but not to the extent required for S-1. Greater margin of safety against collapse than S-3.
Life Safety (S-3)	Significant damage. Some margin against either partial or total structural collapse. No large falling debris hazards. Overall risk of life-threatening injury is low. It should be possible Repair possible but might not be practical. Prudent to implement structural repairs or install temporary bracing before re-occupancy.
Limited Safety (S-4)	Midway point between Life Safety (S-3) and Collapse Prevention (S-5). Greater resistance to collapse compared to a structure that only meets S-5, but not to the full level of safety implied in S-3.
Collapse Prevention (S-5)	Building is on the verge of partial or total collapse. Significant degradation in the stiffness and strength of the structural system. Large permanent deformation of the structure. Limited degradation in the gravity load carrying capacity. Significant risk of injury caused by falling hazards. Structure might not be practical to repair. Structure might not be safe to reoccupy because aftershock activity could induce collapse.

Table 13: Nonstructural Performance levels (ASCE 41-17)

Nonstructural Performance Level (ASCE 41-17)	Description
Position Retention (N-B)	Nonstructural components might be damaged to the extent that they cannot immediately function but are secured in place so that damage caused by falling, toppling, or breaking of utility connections is avoided. Building access and Life Safety systems, including doors, stairways, elevators, emergency lighting, fire alarms, and fire suppression systems, generally remain available and operable, if power and utility services are available.
Life Safety (N-C)	Nonstructural components may be damaged, but the consequential damage does not pose a life safety threat.

Hazards Reduced (N-D)	Nonstructural components are damaged and could potentially create falling hazards, but high-hazard nonstructural components are secured to prevent falling. Preservation of egress, protection of fire suppression systems, and similar life-safety issues are not addressed.

- For voluntary seismic retrofits, ASCE 41-17 allows the owner to select their desired Performance Objectives. For SVCSD facilities, each structure was assigned a Risk Category based on ASCE 7-16 guidance on Risk Category assignments for various type of facilities. The Performance Objectives for SVCSD facilities were established based on correlating the ASCE 7-16 Risk Categories (I & II, III, or IV) with the ASCE 41-17 Structural Performance Levels (S-1 to S-5) for each Seismic Hazard Level (BSE-1E and BSE-2E).
- The performance objectives for SVCSD structures are summarized in Table 14. Structural performance objectives for SVCSD structures, grouped by function, are presented in Table 15. For SVCSD facilities, all structures that are essential to the maintenance of wastewater flow are assigned a risk category IV. Loss of use of these structures would cause a major impact to the system operation. Significant damage could result in sewage backup and environmental and public hazards. All WWTP buildings, water-retaining structures, and other structures essential to the system operation are included in this category. These structures are expected to meet Immediate Occupancy (S-1) structural and Position Retention (N-B) nonstructural performance levels for the BSE-1E earthquake level, and Life Safety (S-3) structural and Hazards Reduced (N-D) nonstructural performance levels for BSE-2E earthquake level.
- Structures that are not directly necessary to preserve wastewater flow through the system are assigned risk category I and II. Loss of use of these structures would not result in immediate wastewater backup. Repairs or replacement would be required but would not be needed immediately following the earthquake. These include Septic Truck Discharge Box, Storage Building (unused), Rainwater Runoff Control, Photovoltaic Panels, and Photovoltaic Inverters. Performance objectives for these structures include Life Safety (S-3) structural and Life Safety (N-C) nonstructural performance levels for BSE-1E earthquake level, and Collapse Prevention (S-5) structural and Hazards Reduced (N-D) nonstructural performance levels for BSE-2E earthquake level.

Table 14: Performance Objectives for SVCSD Structures

Existing Structure Type	Risk Category (ASCE 7-16)	BSE-1E	BSE-2E
Non-essential structures	I and II	S: Life Safety (S-3) NS: Life Safety (N-C)	S: Collapse Prevention (S-5) NS: Hazards Reduced (N-D)
Essential structures (WWTP buildings	IV	S: Immediate Occupancy (S-1) NS: Position Retention (N-B)	S: Life Safety (S-3) NS: Hazards Reduced (N-D)

and water retaining structures)			

Note: S = Structural, NS = Nonstructural

Table 15: Structural Performance Objectives for SVCSD Structure by Function

Group	Structure Name	Risk Category	BSE-1E	BSE-2E
Collection System	Warm Springs Road Pump Station (4700 Warm Springs Rd)	IV	Immediate Occupancy (S-1)	Life Safety (S-3)
	Hill Road Pump Station (1145 Hill Rd)	IV	Immediate Occupancy (S-1)	Life Safety (S-3)
	Septic Truck Discharge Box	I - II	Life Safety (S-3)	Collapse Prevention (S-5)
Primary Treatment	Headworks	IV	Immediate Occupancy (S-1)	Life Safety (S-3)
	Influent-Effluent Pump Station	IV	Immediate Occupancy (S-1)	Life Safety (S-3)
	Grit Chamber	IV	Immediate Occupancy (S-1)	Life Safety (S-3)
	Equalization Basins (4)	IV	Immediate Occupancy (S-1)	Life Safety (S-3)
	MCC-5 Building	IV	Immediate Occupancy (S-1)	Life Safety (S-3)
	MCC-6 Building	IV	Immediate Occupancy (S-1)	Life Safety (S-3)
Secondary Treatment	A-Basin Flow Control Structure	IV	Immediate Occupancy (S-1)	Life Safety (S-3)
	Zeta Floc & Metal Solve Tanks	IV	Immediate Occupancy (S-1)	Life Safety (S-3)
	Aeration Basins (4)	IV	Immediate Occupancy (S-1)	Life Safety (S-3)
	Blower Building	IV	Immediate Occupancy (S-1)	Life Safety (S-3)
	Clarifier Flow Split Structure	IV	Immediate Occupancy (S-1)	Life Safety (S-3)
	Secondary Clarifier No. 1	IV	Immediate Occupancy (S-1)	Life Safety (S-3)
	Secondary Clarifier No. 2	IV	Immediate Occupancy (S-1)	Life Safety (S-3)
	RAS/WAS Pumping Structure	IV	Immediate Occupancy (S-1)	Life Safety (S-3)
Tertiary Treatment	Filter Influent Structure	IV	Immediate Occupancy (S-1)	Life Safety (S-3)

Group	Structure Name	Risk Category	BSE-1E	BSE-2E
	Head Box	IV	Immediate Occupancy (S-1)	Life Safety (S-3)
	Tertiary Filters	IV	Immediate Occupancy (S-1)	Life Safety (S-3)
	Filter Control & Instrumentation	IV	Immediate Occupancy (S-1)	Life Safety (S-3)
	Chlorine Contact Basins	IV	Immediate Occupancy (S-1)	Life Safety (S-3)
	Chlorine Scrubber Tank	IV	Immediate Occupancy (S-1)	Life Safety (S-3)
	Chlorine Storage & Chlorination	IV	Immediate Occupancy (S-1)	Life Safety (S-3)
	NaOH Polymer Storage Tanks	IV	Immediate Occupancy (S-1)	Life Safety (S-3)
Solids Handling	Gravity Thickener	IV	Immediate Occupancy (S-1)	Life Safety (S-3)
	Screw Press Building	IV	Immediate Occupancy (S-1)	Life Safety (S-3)
Other WWTP Structures	Administration Building	IV	Immediate Occupancy (S-1)	Life Safety (S-3)
	Maintenance Building	IV	Immediate Occupancy (S-1)	Life Safety (S-3)
	No.2 Water Building	IV	Immediate Occupancy (S-1)	Life Safety (S-3)
	No.2 Water Well	IV	Immediate Occupancy (S-1)	Life Safety (S-3)
	Generator Room	IV	Immediate Occupancy (S-1)	Life Safety (S-3)
	No.3 Water Pump Room	IV	Immediate Occupancy (S-1)	Life Safety (S-3)
	Storage Building (Blue Room)	IV	Immediate Occupancy (S-1)	Life Safety (S-3)
	Photovoltaic Inverters	I - II	Life Safety (S-3)	Collapse Prevention (S-5)
	Photovoltaic Panels	I - II	Life Safety (S-3)	Collapse Prevention (S-5)
	Storage Building (Unused)	I - II	Life Safety (S-3)	Collapse Prevention (S-5)
	Motor Control Center	IV	Immediate Occupancy (S-1)	Life Safety (S-3)
	Switch Board 2	IV	Immediate Occupancy (S-1)	Life Safety (S-3)
	Transformer	IV	Immediate Occupancy (S-1)	Life Safety (S-3)

Group	Structure Name	Risk Category	BSE-1E	BSE-2E
	Dewatering Utility & Storage Building	IV	Immediate Occupancy (S-1)	Life Safety (S-3)
	8000 Gal. Diesel Storage	IV	Immediate Occupancy (S-1)	Life Safety (S-3)
Recycled Water System	Effluent Meter Pit	IV	Immediate Occupancy (S-1)	Life Safety (S-3)
	Reservoir R-1 and Appurtenances	IV	Immediate Occupancy (S-1)	Life Safety (S-3)
	Reservoir R-2 and Appurtenances	IV	Immediate Occupancy (S-1)	Life Safety (S-3)
	Reservoir R-3 and Appurtenances	IV	Immediate Occupancy (S-1)	Life Safety (S-3)
	Reservoir R-4 and Appurtenances	IV	Immediate Occupancy (S-1)	Life Safety (S-3)
	Reservoir R-5 and Appurtenances	IV	Immediate Occupancy (S-1)	Life Safety (S-3)
	R-5 Pump Station	IV	Immediate Occupancy (S-1)	Life Safety (S-3)
	Mulas Booster Station BP-B1	IV	Immediate Occupancy (S-1)	Life Safety (S-3)
	Mulas Booster Station BP-B2	IV	Immediate Occupancy (S-1)	Life Safety (S-3)
	R-4 Pump Station	IV	Immediate Occupancy (S-1)	Life Safety (S-3)
	R-1, R-2 Pumping Structure DP-G1	IV	Immediate Occupancy (S-1)	Life Safety (S-3)
	Booster Pump BP-J1	IV	Immediate Occupancy (S-1)	Life Safety (S-3)
	R-3 Pump Station	IV	Immediate Occupancy (S-1)	Life Safety (S-3)
	Buena Vista Pump Station BP-D1	IV	Immediate Occupancy (S-1)	Life Safety (S-3)

4.2 Flood Hazard

4.2.1 Description of Flood Hazard

Flooding is the overflow of excess water from a river, stream, or adjacent body of water onto an adjacent floodplain. When floodwaters recede after a flood event, layers of rock and mud are left behind. The rock and mud gradually build up to create a new floor of the floodplain, which generally contains unconsolidated sediments that are accumulations of sand, gravel, loam, silt, and/or clay that often extend below the streambed. Because of the fertile soil, flat reclaimed floodplain lands are commonly used for agriculture. Floodplains have also been developed over time for commerce and residential development, which puts these areas and the infrastructure that supports them at risk for flood damage. Depending on the severity of a flood, impacts to development and infrastructure contained within a floodplain can be significant.

Connections between a river and the adjacent floodplain are most apparent during and after major flood events. These areas form a complex physical and biological system that not only supports a variety of natural resources, but also provides natural flood and erosion control. When a river is separated from its floodplain with levees and other flood control facilities, natural, built-in benefits can be lost, altered, or significantly reduced which can increase the potential for flood damage to facilities.

4.2.2 Location of Flood Hazard

The Sonoma Creek watershed is 170 square miles and drains into the San Pablo Bay. The SVCSD system is located within the Sonoma Creek watershed, where Sonoma Creek is the primary source of flooding. The SVCSD Wastewater Treatment Plant is located outside of the 100-year floodplain and is not susceptible to damage related to high stream flows that would typically occur during flooding events.

The Special Flood Hazard Area (SFHA) is a high-risk area defined as any land that would be inundated by the 100-year flood, or alternatively, that has a 1-percent chance of flooding in a given year (also referred to as the “base flood”). FEMA prepared a Flood Insurance Study (FIS) for the County of Sonoma to identify and map the flood hazard areas in the County. The FIS was last updated in October 2017. The FIS contains technical data hydraulic analyses used to prepare the Flood Insurance Rate Maps (FIRMs), including discharge data and flood elevation profiles for the 10-, 50-, 100-, and 500-year floods.

The Federal Emergency Management Agency’s (FEMA) flood hazard boundaries within Sonoma Valley CSD are shown and overlaid with the SVCSD system in Figures SV-32 through SV-41.

Floods along Sonoma Creek and within the SVCSD boundaries generally result from intense rainfalls that last for a short period, or typically up to 6 hours for a longer duration storm. Figures SV-32 through SV-41 show the 100-year floodplain within the SVCSD boundary. The floodplain is generally confined to the area nearby Sonoma Creek within the SVCSD boundary and expands to a wider area to the south near San Pablo Bay. Several of the SVCSD facilities are in the 100-year floodplain. No SVCSD structures have been damaged by floods and the levees have not been overtopped.

4.2.3 Previous Flood Hazard Events

In January and February 2017, the District and significant portions of the State of California, experienced extensive flooding and associated landslides, mudslides, and riverine erosion. Locally, the Board of Supervisors of the County of Sonoma adopted Resolution 17-0025 on January 13, 2017, and Resolution 17-0079 on February 21, 2017, ratifying disaster proclamations of local emergencies. The Governor issued State Emergency Proclamations on January 23, 2017 and March 7, 2017, declaring states of emergency and requesting Federal Disaster Declarations. Federally, FEMA issued three Major Disaster Declarations in 2017 for severe winter storms, flooding, and mudslides in California between January 3, 2017 and February 23, 2017 (DR-4301, DR-4305, and DR-4308). Water Agency infrastructure was damaged during the storms covered by these declarations. Sonoma County was included in the DR-4301 and DR-4308 disasters.

State and Federal disaster proclamations and declarations are issued when flood stages or damage thresholds are reached. Table 16 shows the flood-related Federal and State disaster declarations that include Sonoma County.

Table 16: Flood-Related Federal and State Declarations that Include Sonoma County

Disaster #	Year	Disaster Name	Disaster Type	Disaster Cause	Counties & Cities Declared	Federal or State Declaration Date
DR-4308	2017	California Severe Winter Storms, Flooding, and Mudslides	Flood	Storms	Alameda, Alpine, Amador, Butte, Calaveras, Colusa, Contra Costa, Del Norte, El Dorado, Glenn, Humboldt, Kings, Lake, Lassen, Marin, Mariposa, Merced, Modoc, Mono, Monterey, Napa, Nevada, Plumas, Sacramento, San Benito, San Joaquin, San Luis Obispo, San Mateo, Santa Barbara, Santa Clara, Santa Cruz, Shasta, Sierra, Siskiyou, Solano, Sonoma, Stanislaus, Sutter, Tehama, Trinity, Tule River Indian Reservation, Tuolumne, Yolo, Yuba	4/1/2017 (Federal)
DR-4301	2017	California Severe	Flood	Storms	Alameda, Amador, Butte, Calaveras, Contra Costa, El Dorado, Humboldt,	2/14/2017

Disaster #	Year	Disaster Name	Disaster Type	Disaster Cause	Counties & Cities Declared	Federal or State Declaration Date
		Winter Storms, Flooding, and Mudslides			Inyo, Lake, Lassen, Marin, Mendocino, Merced, Mono, Monterey, Napa, Nevada, Placer, Plumas, Sacramento, San Benito, San Luis Obispo, Santa Clara, Santa Cruz, Shasta, Sierra, Siskiyou, Solano, Sonoma, Sutter, Trinity, Tuolumne, Yolo, Yuba	(Federal)
DR-1646	2006	2006 June Storms	Flood	Storms	Alameda, Amador, Calaveras, El Dorado, Lake, Madera, Marin, Merced, Napa, Nevada, Placer, San Joaquin, San Mateo, Santa Cruz, Sonoma, Stanislaus, Tuolumne counties + statewide HM	6/5/2006 (Federal)
DR-1628	2005 2006	2005/06 Winter Storms	Flood	Storms	Alameda, Alpine, Amador, Butte, Colusa, Contra Costa, Del Norte, El Dorado, Humboldt, Lake, Lassen, Marin, Mendocino, Napa, Nevada, Placer, Plumas, Sacramento, San Joaquin, San Luis Obispo, San Mateo, Santa Cruz, Sierra, Siskiyou, Solano, Sonoma, Sutter, Trinity, Yolo, Yuba counties + statewide HM	2/3/2006 (Federal)
GP 2003	2003	State Road Damage	Road damage	Flood	Alameda, Colusa, Contra Costa, Del Norte, Humboldt, Lake, Marin, Mendocino, Napa, San Mateo, Santa Clara, Santa Cruz, Solano, Sonoma, Trinity	1/1/2003 (State)
GP 99-03	1999	Sonoma Road Failure	Road damage	Flood	Sonoma	3/29/1999 (State)
DR-1203	1998	1998 El Nino Floods	Flood	Storms	Alameda, Amador, Butte, Calaveras, Colusa, Contra Costa, Fresno, Glenn, Humboldt, Kern, Kings, Lake, Los Angeles, Marin, Mendocino, Merced, Monterey, Napa, Orange, Riverside, Sacramento, San Benito, San Bernardino, San Diego, San Francisco, San Joaquin, San Luis Obispo, San Mateo, Santa Barbara, Santa Clara, Santa Cruz, Siskiyou,	2/9/1998 (Federal)

Disaster #	Year	Disaster Name	Disaster Type	Disaster Cause	Counties & Cities Declared	Federal or State Declaration Date
					Solano, Sonoma, Stanislaus, Sutter, Tehama, Trinity, Tulare, Ventura, Yolo, Yuba, Del Norte	
DR-1155	1997	1997 January Floods	Flood	Storms	Alpine, Amador, Butte, Colusa, Del Norte, El Dorado, Glenn, Humboldt, Lake, Lassen, Modoc, Napa, Nevada, Plumas, Sacramento, San Joaquin, Sierra, Siskiyou, Solano, Sonoma, Sutter, Tehama, Trinity, Yuba, Calaveras, Madera, Mono, Monterey, Placer, San Benito, San Luis Obispo, San Mateo, Santa Cruz, Shasta, Stanislaus, Tuolumne, Yolo, Contra Costa, Fresno, Marin, Tulare, Mariposa, Merced, Santa Clara, Alameda, San Francisco, Kings, Mendocino	1/4/1997 (Federal)
DR-1044	1995	1995 Severe Winter Storms	Flood	Storms	Los Angeles, Orange, Humboldt, Lake, Sonoma, Butte, Colusa, Contra Costa, Del Norte, Glenn, Kern, Lassen, Mendocino, Modoc, Monterey, Napa, Placer, Plumas, San Luis Obispo, Santa Barbara, Santa Clara, Santa Cruz, Tehama, Ventura, Yolo, Yuba, Alpine, Amador, Nevada, Riverside, Sacramento, San Bernardino, San Mateo, Shasta, Sutter, Trinity, San Diego, Alameda, Marin, Fresno, Kings, El Dorado, Madera, Solano, Siskiyou	1/13/1995 (Federal)
DR-979	1992	1992 Late Winter Storms	Flood	Storms	Alpine, Los Angeles, Humboldt, Napa, Santa Barbara, Culver City (Los Angeles County), City of Los Angeles (Los Angeles County), Contra Costa, Mendocino, Sonoma, Fresno, Imperial, Madera, Monterey, San Bernardino, Sierra, Tehama, Trinity, Tulare, Modoc, Orange, Riverside, Lassen, Siskiyou, Plumas, San Diego	1/15/1993 (Federal)
DR-758	1986	1986 Storms	Flood	Storms	Humboldt, Napa, Sonoma, Glenn, Lake, Marin, Modoc, Sacramento,	2/18/1986 (Federal)

Disaster #	Year	Disaster Name	Disaster Type	Disaster Cause	Counties & Cities Declared	Federal or State Declaration Date
					Santa Clara, Santa Cruz, Solano, Yuba, Alpine, Amador, Butte, Calaveras, Colusa, El Dorado, Lassen, Mendocino, Nevada, Placer, Plumas, San Joaquin, Sierra, Sutter, Tehama, Tuolumne, Yolo, Fresno, Madera, San Mateo, Alameda, Contra Costa, Del Norte, Trinity, Mono, San Benito, Shasta	
DR-677	1982 1983	Winter Storms	Flood	Flood	Contra Costa, San Joaquin, Sacramento, Marin, San Mateo, Los Angeles, San Diego, Alameda, Orange, San Benito, Santa Barbara, Santa Clara, Santa Cruz, Shasta, Sonoma, Ventura, Trinity, Colusa, Lake, Mendocino, Monterey, San Luis Obispo, Solano, Yolo, Butte, Glenn, Kern, Kings, San Bernardino, Sutter, Tehama, Merced, Del Norte, Fresno, Madera, Napa, Placer, Riverside, Stanislaus, Tulare, Humboldt, Mariposa, Nevada, Yuba	2/9/1983 (Federal)
DR-651	1982	1982 Winter Storms	Flood	Storms	Alameda, Santa Clara, Solano, San Joaquin, Contra Costa, Humboldt, Marin, San Mateo, Santa Cruz, Sonoma	1/7/1982 (Federal)
DC-78-06-11	1978	Heavy rains excluded	Flood	Storms	Santa Clara, Solano, Sonoma, Tuolumne, Colusa	2/13/1978 (State)
DR-253	1969	1969 Storms	Flood	Storms	Los Angeles, San Luis Obispo, Fresno, Inyo, Riverside, San Bernardino, Santa Barbara, Tulare, Ventura, Amador, El Dorado, Kern, Kings, Madera, Modoc, Mono, Monterey, Orange, Placer, Sacramento, San Joaquin, Shasta, Solano, Stanislaus, Tuolumne, Mariposa, Merced, Calaveras, San Benito, Sierra, Contra Costa, Humboldt, Mendocino, Sonoma, Plumas, Tehama, Yuba, Butte, Marin, Yolo	1/26/1969 (Federal)

Disaster #	Year	Disaster Name	Disaster Type	Disaster Cause	Counties & Cities Declared	Federal or State Declaration Date
DR-183	1964	1964 Late Winter Storms	Flood	Storms	Del Norte, Humboldt, Shasta, Mendocino, Colusa, Glenn, Lassen, Plumas, Sierra, Siskiyou, Sonoma, Sutter, Tehama, Trinity, Amador, Butte, El Dorado, Modoc, Nevada, Placer, Yuba, Alpine, Lake, Sacramento, Yolo, Marin	12/29/1964 (Federal)

Data obtained from NOAA/NCEI and presented in Table 17 shows major flood-related events in Sonoma County with additional impact information.

Table 17: Historic Flood-Related Hazards in Sonoma County, NOAA

Hazard	Date	Time	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
Flash Flood	January 20, 1993	7:15 AM	N/A	0	0	$500K	0
	March 9, 1995	10:34AM	N/A	0	0	$3.5M	$0.5M
	February 2, 1998	6:50 PM	N/A	0	0	$2.0M	0
	February 3, 1998	4:00 AM	N/A	0	0	$5.0M	0
	February 3, 1998	9:30 AM	N/A	0	1	$200K	$159K
	February 4, 1996	10:00 AM	N/A	0	0	0	0
	December 31, 1996	7:00 PM	N/A	1	0	0	0
	January 3, 1997	8:00 PM	N/A	1	0	0	0
	February 5, 1998	6:00 PM	N/A	0	0	0	0
	February 6, 1998	12:22 PM	N/A	0	0	0	0
	February 7, 1998	1:18 PM	N/A	0	0	0	0
	February 13, 2000	10:00 AM	N/A	0	0	0	0
	February 13, 2000	9:00 PM	N/A	0	0	0	0

Hazard	Date	Time	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
	January 11, 2001	10:00 AM	N/A	0	0	$7.0M	0
	December 16, 2002	2:00 AM	N/A	0	0	0	0
	January 25, 2008	8:00 PM	N/A	0	0	$800K	0
	November 30, 2012	1:00 PM	N/A	0	0	0	0
	November 30, 2012	3:00 PM	N/A	0	0	0	0
	December 2, 2012	9:00 AM	N/A	0	0	$0.5K	0
	December 2, 2012	10:00 AM	N/A	0	0	$0.5K	0
	December 23, 2012	8:31 AM	N/A	0	0	$0.5K	0
	December 23, 2012	11:16 AM	N/A	0	0	$1.0K	0
	December 23, 2012	2:46 PM	N/A	0	0	$0.5K	0
	February 8, 2014	2:31 PM	N/A	0	0	$5K	0
	December 11, 2014	10:20 AM	N/A	0	0	$5K	0
	December 15, 2016	12:03 PM	N/A	0	0	0	0
	December 15, 2016	1:42 PM	N/A	0	0	0	0
	December 15, 2016	2:00 PM	N/A	0	0	0	0
	January 4, 2017	2:00 AM	N/A	0	0	$5.0K	$5.0K
	January 8, 2017	3:30 AM	N/A	0	0	0	0
	January 8, 2017	7:00 AM	N/A	0	0	0	0

Hazard	Date	Time	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
	January 8, 2017	8:15 AM	N/A	0	0	0	0
	January 10, 2017	12:18 PM	N/A	0	0	0	0
	January 10, 2017	1:20 PM	N/A	0	0	0	0
	January 18, 2017	7:30 PM	N/A	0	0	0	0
	January 18, 2017	7:45 PM	N/A	0	0	0	0
	January 20, 2017	4:45 AM	N/A	0	0	0	0
	January 22, 2017	4:15 AM	N/A	0	0	0	0
	February 9, 2017	12:00 PM	N/A	0	0	0	0
	February 9, 2017	2:42 PM	N/A	0	0	0	0
	March 22, 2018	4:30 AM	N/A	0	0	0	0
	January 16, 2019	1:45 PM	N/A	0	0	0	0
	January 16, 2019	4:30 PM	N/A	0	0	0	0
	January 16, 2019	7:24 PM	N/A	0	0	0	0
	December 12, 1995	2:45 AM	N/A	0	0	0	0
	December 29, 1996	12:00 AM	N/A	0	0	0	0
	January 2, 1998	4:00 AM	N/A	0	1	0	0
	January 1, 2002	3:00 AM	N/A	0	0	$200K	0
Heavy Rain	December 15, 2002	8:00 PM	N/A	0	0	0	0
	December 16, 2008	7:00 AM	N/A	0	0	$25K	0
	May 5, 2009	6:30 AM	N/A	1	1	$50K	0
	October 24, 2010	11:00 AM	N/A	0	0	0	0
	February 16, 2011	-	N/A	0	0	0	0
	March 24, 2011	5:00 AM	N/A	0	0	$28.5K	0

Hazard	Date	Time	Magnitude	Deaths	Injuries	Property Damage	Crop Damage
	June 4, 2011	1:00 AM	N/A	0	0	0	$20M
	November 30, 2012	5:46 AM	0	0	0	0	0
	December 22, 2012	2:25 PM	0	0	0	$30K	0
	February 8, 2014	10:30 AM	0	0	0	0	0
	September 26, 2014	5:25 PM	0	0	0	0	0
	December 11, 2014	3:20 AM	0	0	0	0	0
	December 11, 2014	8:09 AM	1	0	0	0	0
	December 11, 2014	11:18 AM	0	0	0	0	0
	December 11, 2014	1:22 PM	0	0	0	0	0
	February 8, 2015	8:30 AM	0	0	0	$25K	0
	February 9, 2015	4:02 AM	0	0	0	0	0
	January 16, 2019	2:50 PM	N/A	0	0	0	0
Winter Storm	November 21, 2013	9:40 PM	N/A	0	0	$5.0K	0
	February 16, 1994	8:00 PM	N/A	0	0	$500K	0
	December 9, 1995	10:00 AM	N/A	1	15	$60M	$5.0M
	March 10, 1995	5:09 AM	N/A	0	0	0	0

4.2.4 Frequency of Flood Hazard Events

Historical flooding in Sonoma Valley and the Sonoma Creek watershed generally coincides with broader regional flood events documented for Sonoma County, including historical flooding in the neighboring Russian River and Petaluma River watersheds. Within the last 100 years, some of the most significant flooding that has occurred in the region has occurred in years of 1937, 1940, 1955, 1964, 1982, 1986, 1995, 1997, 1998, 2005/06, and 2017. These floods are often the result of intense, extended precipitation events unleashed from atmospheric rivers emanating from the Pacific Ocean.

Atmospheric rivers are narrow bands of enhanced water vapor which provide approximately half of the major rainfall in the Russian River watershed. Atmospheric rivers have caused 34 out of the 39 floods in the Russian River watershed from the last 60 years.

More recent City of Sonoma records indicate detailed flooding data for events occurring in February 1986, January 1995, December 2002, and December 2005. The southernmost portion of Sonoma Valley, in the unincorporated area of Schellville, experiences flooding with even greater frequency. These southern areas are further subject to tidal and storm surge influence from San Pablo Bay and flooding events have occurred as recently as 2008, 2017, and 2019. Every few years on average, Sonoma Creek overtops at the Southern end of the Valley, resulting in the closure of Highway 121 not far from the District's wastewater treatment plant, and affecting properties irrigated by the District's recycled water distribution system. Recently, Highway 121 experienced closures due to storms in 2018, 2017, and 2016.

4.2.5 Probability of Flood Hazard Events

The frequency and severity of flooding are measured using a discharge probability, which is the probability that a certain river discharge (flow) level will be equalled or exceeded in a given year. The flood frequency equals 100 divided by the discharge probability. For example, the 100-year discharge has a 1-percent chance of being equalled or exceeded in any given year. The "annual flood" is the greatest flood event expected to occur in a typical year. These measurements reflect statistical averages only; it is possible for two or more floods with a 100-year or higher recurrence interval to occur in a short time period. The same flood can have different recurrence intervals at different points on a river.

The extent of flooding associated with a 1-percent annual probability of occurrence (the base flood or 100-year flood) is used as the regulatory boundary by many agencies. Also referred to as the special flood hazard area, this boundary is a convenient tool for assessing vulnerability and risk in flood-prone communities. Many communities have maps that show the extent and likely depth of flooding for the base flood. Corresponding water-surface elevations describe the elevation of water that will result from a given discharge level, which is one of the most important factors used in estimating flood damage.

The intensity, distribution, and duration of rainfall are the most important factors in determining the magnitude of floods. If a storm event extends many hours or days, flooding can be exacerbated as soils become saturated, reservoirs fill, and runoff from the upland and upstream areas accumulates downstream. Table 18 indicates the rainfall levels that are expected to fall in the low and high rainfall areas of the county during a 24-hour period based on the NOAA NWS Precipitation Frequency Data Server.

Table 18: Precipitation Frequency Intervals Associated with 24-Hour Storm Event in Sonoma County

Recurrence Interval	Southeast County, Sonoma (inches)
2-year	3.2
10-year	4.6
25-year	5.5
50-year	6.2
100-year	7.0

4.2.6 Impacts of Flood Hazard and Vulnerabilities

The principal source of flooding within the SVCSD is Sonoma Creek. Figures SV-32 through SV-41 show areas where sections of the SVCSD are located within the 100-year flood zone as mapped by FEMA. These areas, along with areas that experience high flows due to flooding, are at the highest risk of damage to the SVCSD facilities. Debris flowing within Sonoma Creek and its tributaries where the pipelines cross present a hazard to damaging the crossings as discussed in Section 4.1.2.4. Potential for scour and liquefaction at creek crossings also present a hazard. As discussed in Section 4.1.2.4, there are identified locations at creek crossings where damage to the system could occur.

Flood Insurance Rate Map (FIRM) No. 06097C0939E (Figure 7) shows the SVCSD Wastewater Treatment Plant is generally located outside of the 100-year flood zone and there are a few structures within the Wastewater Treatment Plant along Schell Creek that are located within the 100-year flood zone. These structures include the Gravity Thickener, Septic Truck Discharge Box, Dewatering Utility & Storage Building, Storage Building (Blue Room), Storage Building (unused), Headworks and portions of the of the Influent-Effluent Pump Station and Generator Room. However, it should be noted that FEMA maps do not consider the height of engineering levee (one-foot higher than 100-year base flood elevation) at the south of the WWTP in the flood plain. Therefore, WWTP is not vulnerable to flooding hazard.

As shown in Figures SV-32 through SV-41, the SVCSD collection system, recycled water pipelines and reclamation reservoirs are also susceptible to flooding hazards, including the Mulas Booster Station BP-B2, and R-1, R-2 Pumping Structure DP-G1.

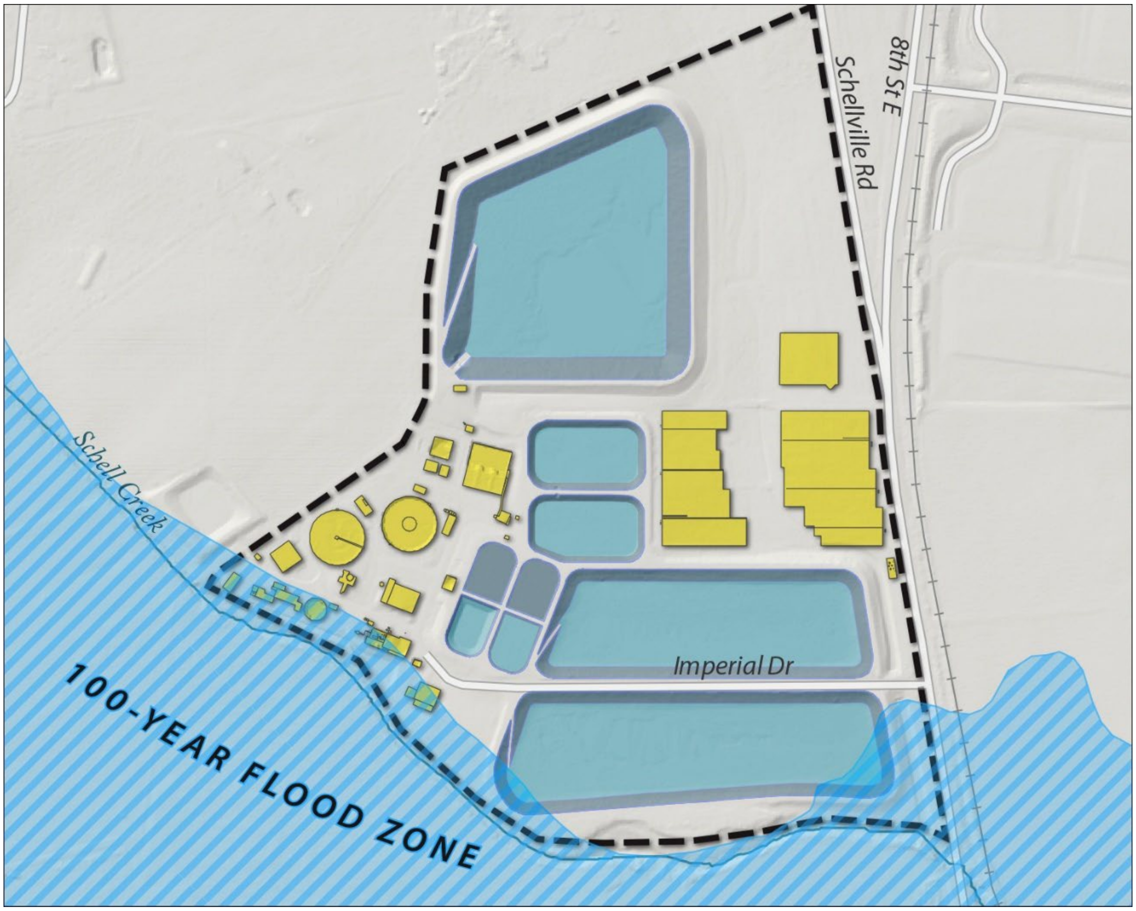

Figure 7: FIRM No. 06097C0939E - 100-Year Flood Zone at the WWTP

The following flood-related issues relevant to the SVCSD should be considered:

The risk associated with the flood hazard overlaps the risk associated with other hazards such as earthquake, landslide, and wildfire losses. This potentially provides an opportunity to seek mitigation alternatives with multiple objectives that can reduce risk for multiple hazards.

Climate change may cause more extensive flood problems due to possible sea level rise and more severe weather patterns. Consequently, the 500-year floodplain inundation area may become a higher probability risk. Coastal flood hazard ratings may also need to be reviewed.

More information is needed on flood risk to support the concept of risk-based analysis of capital projects. Ongoing flood hazard mitigation will require funding from multiple sources.

4.2.7 Secondary Hazards from Flood Hazard Events

The most problematic secondary hazard for flooding is bank erosion, which in some cases can be more harmful than the actual flooding. This is especially true in the upper courses of rivers with steep gradients, where floodwaters may pass quickly and without much damage, but the banks can be left scoured, edging properties closer to the floodplain or causing them to fall in.

Flooding is also responsible for hazards, such as landslides, when high flows over-saturate soils on steep slopes, causing them to fail. Hazardous materials spills are also a secondary hazard of flooding if storage tanks rupture and spill into streams, rivers, or storm sewers. Additionally, sewer systems can be backed up, causing wastewater to spill into homes, neighbourhoods, rivers, and streams.

4.3 Fire Hazard

4.3.1 Description of Fire Hazard

Wildfire is any uncontrolled fire occurring on undeveloped land that requires fire suppression and is a relevant hazard to the SVCSD facilities. Wildfires can be ignited by lightning, faulty or damaged electrical facilities, or by human activity such as smoking, campfires, equipment use, and arson. Fire hazards present a considerable risk to vegetation, wildlife habitats, private and public facilities, and public infrastructure. In addition, wildfire can cause increased vulnerability to flood due to the destruction of watersheds. The potential for significant damage to life and property exists in areas designated as "wildland urban interface areas," where development is adjacent to densely vegetated areas.

Definitions

- **Conflagration:** A fire that grows beyond its original source area to engulf adjoining regions. Wind, extremely dry or hazardous weather conditions, excessive fuel build-up and explosions are usually the elements behind a wildfire conflagration.
- **Fires Hazard**: The potential for fire in an area, based on the fuels available to burn and how intense the fire would burn. It can be influenced by past disturbances or management activities that alter the hazard, for better or worse, by changing the overall site moisture. It is also affected by the volume and spatial arrangement of fuels. Fire hazard is distinguished from fire risk; fire risk incorporates the probability of wildfire occurrence—or ignitions—with fire hazard.
- **Interface Area:** An area susceptible to wildfires and where wildland vegetation and urban or suburban development occur together. An example would be smaller urban areas and dispersed rural housing in forested areas.
- **Wildfire:** Fires that result in uncontrolled destruction of forests, brush, field crops, grasslands, and real and personal property in non-urban areas. Because wildfires can occur at a distance from firefighting resources, wildfires can be difficult to contain and can cause a great deal of destruction.

4.3.2 Location of Fire Hazard

Areas of significant fire hazards are mapped based on factors such as fuel, weather, and terrain.

- **Fuel:** Fuel may include living and dead vegetation on the ground, along the surface as brush and small trees, and above the ground in tree canopies. Lighter fuels such as grasses, leaves, and needles quickly expel moisture and burn rapidly, while heavier fuels such as tree branches, logs, and trunks take longer to warm and ignite. Trees killed or defoliated by forest insects and diseases are more susceptible to wildfire.
- **Weather:** Relevant weather conditions include temperature, relative humidity, wind speed and direction, cloud cover, precipitation amount and duration, and the stability of the atmosphere. Of particular importance for wildfire activities are wind and thunderstorms:
    - Strong, dry winds produce extreme fire conditions. Such winds generally reach peak velocities during the night and early morning hours.
    - The thunderstorm season typically begins in June with wet storms and turns dry with little or no precipitation reaching the ground as the season progresses into July and August.
- **Terrain:** Topography includes slope and elevation. The topography of a region influences the amount and moisture of fuel; the impact of weather conditions such as temperature and wind; potential barriers to fire spread, such as highways and lakes; and elevation and slope of landforms (fire spreads more easily uphill than downhill).

Taking these factors into consideration, a fire hazard severity scale has been devised to characterize zones by the number of days of moderate, high, and very high fire hazard. These zones, referred to as Fire Hazard Severity Zones (FHSZ), define the application of various mitigation strategies to reduce risk associated with wildfires. The FHSZ maps for the SVCSD are shown in Figures SV-42 through SV-51; these maps serve as the basis for the fire/wildfire risk assessment.

The FHSZ model is built from existing data and hazard constructs developed by CAL FIRE's Fire and Resource Assessment Program. The model considers many factors, including existing and potential fuel (i.e., natural vegetation), predicted flame length, blowing embers, terrain, and typical fire weather for the area.

4.3.3 Previous Fire Hazard Events

Fire has been a hazard factor in Sonoma County's history due to the local climate and geography. Figure SV-52 shows historical fires that have occurred near the SVCSD system. In recent history, fire events have increased in frequency and intensity.

2020

The 2020 California wildfire season, part of the 2020 Western United States wildfire season, was a record-setting year of wildfires in California. By the end of the year, 9,639 fires had burned 4,397,809 acres (1,779,730 ha), more than 4% of the state's roughly 100 million acres of land, making 2020 the largest wildfire season recorded in California's modern history (CAL FIRE, 2020), though roughly equivalent to the pre-1800 levels, which averaged around 4.4 million acres yearly and up to 12 million in peak years. California's August Complex fire has been described as the first "gigafire," burning over 1 million acres across seven counties, an area larger than the state of Rhode Island. The fires destroyed over 10,000 structures and cost over $12.079 billion (2020 USD) in damages, including over $10 billion in property damage and $2.079 billion in fire suppression costs. The intensity of the fire season has been attributed in part to over a century of poor forest management as well as increased warming due to climate change.

The LNU Lightning Complex fires were a large complex of wildfires that burned during the 2020 California wildfire season across much of the Wine Country area of Northern California – Lake, Napa, Sonoma, Solano, and Yolo Counties, from August 17 to October 2, 2020. The complex was composed of numerous lightning-sparked fires, most of which were small. However, while they initially started separate from each other, the Hennessey Fire eventually grew to merge with the Gamble, Green, Markley, Spanish, and Morgan Fires, scorching 192,000 acres (777 km^2) by itself, for a total burn area of 363,220 acres (1,470 km^2) in the complex. The fire, which burned in the hills surrounding several large cities, such as Fairfield, Napa, and Vacaville, destroyed 1,491 structures and damaged a further 232. In all, six people were killed and another five injured. The LNU Lighting Complex is currently the fourth-largest wildfire in the recorded history of California.

The 2020 Glass fire burned over 67,000 acres, destroying 1,555 structures and damaging 282 structures. A state of emergency was declared for Napa, Sonoma, and Shasta counties due to the Glass and Zogg fires.

2019

The 2019 Kincade fire burned roughly 77,758 acres and was the largest of the 2019 California wildfire season and the largest wildfire recorded in Sonoma County at the time before being surpassed by the LNU Lightning Complex fires in 2020.

2017

In 2017, there were a series of destructive fires throughout the region (Tubbs, Nuns, Atlas, Redwood Valley, Pocket, and Sulphur). The Tubbs Fire burned approximately 36,807 acres in Sonoma and Napa counties, destroyed 5,636 structures and killed 22 people. The Nuns Fire burned approximately 54,000 acres (34,398 in Sonoma County and 20,025 in Napa County), destroyed 1,355 structures and killed 3 people. The Atlas Fire burned approximately 51,624 acres in Napa and Solano

Counties, destroyed 120 structures and killed 6 people. The Redwood Valley Fire burned approximately 36,523 acres in Mendocino County, destroyed 546 structures and killed 9 people. The Pocket Fire burned approximately 14,225 acres in Sonoma County, destroyed 6 structures. The Sulphur Fire burned approximately 2,207 acres in Lake County, destroyed 162 structures. In total, 2017 North Bay fires burned roughly 195,768 acres throughout the region.

2015 and Prior

Other historic fires include the Valley fire, which took down 76,067 acres in Sonoma, Lake and Napa counties in 2015; the North Pass fire, which destroyed 41,983 acres in Mendocino County in 2012; and the Rumsey fire, which destroyed 39,138 acres in Napa and Yolo counties in 2004.

4.3.4 Frequency of Fire Hazard Events

The wildfire season in Sonoma County generally begins in June and ends in mid-October; however, wildfires have occurred in every month of the year. Drought, light snowpack, and local weather conditions can expand or shorten the length of the fire season. The early and late shoulders of the fire season are usually associated with human-caused fires. The peak months of July, August, and September are usually related to thunderstorms and lightning strikes.

4.3.5 Probability of Fire Hazard Events

Wildfire frequency and severity is projected to increase in Northern California as a result of climate change, which is expected to result in hotter, drier weather with longer summers and expanded fire seasons for the region. In a study for northern California, future climate scenarios including warmer and windier conditions resulted in projected wildfire that burned more intensely and spread faster in most locations (Fried et al., 2004), although local coastal influence may dampen this effect.

4.3.6 Impacts of Fire Hazard and Vulnerabilities

Structures, above-ground infrastructure, critical facilities, and natural environments are all vulnerable to the wildfire hazard. Pipelines may also be vulnerable to wildfires.

Critical facilities of wood frame construction are especially vulnerable during wildfire events. In the event of wildfire, there would likely be little damage to most of the SVCSD's infrastructure. Aboveground power lines are the most at risk from wildfire because most lines have wooden poles that are susceptible to burning. Some buried pipes or sewer laterals, particularly shallow plastic pipe such as PVC and HDPE, may be damaged during wildfires. The City of Santa Rosa has observed thermal degradation of plastic pipes from the 2017 Tubbs and 2020 Glass fires (City of Santa Rosa, 2018; City of Santa Rosa, 2021).

Fires can create conditions that block or prevent access and can isolate residents and emergency service providers that has the potential to affect SVCSD personnel and facilities due to the potential for limited access. Wildfires typically do not have a major direct impact to bridges, but it can create conditions in which bridges are obstructed and can reduce the ability of access to SVCSD facilities.

Additionally, storage of large amount of liquid petroleum gas (LPG) at the Sonoma Marin Area Rail Transit (SMART) yard at the intersection of 8th Street East and Highway 121 is considered a fire hazard to the WWTP and District's assets. The yard is frequently used in winter for the storage of up to 5 million gallons of highly explosive liquid petroleum gas (LPG) and the WWTP is well within the blast zone and evacuation zone of a potential explosion and fire. On December 29th, 2021, we reached out to SMART and were told that their intention is to have the LPG removed soon.

Major Fire Hazard-Related Issues

- Access to SVCSD Facilities may become difficult for operations, maintenance, and fire suppression.
- Wildfires could cause landslides as a secondary natural hazard, which can induce additional sediment loading with potential risk to facilities.
- Critical facilities in the planning area are at risk and have the potential of functional downtime post-event such as loss of power at the treatment plant or pump stations. This creates not only a need for mitigation, but also a need for continuity of operations planning to develop procedures for providing services without access to essential facilities.
- PVC and HDPE pipes may experience degradation due to high temperatures.
- Homes or businesses damaged by wildfires may expose sewer laterals, resulting in potential debris and/or inflow and infiltration to enter the sewer main.
- Fire department water supply may be at risk in wildfire hazard areas.

4.3.7 Secondary Hazards from Fire Hazard Events

Wildfires can also generate a range of secondary effects, which in some cases may cause more widespread and prolonged damage than the fire itself. Secondary effects of concern to the SVCSD include flooding and slope instability. Wildfires strip slopes of vegetation, exposing them to greater amounts of runoff. This can weaken soils and cause failures on slopes. Major landslides can occur several years after a wildfire. Most wildfires burn hot and for long durations that can bake soils, especially those high in clay content, thus increasing the imperviousness of the ground. This increases the runoff generated by storm events, which thereby increases the chance of flooding.

To further complicate the problem, heavy rains could follow, causing flooding and landslides and releasing tons of sediment into rivers, permanently changing floodplains, and damaging sensitive habitat and riparian areas. With the forests removed from the watershed, stream flows could easily double. Floods that could be expected every 50 years may occur more frequently. With the streambeds unable to carry the increased discharge because of increased sediment, the floodplains and floodplain elevations would increase.

4.4 Climate Change

4.5.1 Background

Climate change over the next century may have a significant impact to both the natural and built environments in Sonoma County. Although Sonoma County has developed the Community Climate Action Plan and Climate Action 2020 to mitigate greenhouse gas emissions that cause climate change, the effects of climate change, such as rising sea levels and intensified storms, are imminent. Due to sea level rise, flooding in the Sonoma Creek watershed is likely to increase.

As discussed in Chapter 4.2, flooding can change stream hydraulics and sediment carrying capacity of waterways, which may cause stream water backup flooding. Climate change also has potential to decrease precipitation in the Sonoma Creek watershed, which would increase fire hazards. While the effects of climate change remain uncertain, it is speculated that flooding and wildfire hazards would pose the most significant threat to SVCSD infrastructure. Flood and wildfire hazards to SVCSD are discussed in Chapters 4.2 and 4.3, respectively.

Sea level rise (SLR) is projected to proceed at a rate of up to 50 mm/year by the end of the century, a rate which is about 30 to 40 times faster than the rate experienced over the last century. By the year 2050, the sea levels in Northern California are projected to rise by about 0.2 to 1.4 feet, and by the year 2100, about 0.8 to 7.9 feet (Griggs et al., 2017; Pierce et al., 2018). The wide range in SLR projections after 2050 is attributed to the uncertainty in greenhouse gas emissions, which is highly dependent on policy decisions over the next few decades. Projected sea level rise likely will result in changes to stream hydraulic gradients and may increase upstream backwater flooding.

4.5.2 Collection System

The climate sensitivity of the collection system is high**.** This is primarily due to the aging sewer lines which are sensitive to climatic events such as storm events. These overflows, caused by insufficient capacity, blockages and inflow and infiltration, result in violations.

Existing adaptive capacity of the collection system includes an emergency backup generator at the Warm Springs Road Pump Station and wastewater storage ponds at the Wastewater Treatment Plant.

Sanitary Sewage Overflows (SSOs) throughout the collection system occur during both wet and dry weather events. Because of this, the collection system's adaptive capacity is low. Changes to operations cannot fix the aging collection system and eliminate SSOs. SVCSD has secured funding to implement a series of projects to upgrade the collection system.

4.5.3 Wastewater Treatment Plant

The Wastewater Treatment Plant (WWTP) is sensitive to increased precipitation and increased creek flooding. This can impact the WWTP with direct flooding as well as increased influent entering the WWTP from the collection system due to flooding and increased precipitation. Structures within the WWTP, including the Gravity Thickener, Septic Truck Discharge Box, Dewatering Utility & Storage Building, Storage Building (Blue Room), Storage Building (unused), Headworks and portions of the of the Influent-Effluent Pump Station and Generator Room, are shown within the 100-year flood zone (Figure 7). However, it should be noted that FEMA maps do not consider the height of engineering berm at the south of the WWTP in the flood plain. Therefore, WWTP is not vulnerable to flooding hazard.

In addition, the limited effluent pumping capacity and unreliable power has the potential to exacerbate climate sensitivity.

The climate sensitivity of the WWTP is moderate due to minor flooding and operational challenges associated with pumping effluent.

SVCSD is currently implementing a capital improvements plan for the collection system to increase its collection capacity. Climatic vulnerability may increase if nutrient and wastewater constituents of concern requirements for discharging to the slough and for solids disposal change or if influent characteristics change as a result of climate change impacts.

4.5.4 Recycled Water

The recycled water pipelines are in the low foothills of Napa and Sonoma counties. Under the current SLR projections, portions of the recycled water pipelines may become submerged by the end of the century, including the outfall structure into Schell Slough, the eastern end of the Napa Salt Marsh Segment 1, and Napa Salt Marsh Segment 2. With rising sea levels, these segments of the recycled water pipeline may require active pumping to discharge into each respective slough. The climate sensitivity of the recycled water pipeline is low due to the gradual nature of sea level rise. Under the current projections for 2050, the pipeline is unlikely to become permanently submerged, and thus, SVCSD has several decades to plan for impacts of rising sea levels to the recycled water pipelines.

The recycled water reservoirs that are currently in use include R-1, R-2, and R-4, located along the recycled water pipeline, and R-5, located within the WWTP. Under current SLR projections, the groundwater table under R-1, R-2, and R-4 may potentially rise to directly below the reservoir bottom and the discharge pipes may become submerged. The climate sensitivity of the recycled water pipeline is low. Sensitivity studies for the reservoirs show that stability would not be compromised with rising sea level. As with the recycled water pipelines, due to the gradual nature of sea level rise, SVCSD has several decades to plan for impacts of rising sea levels to the reservoir discharge pipelines.

4.5.5 Adaptation Strategy

Through the Climate Adaptation Plan, Sonoma Water has developed a sanitation portfolio to achieve adaptation strategies by focusing on five strategic areas of action:

- Improve Efficiency of Collection Systems
- Improve Wastewater Treatment Reliability
- Expand Opportunities for Reuse
- Improve Sanitation System Operations
- Establish Integrated Wastewater Planning and Policy

Sonoma Water has identified improvements to the SVCSD facilities that fall under strategic areas 2 and 3. Specifically, Sonoma Water addresses strategy 2: Improving and Maintaining Flood Management Infrastructure by prioritizing eliminating Sonoma Valley WWTP hydraulic constraints due to sea level rise and increasing flood protection at Sonoma Valley WWTP.

4.5 Low Risk and No Risk Hazards

The following hazards are natural hazards identified by FEMA but are of low risk or no risk to the District and do not affect the District's infrastructure. Therefore, a detailed risk assessment was not completed for these hazards. These hazards will be assessed each year and could potentially move out of this category.

4.5.1 Tornadoes – Low Risk

Tornado intensities are rated on a Fujita Scale that ranges from 0-5. A Fujita Scale F0 tornado is defined by a wind speed range from 40-72 mph and is classified by light damage such as broken tree branches, and shallow rooted trees being pushed over. A Fujita Scale F1 is defined by a wind speed range from 73-112 mph and is classified by moderate damage: roof panels start to tear from houses, mobile homes are pushed off their foundations, or moving vehicles pushed off the road. A Fujita Scale F2 is defined by a wind speed range from 113-157 mph and is classified by considerable damage: roof tear from houses, mobile homes demolished, large tree snaps, or light-object missiles generated.

Tornadoes do not regularly occur in California and pose minimal risk to the SVCSD. In the last 70 years, there have been 337 tornadoes in 48 counties of California, but no deaths have occurred from the incidents. Over half of the tornadoes in California have been rated F0 on the Fujita Scale, about

40% have reached F1, and less than 10% were rated F2 or above. Based on historical tornado data files from the Storm Prediction Center (operating under the National Oceanic and Atmospheric Administration – NOAA), thirteen tornadoes occurred between 1958 and 2011 in Sonoma County, with the highest intensity of F2 from the June 1, 1958 tornado, which resulted in 1 injury.

4.5.2 Hurricanes – No Risk

California is at low risk for hurricanes, primarily because the sea surface temperatures of waters off California are cold even during the summer months. Hurricane, or tropical cyclone, formation requires very warm waters that extend to a depth of 160-feet. Additionally, the general path of hurricanes in the eastern Pacific tends to move north-westward or westward due to steering by the prevailing upper-level winds; therefore, even if a hurricane does form near the coast of California, the wind would steer the hurricane out to sea and away from land. While no hurricanes have been found in NOAA's recorded history, tropical storms do result from low pressure waves generated from the Gulf of Mexico. The tropical storms that occur are typically a result of subsided hurricanes but would still cause heavy rainfalls that may lead to flooding. Unlike floods or earthquakes, hurricanes primarily cause localized damage that also makes them a low hazard risk for the SVCSD. In the event of a hurricane or tropical storm, the SVCSD can continue the system operations using its SCADA system at two alternative locations.

4.5.3 Tsunamis – No Risk

Water displacement that occurs from earthquakes can cause a series of rapid, hazardous waves called tsunamis. As indicated on USGS Tsunami Inundation Maps, areas of tsunami danger in Sonoma County are limited to those with coastal exposure, namely in Archer Rock, Duncans Mills, Bodega Head, Valley Ford, Petaluma River, Sears Point, Cuttings Wharf, Petaluma Point, Mare Island, and Novato. The SVCSD and the WWTP do not have coastal exposure and therefore are not anticipated to be affected by tsunamis. In the last 70 years, tsunamis have not impacted Sonoma County.

4.5.4 Agricultural and Silvicultural Pests and Diseases – Low Risk

Agricultural silvicultural pests and diseases can pose economic, environmental, and physical risks to agriculture and forests. However, they are unlikely to pose a significant risk to the SVCSD system.

4.5.5 Air Pollution – Low Risk

Air pollution is a gradual process which can be hazardous to public health. However, it is unlikely to pose a significant risk to the SVCSD system.

4.5.6 Aquatic Invasive Species – Low Risk

Non-indigenous species may be transported to new environments and become a permanent part of an ecosystem and result in imbalances. These imbalances can pose a risk to public health, the economy, and ecology. However, they are unlikely to pose a significant risk to the SVCSD system.

4.5.7 Avalanches – No Risk

Avalanches are caused by a large mass of snow, ice, and rocks that fall down steep mountainsides. Due to the mild climate of the county, avalanches are not considered to be a hazard to the SVCSD system.

4.5.8 Energy Shortage and Energy Resiliency – Low Risk

California receives different types of energy from variable sources. Energy risks include electric power disruptions (both intentional and unintentional), natural gas leaks resulting in disruption of service, and decrease in supply and increase in demand due to climate change.

The District is reliant on electric power for wastewater treatment, disposal and reclamation. Although recent power shutoffs have been due to wildfire risk (and not energy shortage), climate change may amplify shortages in energy and electric power disruptions in the future.

4.5.9 Epidemic/Pandemic/Vector Borne Disease – Low Risk

Epidemic, pandemic, and vector-borne disease pose a threat to public health. COVID-19, the most recent (and on-going) pandemic, is a highly infectious disease which can result in mild to severe complications. Due to its highly contagious nature, many U.S. regions were ordered to shelter-in-place. During this time, non-essential work ceased or transitioned to a remote environment. Although the pandemic had a significant impact on personnel and required the implementation of COVID-19-specific procedures to allow for safe operations of the SVCSD system, it did not directly impact the system.

4.5.10 Extreme Heat – Low Risk

Extreme heat is defined as the occurrence of three or more consecutive severe heat days. Extreme heat may impact public health but is unlikely to impact the system directly.

4.5.11 Freeze – Low Risk

Sustained temperatures below freezing can impact public health and agriculture. Due to the mild climate of the county, freeze is not considered to be a hazard to the SVCSD system.

4.5.12 Severe Weather and Storms – Low Risk

Extreme weather describes a variety of events that are outside of the range of observed weather patterns and can include extreme rainfall events, heat waves, storms, unusually cold temperatures, and wind events. Due to climate change, the frequency of extreme weather and severe storms are expected to increase in the future. The primary hazards related to severe weather and storms are flooding and wildfire hazards. See Section 4.2 and 4.3 for hazard profiles for Flooding and Fire hazard.

4.5.13 Tree Mortality – Low Risk

Tree mortality primarily results from drought conditions coupled with high tree density and/or bark beetles. Tree mortality can create dangerous conditions for people who work in, live in, and/or visit the affected area as well as impact roads and power lines. However, tree mortality is unlikely to directly impact the SVCSD system.

4.5.14 Drought – Low Risk

Unlike typical natural disasters such as earthquakes, floods, or fires, drought occurs gradually over a multi-year period. One dry year does not normally constitute a drought in California. For example, the driest single year of California's measured hydrologic record was 1977. Significant portions of California is presently in a drought, with recent multi-year statewide droughts from 2012-2017 and 2008-2011. Following one of the lowest rainfall years on record in 2013, the Governor of the State of California proclaimed a State of Emergency due to drought conditions on January 17, 2014. On April 21, 2021, the State of California proclaimed a State of Emergency Proclamation due to drought conditions for Sonoma and Mendocino counties.

Defining when a drought begins is a function of drought impacts to water users and therefore, there is no universal definition of when a drought begins or ends. Impacts of drought are typically felt first by those most reliant on annual rainfall, such as ranchers engaged in dryland grazing, rural residents relying on wells in low-yield rock formations, or small water systems lacking a reliable source. Drought impacts increase with the length of a drought, as carry-over supplies in reservoirs are depleted and water levels in groundwater basins decline.

On February 25, 2014 and April 27, 2021, the Board of Supervisors of the County of Sonoma proclaimed a local emergency due to drought conditions. Sonoma County is currently experiencing a second consecutive dry year, which was preceded by the third driest water year (October 2019 – September 2020) on record over the last 127 years. In response to the ongoing drought conditions, Sonoma Water is managing both the existing water supplies in both Lake Mendocino and Lake Sonoma as well as the flows in Russian River. In 2021, Sonoma Water has reduced diversions from the Russian River by 24 percent.

The 2014 drought had significant impacts, including risks to water supply and agricultural and ecosystem water demands, as well as water quality and groundwater overdraft. Accordingly, the County's emergency proclamation led to several initiatives aimed at protecting and preserving reliable drinking water supplies, and providing environmental, agricultural, and economic relief to the region.

Droughts can have a significant impact on society that can include lost jobs and revenues in the landscaping and nursery industries, unemployment and other socioeconomic impacts in farming dependent regions, increased risk of wildfire, additional cost for homeowners to replace lawns and landscaping, loss of forests, decline in fish population, lost revenues to water-based recreation businesses and reduced hydroelectric power generation. Droughts result in a decline of revenues and an increase in operational costs for water agencies. The former occurs due to voluntary or mandatory reductions in water use and the later due to additional cost of purchasing water, deepening wells, or implementing water education and conservation campaigns.

The U.S. Drought Monitor (USDM) is a map that is updated weekly to show the location and intensity of drought across the country. The USDM categories show experts' assessments of conditions related to drought. These experts check variables including temperature, soil moisture, stream flow, water levels in reservoirs and lakes, snow cover, and meltwater runoff. They also check whether areas are showing drought impacts such as water shortages and business interruptions. Associated statistics show what proportion of various geographic areas are in each category of dryness or drought, and how many people are affected. U.S. Drought Monitor data go back to 2000.

SVCSD area is located in the portion of Sonoma County that experiencing sever (D3) drought as shown in Figure 8. However, drought does not directly affect any sewer system or recycled water infrastructures, therefore we have this hazard in the low-risk section of the LHMP.

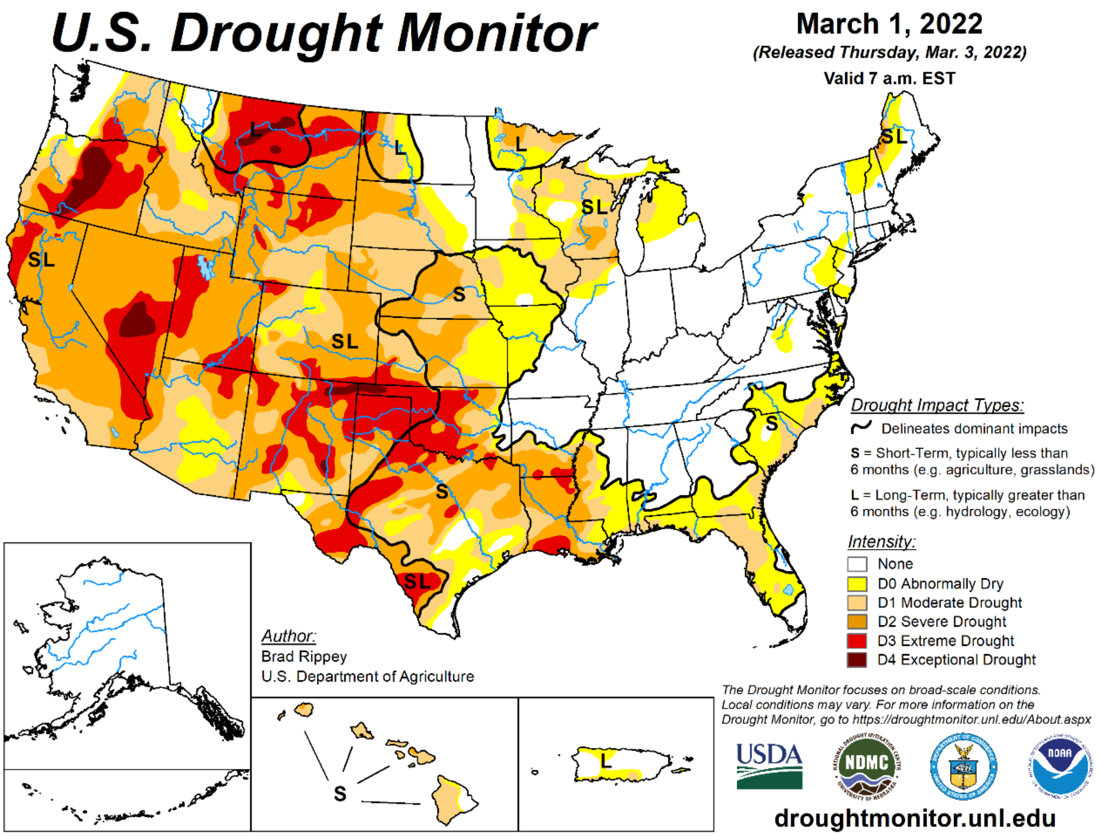

Figure 8: U.S. Drought Monitor - (Source: US Drought Monitor Web Page – March 2022)

4.6 Vulnerability Assessment

A vulnerability assessment was completed to evaluate the extent to which the SVCSD system can withstand the applicable hazards discussed in Chapters 4.1 through 4.5 The SVCSD system includes the collection system (gravity and pressure pipelines and associated pump stations), treatment system (wastewater treatment plant), and recycled water system (recycled water pipelines, reclamation reservoirs, and pump stations). Mitigation plans and future emergency operations plans will serve as a guide for developing a response to natural hazards.

The vulnerability assessment included a review of the data collected, as-built drawings of the system, and field reconnaissance of the system. Potholing and underground/in-pipe investigations were not included in the assessment. As additional data is developed and vulnerabilities of the SVCSD system are identified, the SVCSD will prioritize the vulnerable components of the system with the most relevant hazards; additional investigations will be completed as necessary in order to refine the assessment and develop a plan to mitigate the potential damages from the relevant hazards. The vulnerability analysis presented in this section is intended to meet the following objectives:

- Identify and quantify hazards that may affect the SVCSD system.
- Quantify the susceptibility to damage of essential facilities (conveyance, treatment, and reclamation) to providing services in the event of a natural disaster.
- Develop measures that will be included in a mitigation plan to decrease the vulnerability of the system.

The following sections describe the significant vulnerabilities to the SVCSD as identified in previous chapters. This vulnerability assessment emphasizes the geologic and seismic hazards (including earthquake and creek hazards) discussed in Chapter 4.1 because earthquakes pose the highest risk to SVCSD facilities. In addition, the vulnerabilities associated with the lower risk hazards would be like those identified and associated with earthquakes. Specific vulnerabilities to the SVCSD system which are related to flooding, high creek flow, and seismic related events are also identified. Low risk hazards are not discussed in the vulnerability assessment because efforts to protect the SVCSD facilities against low hazards would not justify the costs.

4.6.1 Wastewater Collection System

The wastewater collection system consists of the collection system pipelines and two pump stations located at the northern end of service area. Hazards to the wastewater collection system and pump stations are generally due to or directly related to the after-effects of seismic events, floods, and fires.

4.6.1.1 Collection System Pipelines

The existing collection system was reviewed via mapping and field reconnaissance. Field visits of areas with potential for landslides, creek crossings, and other potentially vulnerable areas were completed. Hazards were identified and then discussed with the field operations staff. Areas of potential vulnerabilities were noted and mapped. The identified locations are presented in Figures SV-2 through SV-6.

Vulnerabilities

The site-specific vulnerable areas identified in 2016 LHMP are described below:

<u>Point 1:</u> Creek bank failure was observed adjacent to the roadway. There is no sewer main within the roadway upslope of the failure. However, lateral/upslope migration of the failure could potentially impact manholes to the northeast and south.

Hazard: Static and seismic embankment failure (landslide) potential with possible damage to main, manholes and laterals.

Point 2: The existing manhole's proximity to an active creek can result in embankment failure. The sewer main was constructed beneath the existing channel; burial depth below channel thalweg is unknown and assumed shallow.

Hazard: Static and seismic embankment failure (landslide) potential with possible damage to sewer main and manholes. Potential exposure and damage of pipeline due to erosion and debris impact during periods of rapid creek flow.

Point 3: The sewer main and manholes are located at the top of the creek bank. Localized shallow failure and erosion of the bank during periods of peak flow have exposed the manhole at depth. Rock slope protection has been placed on the bank to protect the manhole.

Hazard: Static and seismic embankment failure (landslide) potential with possible damage to main and manholes.

Point 4: The sewer main is suspended from the bridge with non-rigid anchors. The main appears to be fixed and extend through the abutment foundations at both the east and west ends of the bridge. Erosion of the slope below the abutments and within the channel has locally undermined the abutment and bridge bent foundations.

Hazard: Potential damage to main during a seismic event due to shaking, differential settlement of structure.

Point 5: The sewer main and manholes are constructed within a contour-parallel roadway. Slopes above and below the roadways are generally steeper than 2H:1V (Horizontal:Vertical). Edge parallel cracking of pavement due to fill prism settlement and creep on ridge flank observed.

Hazard: Static and seismic landslide potential with possible damage to main, manholes and laterals.

Point 6: The sewer main is suspended from the bridge with non-rigid anchors and apparently fixed at abutments.

Hazard: Potential damage to main during a seismic event due to shaking, differential settlement of structure.

Point 7: The sewer main extends through the walls of the arch culvert at the crossing location. The main is unsupported throughout the span and is suspended approximately 1.5 feet above the creek thalweg.

Hazard: There is the potential for damage to the main from debris impact during high, and/or rapid creek flow.

Point 8: The sewer main was exposed above the creek from MH103-16 to MH103-17. This was mitigated with the Agua Caliente Creek Crossing Project.

Hazard: N/A.

Point 9: Sewer main and manholes are located/found within young alluvium (Holocene) at the creek crossing. Embankments are generally steeper than 2H:1V (Horizontal:Vertical) and the creek channel is 20 to 30 feet in depth below the top of the creek bank. Localized embankment undermining and failure observed.

Hazard: Static and seismic embankment failure (landslide) potential with possible damage to main and manholes.

Point 10: The sewer main extends under the east and west bridge abutments. The top of the pipe is roughly at thalweg elevation and has been armored with concrete which has locally been undermined by stream flow.

Hazard: There is the potential for damage to main from debris impact during high and/or rapid creek flow and from future erosion.

Point 11: The sewer main extends under the east and west bridge abutments. The top of the pipe is roughly at thalweg elevation and has been armored with concrete.

Hazard: There is the potential for damage to the main from debris impact during high and/or rapid creek flow and from future erosion.

Point 12: The sewer main extends through the walls of the arch culvert at the crossing location. The main is unsupported throughout the span, is suspended approximately 2 feet above the creek thalweg, and is potentially exposed to debris impact during high creek flow.

Hazard: There is the potential for damage to the main from debris impact during high, and/or rapid creek flow.

Additional site-specific vulnerable areas identified based on 2021 field reconnaissance and discussions with staff are described below:

Point 13: The sewer main extends below the active Sonoma creek, whose channel is 10 to 20 feet in depth below the top of the creek bank. The main is at a depth of about 12 feet below ground surface (bgs) at the manhole located at the western bank and 6 feet bgs on manhole located on the eastern bank. Liquefaction hazard has been regionally mapped as very high.

Hazard: Lateral spreading potential with possible damage to main and manholes.

Point 14: The sewer main extends below the active Sonoma creek, whose channel is 10 to 20 feet in depth below the top of the creek bank. The main is at a depth of about 10 feet below ground surface (bgs) at manholes located near the banks. Liquefaction hazard has been regionally mapped as very high.

Hazard: Lateral spreading potential with possible damage to main and manholes.

Point 15: The asbestos cement sewer main parallels the active Sonoma creek, whose channel is up to 30 feet in depth below the top of the creek bank. Along the creek, the main ranges in depth from about 8 to 25 feet bgs. Liquefaction hazard has been regionally mapped as very high.

Hazard: Lateral spreading potential with possible damage to main and manholes. Asbestos cement pipes are especially vulnerable to ground deformations.

Point 16: The asbestos cement sewer main parallels and extends below an unnamed tributary of Sonoma creek, whose channel is 10 to 25 feet in depth below the top of the creek bank. Along the tributary, the main is about 12 feet bgs. Liquefaction hazard has been regionally mapped as high.

Hazard: Lateral spreading potential with possible damage to main and manholes. Asbestos cement pipes are especially vulnerable to ground deformations.

Point 17: The asbestos cement sewer main extends below the active Sonoma creek, whose channel is up to 20 feet in depth below the top of the creek bank. The main is at a depth of about 14 to 15 feet below ground surface (bgs) at the manholes located at the banks. Liquefaction hazard has been regionally mapped as very high.

Hazard: Lateral spreading potential with possible damage to main and manholes. Asbestos cement pipes are especially vulnerable to ground deformations.

Point 18: The asbestos cement sewer main parallels the active Sonoma creek, whose channel is up to 25 feet in depth below the top of the creek bank. Along the creek, the main is located about 6 feet bgs. Liquefaction hazard has been regionally mapped as very high.

Hazard: Lateral spreading potential with possible damage to main. Asbestos cement pipes are especially vulnerable to ground deformations.

Point 19: The sewer main is supported on two supports over Hooker creek, whose channel is up to 20 feet in depth below the top of the creek bank. Active erosion along the western bank has been observed. Liquefaction hazard has been regionally mapped as very high.

Hazard: Continued bank failure may expose additional length of the sewer main. The older northern support may be vulnerable during a strong shaking. Both supports may be undermined if settlement and/or lateral spreading due to liquefaction occurs.

<u>Point 20</u>: The sewer main extends below the active Fowler creek, whose channel is up to about 10 feet in depth below the top of the creek bank. The main is at a depth of about 9 feet below ground surface (bgs) at the manholes located at the banks. Undermining of the southern side of the sandbag/concrete filled vertical wall on the east bank was observed. Liquefaction hazard has been regionally mapped as very high.

Hazard: Lateral spreading potential with possible damage to main and manholes. Potential failure of wall under significant flooding. Potential of erosion and exposure of main under heavy flows.

<u>Point 21</u>: The sewer main extends below the active Sonoma creek, whose channel is up to 15 feet in depth below the top of the creek bank. The main is at a depth of about 18 feet below ground surface (bgs) at the manhole located at the western bank and 21 feet bgs on manhole located on the eastern bank. Liquefaction hazard has been regionally mapped as very high.

Hazard: Lateral spreading potential with possible damage to main.

<u>Point 22</u>: The sewer main and recycled water line extend below the active Schell creek, whose channel is up to 10 feet in depth below the top of the creek bank. Liquefaction hazard has been regionally mapped as very high.

Hazard: Lateral spreading potential with possible damage to sewer main and recycled water line. This is a critical location for the collection system.

The highest vulnerability to the wastewater collection system is due to seismic events, which also translates to the highest potential cost to the SVCSD. The seismic response of buried pipelines depends on complex interactions between pipelines and adjacent soil. Seismic response is a function of both the imposed ground deformation and the type of pipeline construction.

Buried pipelines are most susceptible to large permanent ground deformations (PGD), such as that from fault rupture, liquefaction, and landslides. For this study, liquefaction-induced PGD are the primary hazards. In addition, pipelines are also impacted by transient ground deformations (TGD) resulting from ground shaking and seismic wave propagation, but to a substantially lesser degree. A majority of SVCSD’s pipes consist of asbestos cement (39%) and vitrified clay pipe (27%), both of which are brittle and especially vulnerable during earthquakes as observed in the Christchurch, NZ earthquakes (O’Rourke et al., 2014).

Depending on the nature of the hazard, wastewater pipelines in the SVCSD study area can be divided into three distinct categories:

- Pipeline creek crossings where lateral spreading may occur. With geotechnical investigations, lateral spreading hazard can be reasonably well constrained, and pipeline damage location can be pinpointed to within a few hundred feet. The locations with potential for the most significant lateral spreading hazard are included in the hazard points described above.
- Pipelines crossing a large but geographically defined area of liquefaction hazard. Damage in terms of number of leaks and breaks as a function of PGD can be estimated using empirical relations. Exact location of damage cannot be pinpointed but would be located within the liquefaction zone. There is significant uncertainty in estimated damage rates.
- Random damage within the pipeline network distributed over the entire study area due to TGD from earthquake shaking. Pipeline damage in terms of likely leaks or breaks is estimated using empirical relations; however, damage rates from ground shaking is generally an order-of-magnitude lower than damage from liquefaction. Exact location of damage cannot be pinpointed but would likely be more frequent in areas of greater shaking. There is significant uncertainty in estimated damage rates.

For distributed hazards, such as PGDs due to liquefaction or TGDs due to shaking, pipeline repair rates were evaluated using the empirical fragility functions for buried pipelines included in the American Lifelines Alliance project (ALA, 2001). They were also compared to empirical fragility functions developed by Professor T. O'Rourke, which estimates larger repair rates for brittle pipes (such as asbestos cement and vitrified clay pipe). The estimated number of repairs for the median and 84^{th} percentile M7 Rodgers Creek event for the SVCSD collection system is shown in Table 19.

The estimated number of repairs include both leaks and breaks. A leak results from the loss of a pipeline's pressure boundary resulting from joint pullout, round or longitudinal crack, local loss of pipe wall, or local tear in the pipe wall. A break is defined as a complete disengagement of the pipe, with sewage flowing from the full cross-section of the pipe. Observations from past earthquakes suggest that leaks are more common, and generally constitute 80 percent to 90 percent of total repairs (Ballantyne, 2008). However, for pipelines at significant stream crossings where lateral spreading occurs, it is more likely that the pipes will break instead of leak, because of large, expected displacements.

There is significant uncertainty associated with the repair rates estimated by the fragility functions. This is due to uncertainties in estimating ground shaking from a single event (as evidenced by the PGA for the 84^{th} percentile event being almost twice as large as the median event), uncertainties in the extent and magnitude of consequences due to ground shaking (e.g., liquefaction), and uncertainties in the fragility functions themselves due to limitations in historical data. Some uncertainty may be mitigated by quantifying the extent and magnitude of deformation associated with liquefaction in the region.

Table 19: Estimated Number of Pipe Repairs – Rodgers Creek M7.0 Median and 84th Percentile Earthquake

	Repairs due to PGD	Repairs due to TGD		Total	
Pipe Type	**Total**	**M7 RC Median**	**M7 RC 84th**	**M7 RC Median**	**M7 RC 84th**
Collection	72 – 100	20 – 51	36 – 211	92 – 150	108 – 311
Trunk Main	23 – 28	2 – 4	4 – 11	25 – 32	27 – 39
I&I Line	7	1 – 2	2 – 5	8 – 9	9 – 12
Total	**102 - 136**	**23 – 56**	**42 – 227**	**125 – 191**	**144 – 363**

Mitigations

The vulnerable areas of the collection system and potential failures due to the hazards have the potential for a significant number of failures. If pipe breaks are identified after an earthquake, flooding, or due to high stream flow, full repair is required before the sewer can be re-used. In contrast, pipes with leaks can be kept in service while repairs are made. The general approach to pipe repair is as follows:

- Identify obvious damage at the surface (i.e., sewage backups, readily seen at the surface). Damage at the surface may happen infrequently, but it is important to investigate and/or notify property owners to report sewage backups to the SVCSD.
- From the WWTP, trace back to find locations where there is no flow. Visual inspection under manholes can often identify no flow conditions.
- Map out locations where manholes have floated. Manholes will float (rise) when the pore pressure exceeds the weight of the manhole for a period of time. This will typically only occur at locations with Very High (or High) liquefaction susceptibility and a high ground water table. At these locations, there will almost certainly be broken pipes attached to the manhole at depth. For a gravity flow system, floated manholes will need to be replaced. Given the available liquefaction maps, and assuming a high magnitude earthquake during ground saturated/high water table conditions, it would be prudent to plan for flotation of manholes. In order to provide a more precise/quantified value of floated manholes, additional assessments will need to be performed using precise manhole weights and geometries and local soil borings.
- Use video cameras to perform a visual inspection of all accessible pipe mains, lower laterals, and upper laterals suspected to be damaged. Start video inspection on all pipes within the mapped High and Very High zones, then proceed to the moderate and low liquefaction zones, respectively.

- At key locations where there is a sewage blockage or broken pipe, isolate the manhole and use pumps and flexible hose to move the sewage between usable manholes.
- Working radially from the WWTP, repair broken pipes and, where initially convenient, repair leaking pipes. Depending on site-specific conditions, leaking pipes might be left in service. Repair crews can be used to expeditiously repair broken pipes first (while leaving the street open), and then ultimately returning to the leaking pipes to make permanent repairs.
- Jet-flush the repaired pipes to clean out accumulated silts and sands and debris. On average, assume 2 flushes per repaired pipe.

Pipe replacement might be the most effective solution if there are a few highly damaged locations. Depending on the type of damage, in-situ repairs such as pipe patches, lining, or pipe bursting could also be effective. Where repairs are made, some common approaches are:

- Install a pipe repair clamp for a small leak or break.
- Replace a short section of damaged pipe (a few feet to one segment) and insert a new length of pipe with collars at each end to make leak-tight joints.
- Replace an entire length of sewer line if there are multiple damage points between two manholes.

Post-earthquake replacement of entire lengths of pipe between manholes can be the most cost-effective strategy if:

- Manholes have floated.
- There are multiple breaks or severe cracking between manholes.
- There are known hydraulic/flow issues in this location, so replacement with a new pipe is already known to be warranted.

While pipe repairs will be satisfactory to return the pipe to service, it will not prevent further damage due to future earthquakes (or large aftershocks). Unless the replacement pipe is seismically designed, the replacement pipe will remain vulnerable to damage in aftershocks or future earthquakes. It is recommended that seismic resistant pipes be installed in the Very High and High liquefaction zones, in areas closest to creek crossings, or where the pipe runs parallel to creeks such that the pipe will not leak or break under a 1% soil strain. Pipe replacements can be installed piece-meal post-earthquake or done prior to future earthquakes as part of a planned pipe replacement program. If replaced as part of a planned pipe replacement program, it is recommended that the liquefaction hazards are first quantified.

4.6.1.2 Pump Stations

Warm Spring Road and Hill Road Pump Stations) at the northern end of the collection system collectively serving less than 20 properties that could be impacted by a significant seismic event.

These are underground reinforced concrete vault structures that are not vulnerable to ground shaking hazard. These structures may be vulnerable to permanent ground deformation hazard, but the risk of liquefaction, liquefaction-induced permanent ground deformations, and landslide at these locations is negligible. Therefore, no significant structural damage for these two pump stations is expected for the median or the 84th percentile M7 Rodgers Creek scenario events. The two pump stations were not accessed as part of this assessment.

Mitigations

It is recommended to have on hand emergency generators to operate critical pump stations following a M7 Rodgers Creek earthquake. After 48 hours, it is reasonable to assume that PG&E power will be restored to most of the pump stations; however, emergency generators may still be needed. Anchorage of all equipment contained in these vaults should be confirmed and provided if lacking.

4.6.2 Wastewater Treatment Plant

The wastewater treatment plant is susceptible to several hazards including seismic, fire, and flooding. The predominant seismic hazard at the WWTP is ground shaking. Because it is generally estimated to be on the order of a few inches or less, differential ground displacements due to liquefaction are considered a secondary hazard. Sections 4.6.2.1 through 4.6.2.7 discuss the vulnerability of the WWTP structures to earthquake hazards. The discussion is organized by treatment phase (primary, secondary, tertiary) and function (solids handling and other buildings). Reclamation reservoirs, including Reservoir R-5 located within WWTP, are discussed in Section 4.6.3 – Recycled Water System.

4.6.2.1 Primary Treatment

WWTP structures that are part of the primary treatment system include the Headworks, Influent-Effluent Pump Station, Grit Chamber, Equalization Basin (4), MCC-5 Building, and MCC-6 Building. The primary treatment structures were evaluated for the median and 84th percent M7 Rodgers Creek scenario following the ASCE 41-17 Tier 1 methodology for the performance levels described in Chapter 4.1. The results are summarized in Table 20 and show that all primary treatment structures were found to meet the BSE-1E and BSE-2E performance objectives.

However, as shown in the table, mitigation is recommended for the MCC-5 and MCC-6 Buildings.

The MCC-5 and MCC-6 buildings are small single-story structures with CMU walls and reinforced concrete roof slabs. Significant water damage, including deterioration of the CMU blocks, was observed at two of the four corners for both buildings. This is possibly due to insufficient drainage provided at the roof. In the present condition, the damage is not critical, but if not addressed, the issue is likely to progress to a structural deficiency. Repair of the damaged CMU blocks does not appear mandatory at present. In their present state, both structures passed the ASCE 41-17 Tier 1 checks for LS and IO performance objectives.

Mitigations

Evaluate the source of water damage and structural degradation of the corner CMU blocks of the MCC-5 and MCC-6 buildings. Develop and implement measures to prevent the water damage from progressing. Evaluate the necessity to repair damaged CMU blocks and implement repairs, as needed.

Table 20: Summary of ASCE 41-17 Evaluation for Primary Treatment Structures

Structure	Meets BSE-1E Performance Objective	Meets BSE-2E Performance Objective	Mitigation Needed
Headworks	Yes	Yes	No
Influent-Effluent Pump Station	Yes	Yes	No
Grit Chamber	Yes	Yes	No
Equalization Basin No. 1	Yes	Yes	No
Equalization Basin No. 2	Yes	Yes	No
Equalization Basin No. 3	Yes	Yes	No
Equalization Basin No. 4	Yes	Yes	No
MCC-5 Building	**Yes**	**Yes**	**Yes**
MCC-6 Building	**Yes**	**Yes**	**Yes**

4.6.2.2 Secondary Treatment

WWTP structures that are part of the secondary treatment system include the A-Basin Flow Control Structure, Aeration Basins (4), Blower Building, Clarifier Flow Split Structure, Secondary Clarifier Nos. 1 and 2, and RAS/WAS Pumping Structure. The secondary treatment structures were evaluated for the median and 84th percent M7 Rodgers Creek scenario following the ASCE 41-17 Tier 1 methodology for the performance levels described in Chapter 4.1.

The results are summarized in Table 21 and shows that all secondary treatment structures were found to meet the BSE-1E and BSE-2E performance objectives. Observations for the structures part of the secondary treatment include:

- The clarifiers were also evaluated following ACI 350.3-06 for hoop stress and found to have a significant factor of safety.
- Possible damage to the central steel tower, baffles, and launders of the Secondary Clarifiers is possible due to water sloshing. This issue is currently being addressed by a seismic retrofit project, as recommended in the 2016 LHMP.

- At the RAS/WAS Pumping structure, minor vertical cracks were observed in the southeast wall at ground level, but overall, the building was observed to be in good condition.

Table 21: Summary of ASCE 41-17 Evaluation for Secondary Treatment Structures

Structure	Meets BSE-1E Performance Objective	Meets BSE-2E Performance Objective	Mitigation Needed
A-Basin Flow Control Structure	Yes	Yes	No
Aeration Basins (4)	Yes	Yes	No
Blower Building	Yes	Yes	No
Clarifier Flow Split Structure	Yes	Yes	No
Secondary Clarifier No. 1	Yes	Yes	No
Secondary Clarifier No. 2	Yes	Yes	No
RAS/WAS Pumping Structure	Yes	Yes	No

4.6.2.3 Tertiary Treatment

WWTP structures that are part of the tertiary treatment system include the Filter Influent Structure, Head Box, Tertiary Filters, and Filter Control & Instrumentation. Additionally, the disinfection system, which consists of the Chlorine Contact Basins, Chlorine Scrubber Tank, Chlorine Storage & Chlorination, and NaOH Polymer Storage Tanks are also part of the tertiary treatment. One of the most hazardous materials in the wastewater system is chlorine. Chlorine is used for disinfection, and sulfur dioxide is used to neutralize the chlorine before the treated water is discharged into the waterways.

The disinfection system at the Sonoma Valley WWTP includes piping, contact tanks, vessels, equipment, and support structures. The chlorine is stored in "one-ton" containers. One of the key concerns for storing chlorine is the potential of the storage containers (vessels) to dislodge or move during earthquake motions, resulting in failure of the valve(s) on the containers, and thereby discharging an unrestricted amount of chlorine gas into the atmosphere. Two failure mechanisms of concern:

- Rolling of the horizontal one-ton containers in a manner that could damage the outlet nozzle/valve (or secondarily, the hoses attached to the outlet nozzle)
- Based on accounts from water and wastewater treatment plants after earthquakes, the following observations were made with regards to preventing failure mechanisms of the chlorine containers: where one-ton containers are used, most (but not all) containers are strapped down to prevent slippage under earthquake motions. In Concepcion, Chile, the chlorine containers were not tied down, and thus moved sideways during sufficiently strong ground shaking. The water treatment plant was exposed to strong

shaking from a nearby M8.8 subduction zone earthquake in February 2010 (PGA at the WWTP was about 0.3g, with over 60 seconds of string shaking). Even so, there was no damage to coiled pigtail attached pipes, and the plant manager reported that no chlorine was released.

There are other ways for the chlorine system to fail, notably between the pigtail hoses (from the containers) into the chlorinators/mixing systems, as well as in the various small diameter pipes that connect to various chemical injection points throughout the WWTP. On May 21, 2014, Mr. Brian Anderson of the SVCSD reported that the chlorine lines at the WWTP shut off immediately when vacuum pressure is not maintained. Furthermore, if there are leaks/damage to the equipment or pipes, the chlorine is by that time in a liquid state and diluted. Once a liquid and diluted, the chlorine does not have the immediate life safety consequences as if the chlorine gas is released directly from the containers.

Other potential failure modes would be the collapse (or severe distortion) of the buildings that house the chlorine containers/equipment; or the failure of the equipment/process when the chlorine containers were being handled by lifting devices (overhead cranes, etc.).

Myers (1999) conducted a seismic evaluation for the Chlorine Storage Building as part of the CalARP Program and concluded that the typical off-loading steel frame for the one-ton containers has a margin of safety of about 1.1 for PGA = 0.4g, similar to the PGA estimate for the median Rodger's Creek earthquake. Myers (1999) assumed that the frame is only loaded about 7 hours per month (7 hours per 700 hours) and therefore had a low probability of failure.

The tertiary treatment structures were evaluated for the median and 84th percent M7 Rodgers Creek scenario following the ASCE 41-17 Tier 1 methodology for the performance levels described in Chapter 4.1. The results are summarized in Table 22 and show that all structures are expected to meet the BSE-1E and BSE-2E performance objectives for the median and 84th M7 percentile Rodgers Creek scenario earthquake.

Mitigations

Restrain all containers (used and unused) in the Chlorine Storage building. Straps should fit snugly so that there is little room for the containers to move.

Table 22: Summary of ASCE 41-17 Evaluation for Tertiary Treatment Structures

Structure	Meets BSE-1E Performance Objective	Meets BSE-2E Performance Objective	Mitigation Needed
Filter Influent Structure	Yes	Yes	No
Head Box	Yes	Yes	No
Tertiary Filters	Yes	Yes	No

Filter Control & Instrumentation	Yes	Yes	No
Chlorine Contact Basins	Yes	Yes	No
Chlorine Scrubber Tank	Yes	Yes	No
Chlorine Storage & Chlorination	**Yes**	**Yes**	**Yes**
NaOH Polymer Storage Tanks	Yes	Yes	No

4.6.2.4 Solids Handling and Disposal

The solids handling and disposal system consists of the Screw Press Building and Gravity Thickener. The Screw Press Building appears to be a post-2000 structure and was updated in 2014 using the 2010 California Building Code (CBC). Lateral forces are resisted through moment frame action in one direction and through braced frame action in the other direction.

The Screw Press Building and Gravity Thickener structures were observed to be in good and fair condition, respectively, and were found to meet the ASCE 41-17 Tier 1 checks for LS and IO performance objectives. No mitigations are recommended for the Screw Press Building.

For the Gravity Thickener, no mitigations are recommended for the reinforced concrete structure, but mitigation is recommended for the mechanical components, which are susceptible to damage due to sloshing. Significant sloshing of at least one to four feet is expected for BSE-1E and BSE-2E hazard levels. Additionally, evidence of corrosion of the scum skimmer and the supporting structure was observed.

Mitigations

Evaluate and implement a seismic retrofit program for the Gravity Thickener mechanical components, like that currently underway for the Secondary Clarifiers as was recommended in the 2016 LHMP.

4.6.2.5 Other WWTP Structures

The WWTP Facility includes several buildings and structures that are required for the operation of the WWTP but serve more than one function and are therefore not generally grouped with any single treatment phase or function. These structures include the Administration Building, the Maintenance Building, No. 2 Water Building, No. 2 Water Well, Rainwater Runoff Control, Storage Building, Zeta Floc & Metal Solve Tanks, and Photovoltaic Panels and Inverters. These WWTP structures were evaluated for the median and 84th percent Rodgers Creek M7 scenario following the methodology in ASCE 41-17 for the performance levels described in Chapter 4.1.

The results are summarized in Table 23 and show that, except for the Dewatering Utility & Storage Building and Zeta Floc & Metal Solve Tanks, all structures in this category are expected to meet the BSE-1E and BSE-2E performance objectives for the median and 84th percentile M7 Rodgers Creek scenario earthquake. Mitigations are recommended for Zeta Floc & Metal Solve Tanks.

Table 23: Summary of ASCE 41-17 Evaluation for Other WWTP Structures

Structure	Meets BSE-1E Performance Objective	Meets BSE-2E Performance Objective	Mitigation Needed
Administration Building	Yes	Yes	No
Maintenance Building	Yes	Yes	No
No.2 Water Building	Yes	Yes	No
No.2 Water Well	Yes	Yes	No
Generator Room	Yes	Yes	No
No.3 Water Pump Room	Yes	Yes	No
Storage Building (Blue Room)	Yes	Yes	No
Photovoltaic Inverters	Yes	Yes	No
Photovoltaic Panels	Yes	Yes	No
Storage Building (Unused)	Yes	Yes	No
Motor Control Center	Yes	Yes	No
Switch Board 2	Yes	Yes	No
Transformer	Yes	Yes	No
Dewatering Utility & Storage Building	**No**	**No**	**No**
8000 Gal. Diesel Storage	Yes	Yes	No
Zeta Floc & Metal Solve Tanks	**No**	**No**	**Yes**

4.6.2.6 Dewatering Utility & Storage Building

The Dewatering Utility & Storage Building is a single-story structure with CMU walls and a wood truss roof. Pumps are contained in the below-ground reinforced concrete section of the building.

The building does not pass the ASCE 41-17 Tier 1 minimum reinforcement check, although the calculated total $\rho = 0.0018$ is close to the minimum required $\rho_{min} = 0.002$. The structure meets all other Tier 1 checks for LS and IO performance objectives. Additional Tier 2 calculations were completed to confirm that the wall has sufficient out-of-plane bending capacity. Despite having slightly insufficient reinforcement in the walls, the structure has sufficient capacity to meet all other Tier 1 and Tier 2 requirements for the LS and IO performance objectives. Therefore, no mitigations are recommended for the Dewatering Utility & Storage Building.

4.6.2.7 Zeta Floc & Metal Solve Tanks

The Zeta Floc & Metal Solve polymer tanks are restrained against uplift by metal cables that are anchored to the foundation slab on which the tanks are located. However, there are no restraints at the base against sliding. There is, therefore, a significant risk of damage at pipe connections to these tanks due to sliding in an earthquake, which can lead to a hazardous spill. This would be a life safety hazard to people in the vicinity and would impact operations.

Mitigations

Install four equally spaced metal brackets anchored to the foundation slab at the base of each Zeta Floc & Metal Solve polymer tank to prevent sliding and damage at pipe connections.

4.6.2.8 Buried Piping at the WWTP

Figure 9 shows a detail of the western portion of the plant and some of the buried piping. Figure 10 shows pipe in a concrete vault. Figures 11 and 12 highlight some pipes at the WWTP with flexible connections just outside concrete tanks.

It appears that the general style of pipes used at the WWTP are welded steel (possibly cement-lined), using bolted connections for valves, and with dresser couplings used occasionally where pipes enter/exit concrete tanks. As indicated by drawings, other pipes used within the WWTP range from small diameter (4 to 8 inches) cast iron cement mortar (CIP-C) or glass lined (CIP-GL) pipes to larger diameter (15 to 42 inches) reinforced concrete (RCP) and steel cement lined and coated pipes (SCLC). At least one of the 21-inch diameter pipes is an asbestos cement pipe (ACP), which are brittle and especially vulnerable during earthquakes. Due to a lack of available records and calculations for the original WWTP design, it cannot be ascertained that any of the buried piping was specifically designed to handle earthquake loads.

Vulnerabilities

Buried pipe may experience leakage due to the median and 84th percentile M7 Rodgers Creek scenario earthquakes. Particularly vulnerable sections include pipes that have become distressed due to corrosion (internal or external), have construction defects (like improper welds), or are exposed to much more than about an inch of sharp-edged differential settlements (where pipes enter concrete tanks).

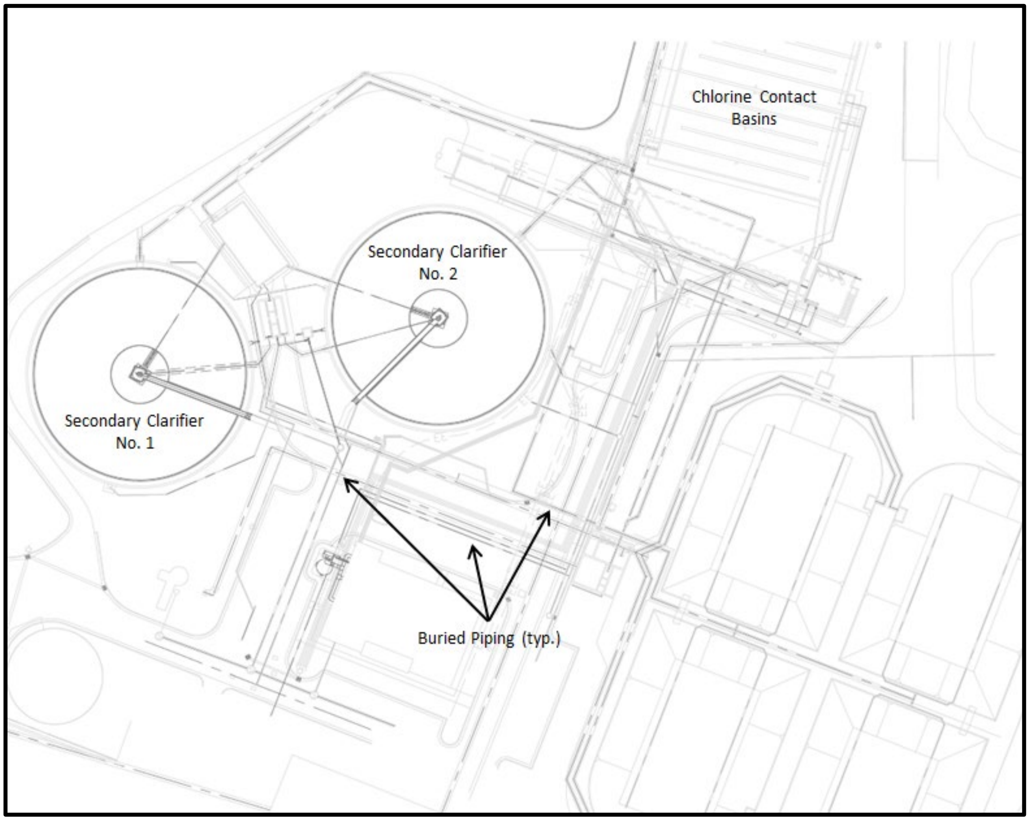

Figure 9: Partial Site Plan Showing Buried Piping - (Source: Sonoma Water CAD/GIS Application Gallery – September 2016)

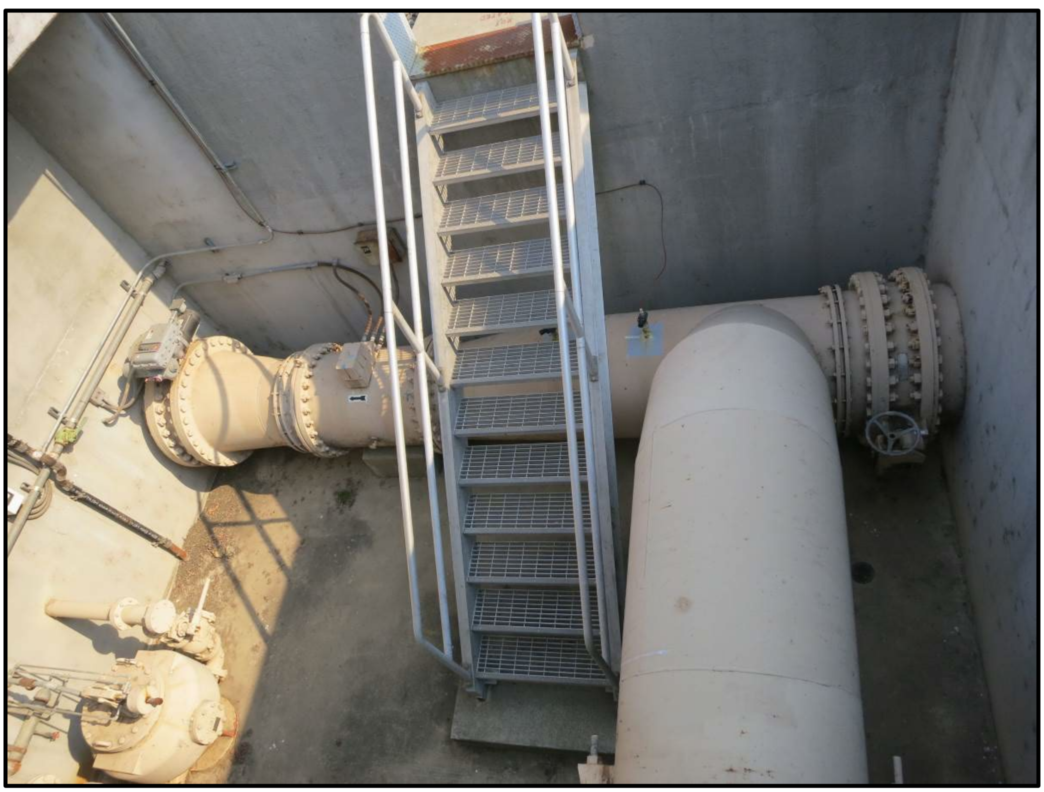

Figure 10: Buried Piping for Aeration Basins - (Source: SVCSD WWTP – September 2016)

There remains a relatively low probability that the PGAs corresponding to median and 84th percentile M7 Rodgers Creek scenario earthquakes result in differential displacements exceeding an inch between some of the concrete tanks/structures and the surrounding soil. Various geotechnical studies for the site have indicated that the site will not experience liquefaction-related lateral spreading but might experience differential displacement on the order of one inch.

Given these issues, there might be a pipe failure at the WWTP site for the median or 84th percentile M7 Rodgers Creek scenario earthquakes, but there is insufficient information to highlight the specific location where this might occur. The pipe failure could manifest itself in imposed distortions on a valve (like on the right side of Figure 9), such that the valve becomes inoperable.

Mitigations

Given the relatively low chance of pipeline damage at the plant and the uncertainty of specific locations, pre-earthquake mitigations to the buried large bore conveyance pipes at the plant are not recommended. Rather, a more prudent approach may be to have an emergency response plan that factors in that there might be the need to mobilize a pipe repair crew that could make a repair within 24 hours. Assuming the causative earthquake is a M7 Rodgers Creek earthquake, there will be lots of other pipe damage in Sonoma County (as well as other parts of the greater Bay Area), so having a pre-set agreement to mobilize pipe repair crews will be beneficial. Access to crews via mutual aid from other lesser-impacted agencies in the Bay Area (in the Bay Area, only the East Bay Municipal Utility District (EBMUD) has a large in-house crew capable of repairing 24" to 48" steel pipe; in Southern California, the Metropolitan Water District of Southern California can roll spare pipe to any size diameter) is also an option. It is unlikely there will be a need to replace any steel pipe, but in making repairs, having the ability to roll steel shapes will likely be needed. Larger pipe contractors might have this capability, but from a planning perspective, SVCSD should assume that there will be much more demand for their services than normal. To mitigate potential need for fabrication, it is recommended that the SVCSD pre-purchase a few spare pipe segments, butt straps, repair couplings (clamps), flange couple adaptors (FCA), dismantling joints, and establish a procedure for rapid mobilization for repair crews. The advantage of repair couplings or clamps over butt straps for steel pipes is that they are secured in place with bolts such that no field welding is required.

Another potential repair technique is the use of interior rubber seals (e.g., HydraTite or Weko-Seal), which are secured in place by steel retaining bands. Installation of such rubber seals require entry inside the pipe and is possible for pipe diameters of at least 30 inches. Rubber seals are compatible with nearly all pipe types.

Possible repair techniques for the asbestos cement pipe include cure-in-place (CIPP) and spray-in-place (SIPP), which install a coating on the interior of the existing pipe.

It is recommended that 1) an inventory of WWTP pipelines is created, 2) optimal repair techniques specific to the pipe types and sizes are identified, and 3) appropriate materials are stockpiled and crews are trained to implement the selected repair techniques. Some repair methods may require specialized contractors; therefore, advance communication and, if possible, contractual agreement is recommended.

Figure 11: Attached Piping for A-Basin Flow Control Structure (Source: SVCSD WWTP – September 2016)

Figure 12: Flexible Connections (Source: SVCSD WWTP – September 2016)

4.6.2.9 Housekeeping

Under the term "housekeeping," two types of seismic issues are addressed:

- Equipment with inadequate anchorage/restraint and whose failure would impact plant operations (e.g., switchgear).
- Items with inadequate anchorage/restraint and whose failure might result in some losses, but unlikely to impact plant operations (e.g., storage cabinets, suspended ceilings over office areas).

It is recommended to make an inventory of and restrain housekeeping items.

4.6.3 Recycled Water System

The recycled water system includes the reclamation reservoirs, recycled water pipeline, pump stations, and electrical buildings.

4.6.3.1 Reclamation Reservoirs

The SVCSD reclamation system includes five storage reservoirs, including two reservoirs (R-1 & R-2) that are under the jurisdiction of the California Division of Safety of Dams (DSOD). DSOD makes periodic inspections and most recently completed inspections and report in 2020 of R-1 and R-2. The following are DSOD and current observations:

- Reservoir R-1 (West). Based on the DSOD (2020) report, the dam and appurtenances are very well maintained by the SCWA, and no work other than regularly scheduled maintenance is required at this time. From the known information and visual inspection, the dam, reservoir and the appurtenances are judged safe for continued use.
- Reservoir R-2 (East). Based on the DSOD (2020) report, the dam and appurtenances are very well maintained by the SCWA, and no work other than regularly scheduled maintenance is required at this time. From the known information and visual inspection, the dam, reservoir, and the appurtenances are judged safe for continued use.
- Reservoir R-3. Reservoir R-3 is currently not being used. If it is returned to service, it should be assessed prior to being put into service.
- Reservoir R-4. The dam and appurtenances are very well maintained by the SCWA, and no work other than regularly scheduled maintenance is required at this time. From the known information and visual inspection in 2016, the dam, reservoir, and the appurtenances are judged safe for continued use. The R-4 Pump Station consisting of a small single-story CMU structure was observed to be in good condition and passed the ASCE 41-17 Tier 1 checks for LS and IO performance objectives.
- Reservoir R-5 (at WWTP). The dam and appurtenances are very well maintained by the SCWA, and no work other than regularly scheduled maintenance is required at this time. From the known information and visual inspection in 2021, the dam, reservoir and the appurtenances are judged safe for continued use. The Motor Control Center adjacent to Reservoir R-5 includes a steel canopy structure that consists of a steel frame canopy supported by four square closed shape steel columns, each anchored to the foundation with four ¾" bolts. The electrical cabinets are anchored to the foundation slab. No significant structural damage is expected to the Motor Control Center for the median or 84th percentile scenario earthquakes.

Vulnerabilities

The seismic slope stability of the in-use reservoirs was evaluated for the median and 84th percentile M7 Rodgers Creek using the slope stability software, Slide2 by RocScience, and ground surface elevation from recently collected high resolution LiDAR (Sonoma County, 2016). For R-1, R-2, and R-5, soil properties were based on geotechnical investigations previously conducted by others. The investigations were located along the perimeter of the reservoirs and provide sufficient coverage to adequately characterize the slopes and subsurface conditions. For R-4, only borings along the recycled water pipeline were available and were assumed to be characteristic of the subsurface conditions of R-4. However, regional geologic mapping shows that the southwestern portion of R-4 may potentially be underlain by thin layers of young bay mud.

Geotechnical investigations of R-4 have been completed in the past, and it is recommended that these investigations are located to confirm subsurface conditions.

The evaluation showed that the in-use reservoirs would not experience significant seismic displacements under the median and 84th percentile M7 Rodgers Creek events. Depending on the height of the water in the reservoirs, some sloshing and spillage of water may occur. Additionally, cracking may be observed following an earthquake, but a breach failure leading to uncontrolled release of water is unlikely. Following an earthquake, SVCSD should inspect all in-use reservoirs for any leaks or cracks.

The largest potential risk is failure of the pipelines to/from the reservoirs. As these pipelines deliver only tertiary treated water, their failure would normally not impose any public health (sewage) issues, but release of high volumes of water could still create inundation and erosion risks. From a seismic planning point of view, in case of damage to these pipes, it might be possible that SVCSD could likely safely discharge tertiary-treated water into receiving waters, and then make repairs. No significant damage to the reservoirs or pipeline connections is expected for the median or 84th percentile earthquakes.

Mitigations

None recommended.

4.6.3.2 Recycled Water Pipeline

Hazards to the recycled water pipelines are generally directly related to the after-effects of seismic events and floods. The existing recycled water pipeline network was evaluated for the median and 84th percentile M7 Rodgers Creek event following a similar method to the collection system.

The recycled water pipeline network primarily consists of PVC pipes, which are generally more flexible and perform better in earthquakes than brittle pipes such as asbestos cement and vitrified clay pipes (O'Rourke et al., 2014). A total of 8 repairs are estimated for the recycled water pipelines. As with the collection system, these repair estimates consist of both breaks and leaks, with leaks generally constituting 80 percent to 90 percent of total repairs. The most vulnerable segments are the recycled water lines from the Watmaugh Road East to WWTP pipeline that cross zones of high liquefaction hazard and the segment that parallels Schell Creek between the Septic Truck Discharge Box and the Effluent Meter Pit in the WWTP.

Additionally, the WWTP to the Outfall Slough pipeline consists of more vulnerable reinforced concrete pipe.

Constructed in 1959, this segment is over 60 years old, unlined, and has been reported by SVCSD to show signs of deterioration. Although the segment is mapped adjacent to (and not on) an area of very high liquefaction susceptibility, the combination of potential for differential movement due to the difference in liquefaction susceptibility, limitations at this scale due to the regional nature of the mapping, and historic observations of deterioration, this segment is identified as a vulnerable segment.

The recycled water lines from the WWTP to the 5th Street East pipeline cross several zones of high and very high liquefaction hazard. The recycled water lines from the WWTP to the Schell and Napa Sloughs are characterized by moderate and lower liquefaction hazard, except at the Huichica Creek crossing, which has been regionally mapped as having very high liquefaction hazard. Geotechnical investigations and evaluations by others for the recycled water pipe from the WWTP to the Napa Slough show that a few borings encountered soils that may be susceptible to liquefaction. However, the estimated deformations due to liquefaction are relatively small (less than two inches), and damage to this segment of the recycled water pipe would likely be primarily due to ground shaking.

Although the 5th St East segment of the recycled water pipeline crosses Nathanson creek, drawings show that that the pipe begins angling downwards at least 160 feet from the crossing and is buried approximately 13 feet below the creek bottom. If lateral spreading occurs at the creek, it is unlikely to significantly impact the pipe. Similarly, at the Huichica creek crossing, drawings show that the recycled water pipe is buried at least 10 feet deep and is unlikely to be significantly impacted by lateral spreading, if it occurs.

Mitigations

The vulnerable areas of the recycled water pipelines system and potential failures due to the hazards have the potential for a minor number of failures. If pipe breaks are identified after an earthquake, full repair is required before the recycled water line can be re-used. In contrast, pipes with leaks can be kept in service while repairs are made. The general approach to pipe repair is like that of the collection system.

4.6.3.3 Structures

The structures within the recycled water system include the Mulas Booster Station BP-B1 and an electrical building at the Napa Slough outfall. The structures were evaluated following the ASCE 41-17 Tier 1 checks, with results showing that the structures met the BSE-1E and BSE-2E performance objectives.

Mitigations

No mitigations are recommended for these structures.

4.6.4 Emergency Response

Pipes may be damaged in the collection system due to liquefaction. The segments most likely to be damaged are the ones located adjacent to or over stream crossings. There are options available for emergency response of critical sewer mains, including:

- Using portable pumps and flexible bypass hoses around broken pipes while repairs are made.
- Stockpiling hard HDPE and/or PVC pipes for replacement of broken sections. The trunk mains at the stream crossings are generally large (12-inch diameter and greater).
- For small diameter breaks on the non-trunk mains, a vacuum truck may be used to collect sewage that may be transported to the WWTP.

Vulnerable critical locations (numbers are based on figures in Appendix A) and their lengths are listed in Table 24. In the table, the “Length” column signifies the length of emergency bypass hose that may be needed at each location. For the locations listed in Table 24, the manholes immediately adjacent to the stream crossings are in potential lateral spread zones. Therefore, the lengths were based on the second nearest manhole on either side of the bank, with some additional lengths to account for elevation changes as well as potential need to bypass any obstructions. The locations in Table 24 consider both consequence of failure as well as hazard and are listed in decreasing risk (i.e., Hazard Point 22 is considered the most critical location). It is recommended that the SVCSD have on hand at least two sets of portable pumps and suitable lengths of large diameter hose as defined in Table 24 so that emergency bypass around broken pipes can be made.

Table 24: Critical Locations in Decreasing Priority

Hazard Point	Diameter (in)	Length (ft)	Notes
22	42	600	This is the only trunk main that transports all materials to the WWTP.
20 or 21	12	750	The trunk main is the only trunk main for the Temelec community. It assumed that one of these points may fail. The 750 feet length corresponds to the longer of the two lengths.

18 and 19	18	2,300	This is a very significant length. However, it is a critical location for the Eldridge and Glen Ellen communities.
4	18	700	This is the only trunk main that servers the Eldridge community.
17	18	750	This is the singular trunk main that serves the Glen Ellen community. However, upstream of this location, there are multiple other stream crossings and thus, this one may not make sense to plan for.
9	18 and 15	800	This is some redundancy here (with the non-trunk main), though it is over the same stream crossing. This is a critical location for the El Verano community.

It is not feasible for the District to store the long lengths of different diameter pipes. Currently, only a few of feet of both flexible and rigid pipes, couplings and repairs clamps are stored on hand for the most common pipe sizes (8” and 12”).

Also, as mentioned earlier in Chapter 3, the District via Sonoma Water is currently participating in the following programs to ensure resources are available during an emergency:

- Water Contractors Mutual Aid and Assistance Program (MAAP) (under development):

  Local mutual aid relationship with Sonoma Water’s retailers who can provide additional equipment and personnel to assist in repair, mitigation, and maintenance efforts of the water and wastewater systems and can assist in alleviating an emergency’s impact on the public.

- CalWARN (California Water/Wastewater Agency Response Network):

  State mutual aid relationship with a network of water/wastewater utility providers who can mobilize resources to the incident area upon request. CalWARN coordinates with California Office of Emergency Services (CalOES), Department of Public Health, Department of Water Resources, American Water Works Association, and California Utility Emergency Association (CUEA).

5. Mitigation Goals, Objectives, and Actions

SVCSD is directly responsible for providing wastewater sanitation services to over 42,000 people in the Sonoma Valley portion of the North Bay Area. The SVCSD is the sole entity providing public wastewater collection, treatment, solid waste disposal, and reclamation services for the City of Sonoma and numerous unincorporated communities within Sonoma Valley. The public relies on the domestic and industrial sanitation services supplied by the SVCSD to be functional in both emergency and non-emergency circumstances.

The SVCSD's facilities stretch over an area of multiple natural hazards, and the system has a range of vulnerabilities to these hazards. Damage to one or more critical elements of the facilities may impact the SVCSD's ability to provide continuous sanitation services during and following a natural disaster, which may compromise public health and safety as well as pose environmental risks.

The SVCSD takes this responsibility seriously and has developed this plan to systematically address the vulnerabilities of its sanitation and reclamation systems. In this capacity, the SVCSD's goals are in line with the goals of the community as addressed in the Sonoma County (County) hazard mitigation plan. The County's main goals are to reduce the vulnerability of people and property exposed to earthquake, landslide, flood, and wild-land fire hazards. One of the approaches identified by the County for meeting these goals is to promote the implementation of disaster mitigation projects and to increase disaster resistance and reliability. Keeping in view the desires of the community, as expressed in the County's plan and the understanding of the system vulnerabilities, the SVCSD has formulated the following four main goals:

- **Goal 1**: Increase organizational efficiencies and effectiveness when responding to natural disasters
- **Goal 2**: Increase reliability of the treatment system capabilities during and after natural disasters
- **Goal 3:** Increase reliability of the wastewater collection system to maintain conveyance capabilities during and after natural disasters
- **Goal 4:** Increase reliability of the recycled water system to maintain conveyance and containment capabilities during and after natural disasters

Based on the insights obtained from a system-wide natural hazard reliability assessment of the SVCSD's facilities, a series of goals, objectives, and mitigation actions are included in this plan to form the basis of a hazard mitigation strategy. The identified goals and objectives are intended to enhance system reliability, emergency response, and overall operational resilience in the face of potential risks to public health and safety and the environment from specific hazards and system vulnerabilities associated with the SVCSD's facilities. For each goal, objectives that more specifically address areas of mitigation opportunity have been developed along with related mitigation actions that support implementation of those objectives.

Goal 1: Increase organizational efficiencies and effectiveness when responding to natural disasters

<u>Objective 1.1</u>: Develop an emergency response and recovery plan that addresses widespread damage and limited sanitation functions including a damage assessment process and restoration of collection, treatment and reclamation capabilities.

<u>Mitigation Actions</u>:

1.1.1 Develop SVCSD-specific measures to include in an integrated Sonoma County Water Agency emergency response (immediate, short-term, and long-term) and recovery plan for sanitation and reclamation operations.

1.1.2 Establish emergency on-call contracts with contractors and suppliers for rapid response and delivery in an emergency.

1.1.3 Develop formal mutual aid contracts with other municipalities in the region and state.

<u>Objective 1.2</u>: Invest in Supervisory Control and Data Acquisition (SCADA) infrastructure upgrades which will allow operators to quickly identify and respond to issues during and after natural disasters.

<u>Mitigation Actions</u>:

1.2.1 Enhance the reliability of SCADA operations by upgrading network hardware, computer hardware, and radio hardware.

<u>Objective 1.3</u>: Obtain emergency response equipment to enhance the SVCSD's ability to restore service after a natural disaster.

<u>Mitigation Actions</u>:

1.3.1 Obtain flexible hoses, emergency pumps, generators, pipe clamps, and related emergency response equipment to enhance the SVCSD's ability to restore service in the collection system after a natural disaster.

1.3.2 Evaluate the feasibility of and, if needed, obtain battery storage to keep the solar farm in operation after a natural disaster.

Goal 2: Increase reliability of the treatment system capabilities during and after natural disasters

<u>Objective 2.1</u>: Develop and implement a strategy to mitigate the potential effects of earthquakes.

<u>Mitigation Actions</u>:

2.1.1 Develop an inventory of and seismically restrain/anchor miscellaneous equipment at the treatment plant.

2.1.2 Seismically retrofit clarifiers.

2.1.3 Assess the source of water damage to MCC-5 and MCC-6 Buildings and repair as needed.

2.1.4 Provide sliding restraints to Zeta Floc & Metal Solve polymer tanks.

2.1.5 Strap down unused one-ton containers in the Chlorine Storage building to prevent movement.

2.1.6 Develop an inventory of pipelines at the WWTP, select optimal repair techniques for each pipe type and size, stockpile materials, train crews, and/or establish contractual agreements with specialized contractors.

2.1.7 Seismically retrofit the mechanical components of the gravity thickener.

Objective 2.2: Develop and implement a strategy to mitigate the potential effects of flooding.

Mitigation Actions:

2.2.1 Evaluate and, if needed, design and mitigate flood hazard to SVCSD facilities located in the 100-year floodplain.

Goal 3: Increase reliability of the wastewater collection system to maintain conveyance capabilities during and after natural disasters

Objective 3.1: Develop and implement a design strategy to mitigate the effects of earthquakes in areas of potential liquefaction or significant differential movement.

Mitigation Actions:

3.1.1 Not used.

3.1.2 Evaluate and, if needed, design and mitigate the liquefaction hazard to the trunk main in areas that have very high to high liquefaction potential.

3.1.3 Evaluate and, if needed, design and mitigate the liquefaction hazard to the collection system (non-trunk) in areas that have very high to high liquefaction potential.

3.1.4 Evaluate and, if needed, design and mitigate the liquefaction hazard to the trunk main in areas that have moderate liquefaction potential.

3.1.5 Evaluate and, if needed, design and mitigate the liquefaction hazard to the collection system non-trunk in areas that have moderate liquefaction potential.

3.1.6 Update District Sanitation Standards to address liquefaction potential along the collection system.

3.1.7 Conduct site-specific studies to better evaluate seismic related vulnerabilities and further define the scope of capital project mitigation actions.

3.1.8 Evaluate and, if needed, design and mitigate the seismic hazard to the trunk main at the Sonoma Creek crossing at Madrone Road.

3.1.9 Evaluate and, if needed, design and mitigate the seismic hazard to the collection system at the Sonoma Creek crossing at Agua Caliente Road.

3.1.10 Evaluate and, if needed, design and mitigate the seismic hazard to the trunk main at the Sonoma Creek crossing near Riverside Road/W. Napa Street.

3.1.11 Seismically retrofit chlorine building including chlorinators, piping, and rail system.

3.1.12 Seismically retrofit suspended ceiling over office area and water quality lab.

3.1.13 Quantify liquefaction hazards in areas of Moderate, High, and Very High liquefaction susceptibility along the collection system pipelines.

3.1.14 Evaluate and, if needed, design and mitigate the liquefaction hazard to the trunk main at the Schell Creek crossing.

3.1.15 Evaluate and, if needed, design and mitigate the seismic/flood-related damage to the trunk main at Hooker Creek.

3.1.16 Evaluate and, if needed, design and mitigate the liquefaction hazard to the trunk main along Sonoma Creek between Madrone Road and Hooker Creek.

3.1.17 Evaluate and, if needed, design and mitigate the liquefaction and/or high stream flow hazard to the trunk main at the Fowler Creek crossing west of the WWTP.

3.1.18 Evaluate and, if needed, design and mitigate the liquefaction hazard to the trunk main at the Sonoma Creek crossing west of the WWTP.

Objective 3.2: Develop and implement a strategy to mitigate the potential effects of landslides.

Mitigation Actions:

3.2.1 Evaluate and, if needed, design and mitigate the effects of landslides, high stream flows, and liquefaction on portions of the collection system along Sonoma Creek in the vicinity of Arnold Drive in Glen Ellen.

3.2.2 Evaluate and, if needed, design and mitigate the effects of a landslide along Buena Vista Avenue.

3.2.3 Evaluate and, if needed, design and mitigate the effects of a landslide on the trunk main at the Sonoma Creek crossing near Riverside Road/W. Napa Street.

Objective 3.3: Develop and implement a design strategy to minimize the potential effects of storms and flooding.

Mitigation Actions:

3.3.1 Not used.

3.3.2 Evaluate and, if needed, design and mitigate the effects of high stream flows on the collection system for the Lilley Creek crossing at West Thompson Avenue.

3.3.3 Evaluate and, if needed, design and mitigate the effects of high stream flows on the collection system for the Nathanson Creek crossings at France Street, Chase Street, MacArthur Street, and other identified creek crossing concern areas.

3.3.4 Evaluate and, if needed, design and mitigate the effects of storm water inflow and infiltration on the collection system during significant rainstorms.

Objective 3.4: Develop and implement a design strategy to minimize the potential effects of wild-land fire.

Mitigation Actions:

3.4.1 Develop and implement a design strategy to mitigate the effects of wild-land fire on critical facilities.

3.4.2 Develop and implement a post-fire inspection plan system-wide.

3.4.3 Develop and implement a post-fire capping plan for exposed sewer laterals.

Goal 4: Increase reliability of the recycled water system to maintain conveyance and containment capabilities during and after natural disasters

Objective 4.1: Develop and implement a design strategy to minimize the potential effects of climate change*.

* Sonoma Water is developing a Climate Adaptation Plan (CAP) to guide the assessment of climate risks to water supply, sanitation (including SVCSD), and flood management infrastructure and operations, and to serve as a roadmap for developing, evaluating, and implementing adaptation strategies to improve the resilience of its systems. Sanitation system adaptation concepts in CAP include various types of responses and mechanisms to address the risks, ranging from major system efficiency improvements to planning and policy. The CAP actions listed at the bottom of Table 25 are a placeholder for now. These actions serve as a placeholder and will be prioritized and incorporated as Tier 1 or Tier 2 actions in the next LHMP update, when the CAP is finalized.

Mitigation Actions:

4.1.1 Develop and implement an operational strategy to mitigate the effects of climate change to the outfall pipe and other discharge points.

Objective 4.2: Develop and implement a design strategy to minimize the potential effects of earthquakes.

Mitigation Actions:

4.2.1 Evaluate and, if needed, design and mitigate the liquefaction hazard to the recycled water pipeline at the western Schell Creek crossing at the WWTP.

4.1.2 Replace the WWTP to Slough Outfall pipe.

6. Plan Implementation

The SVCSD believes that the hazard mitigation upgrades and safe operations of its systems will be accomplished most effectively with an implementation strategy in which the most significant vulnerabilities and those with the highest probability of occurrence are mitigated first, followed systematically by vulnerabilities of less significance and/or lower probability. Adding to that principle, however, the SVCSD also believes that opportunities to address vulnerabilities that can be mitigated efficiently in conjunction with other necessary upgrades, planned maintenance work, or current pursuits should be included among first-tier mitigation priorities. Mitigation of newly identified vulnerabilities—based on new or refined information—should be prioritized similarly and addressed as resources are available. Continued improvement in the reliability of the system and responsiveness to natural disasters is expected to be a key outcome of this approach. We have indicated on Table 25 which mitigation actions are new actions/projects. Some actions also moved to a higher or lower priority based on the risk assessment performed during this update.

Prioritization of actions that support the SVCSD's mitigation goals and objectives is based upon qualitative categorization of planning level benefit/cost (pro/con) assessments of the individual mitigation actions identified in Chapter 5. The prioritization method did not change from the 2016 LHMP, and the District's priorities are consistent with the 2016 LHMP as well. Key factors that were considered in the development of the benefit/cost assessment included:

- **Significance of impact**. For example, a potential break along the trunk main which serves the whole SVCSD would have a more significant impact (number of people affected and risk to public health and safety) than a smaller diameter collection pipe serving a limited area.
- **Likelihood of failure**. For example, more damage is likely to occur in areas of very high liquefaction potential near waterways than areas with moderate liquefaction potential far from waterways.
- **Cost to implement**. Mitigations actions that are relatively low cost to implement will increase the overall benefit/cost assessment. For example, anchorage of critical equipment is considered a high priority because of the relatively low cost of installing anchors compared to the overall benefits. Mitigation actions that address hazards having high significance of impact or high likelihood of failure will increase its overall benefit/cost assessment. However, additional considerations that may also influence the benefit/cost assessment of individual mitigation actions could include factors such as:
    - Opportunities to implement certain actions as part of other SVCSD efforts or programmed work.
    - Reliance on additional information (to better define the scope, benefit, or schedule of mitigation actions, especially larger, long-term programmatic actions).
    - The complexity or challenges to implementation.

The SVCSD's implementation strategy is based on a two-tier system consisting of four priority categories as represented in Table 25 and described here:

- The first-tier actions (Tier 1) are those that provide the highest cost benefit, and once implemented, will result in substantial improvement in the overall reliability of the system. Tier 1 actions were assessed to have both a high significance of impact and high likelihood of failure (principal actions). Tier 1 also includes all other mitigation actions with a benefit/cost assessment approximately equal to or greater than the lowest principal action. Within Tier 1, there are two priority categories: A1 and B1. Priority A1 actions are estimated to have potential or likelihood to be completed or initiated within the 5-year life of this plan based on current projections of available resources and/or opportunities. Priority B1 consists of those actions for which the availability of dedicated resources or opportunity are not likely with the 5-year plan life.
- The second-tier actions (Tier 2) are considered desirable and will further enhance the system reliability once the first-tier objectives are achieved. Tier 2 actions include all remaining mitigation actions with benefit/cost assessments below the Tier 1 threshold. Mitigation actions identified in the CAP are added to Tier 2 since those actions are not required to be implemented in the immediate future.
- As presented, the mitigation actions determined to have higher benefit/cost assessments are prioritized ahead those having lower benefit/cost assessments.

Table 25: Summary Benefit-Cost Review of Mitigation Actions

2021 SVCSD LHMP UPDATE

Tier	Priority	LHMP Action	Description	Benefits (Pros)	Costs (Cons)	Status Update	Hazard Mitigation	Time Frame	Responsible Entity*	Potential Funding**
Tier 1	A1	2.1.1	Seismically restrain/anchor miscellaneous equipment at the treatment plant	• Prevents failure of a variety of critical and non-critical equipment at treatment plant • Low cost high return measure • Expedites system recovery efforts • Prevents damage to equipment needed in recovery	• Ongoing operational effort for some systems	In progress from 2016 LHMP. Will be Maintained in 2021 LHMP.	Earthquake	0-5 years	Water/Wastewater Operations and Maintenance	Sewer Usage Fees, Sewer Connection Fees
Tier 1	A1	1.1.1	Develop District-specific emergency response measures to include in an integrated Sonoma County Water Agency emergency response and recovery plan for sanitation operations.	• Critical emergency response • Critical for reducing post-event restoration time • Minimizes significant loss of services • Reduces public health and safety risk and environmental damage from uncontrolled release of wastewater	• Ongoing effort and costs to maintain plan and train staff on implementation	In progress from 2016 LHMP. Will be Maintained in 2021 LHMP.	Earthquake, Fire, Flood	0-5 years	Emergency Response	FEMA Grant Funding, Bonds
Tier 1	A1	3.1.6	Update construction standards to address liquefaction potential along the collection system	• Improves risk awareness to public and design/construction community • Facilitates consistent system-wide application of reliability improvements • Reduces the risk of collection system failure • Minimizes significant loss of services • Reduces public health and safety risk and environmental damage from uncontrolled release of wastewater	• Requires public outreach and training to adapt to new standards • Increased cost to new development	In progress from 2016 LHMP. Will be Maintained in 2021 LHMP.	Earthquake	0-5 years	Design Engineering	FEMA Grant Funding, Bonds, Sewer Usage Fees, Sewer Connection Fees
Tier 1	A1	1.3.1	Obtain flexible hoses, emergency pumps, generators, and related emergency response equipment to enhance the District's ability to restore service in the collection system after a natural disaster.	• Allows for rapid and effective first response • Critical for reducing post-event restoration time •Minimizes significant loss of services • Reduces public health and safety risk and environmental damage from uncontrolled release of wastewater	• Storage and accessibility required • Uncertainty in needed quantity	In progress from 2016 LHMP. Will be Maintained in 2021 LHMP.	Earthquake, Fire, Flood	0-5 years	Water/Wastewater Operations and Maintenance	Sewer Usage Fees, Sewer Connection Fees
Tier 1	A1	2.1.2	Seismically retrofit clarifiers	• Prevents failure of a critical component needed for secondary treatment • Avoids prolonged system recovery efforts • Reduces public health and safety risk and environmental damage from release of inadequately treated wastewater	• Capital cost	In progress from 2016 LHMP. Will be Maintained in 2021 LHMP.	Earthquake	0-5 years	Design Engineering	FEMA Grant Funding, Bonds, Sewer Usage Fees, Sewer Connection Fees
Tier 1	A1	3.3.3	Develop and implement a design strategy to mitigate the effects of high stream flows on the collection system for the Nathanson Creek crossings at France Street, Chase Street, and MacArthur Street*	• Reduces risk of collection system failure • Avoids loss of services • Reduces public health and safety risk and environmental damage from uncontrolled release of wastewater	• Capital costs • Possible riparian impacts, permitting challenges, and/or increased long-term maintenance depending on mitigation approach.	In progress from 2016 LHMP. Will be Maintained in 2021 LHMP.	Flood	0-5 years	Design Engineering	FEMA Grant Funding, Bonds, Sewer Usage Fees, Sewer Connection Fees
Tier 1	A1	3.4.1	Develop and Implement a design strategy to mitigate the effects of wild-land fire on critical infrastructure.	• Improves risk awareness to public and design/construction community • Facilitates consistent system-wide application of reliability improvements • Reduces the risk of collection system failure • Minimizes significant loss of services	• Requires public outreach and training to adapt to new standards • Increased cost to new Projects	No progress. Will be Maintained in 2021 LHMP.	Fire	0-5 years	Design Engineering	FEMA Grant Funding, Bonds, Sewer Usage Fees, Sewer Connection Fees
Tier 1	A1	2.1.4	Provide sliding restraints to Floc Metal Solve polymer tanks.	• Reduces risk of wastewater treatment disruption. • Low cost high return measure • Reduces public health and safety risk and environmental damage from release of inadequately treated wastewater.	• Capital cost	**NEW**	Earthquake	0-5 years	Water/Wastewater Operations and Maintenance	Sewer Usage Fees, Sewer Connection Fees
Tier 1	B1	3.1.14	Evaluate and, if needed, design and mitigate the liquefaction hazard to the trunk main at the Schell Creek crossing.	• Reduces the risk of trunk main failure • Avoids significant loss of service • Benefits significant service area. • Reduces public health and safety risk and environmental damage from uncontrolled release of wastewater	• Capital costs • Potential construction complexities • Increased maintenance	**NEW**	Earthquake	5-10 years	Design Engineering	FEMA Grant Funding, Bonds, Sewer Usage Fees, Sewer Connection Fees
Tier 1	B1	3.1.3	Develop and implement a design strategy to mitigate the effects of liquefaction on the collection system (non-trunk) in areas that have very high to high liquefaction potential	• Reduces the risk of collection system failure • Avoids significant loss of services • Benefits significant service area • Reduces public health and safety risk and environmental damage from uncontrolled release of wastewater	• Capital costs • Long-term goal	No progress. Will be Maintained in 2021 LHMP.	Earthquake	5-10 years	Design Engineering	FEMA Grant Funding, Bonds, Sewer Usage Fees, Sewer Connection Fees
Tier 1	B1	3.2.3	Develop and implement a design strategy to mitigate the effects of a landslide on the trunk main at the Sonoma Creek crossing near Riverside Road/ W. Napa Street	• Reduces the risk of trunk main failure • Avoids significant loss of services • Benefits significant service area • Reduces public health and safety risk and environmental damage from uncontrolled release of wastewater	• Capital Cost • Construction in riparian habitat • Permitting Challenges	No progress. Will be Maintained in 2021 LHMP.	Earthquake	5-10 years	Design Engineering	FEMA Grant Funding, Bonds, Sewer Usage Fees, Sewer Connection Fees
Tier 1	B1	3.1.8	Develop and implement a design strategy for the Sonoma Creek crossing at Madrone Road to protect the trunk main from significant damage during a seismic event	• Reduces the risk of trunk main failure • Avoids significant loss of services • Benefits significant service area • Reduces public health and safety risk and environmental damage from uncontrolled release of wastewater	• Capital costs • Construction in riparian habitat • Permitting challenges	No progress. Will be Maintained in 2021 LHMP.	Earthquake	5-10 years	Design Engineering	FEMA Grant Funding, Bonds, Sewer Usage Fees, Sewer Connection Fees
Tier 1	B1	3.1.9	Develop and implement a design strategy for Sonoma Creek crossing at Agua Caliente Road to protect the collection system from significant damage during a seismic event	• Reduces the risk of collection system failure • Avoids loss of services • Reduces public health and safety risk and environmental damage from uncontrolled release of wastewater	• Capital costs • Construction in riparian habitat • Permitting challenges	No progress. Will be Maintained in 2021 LHMP.	Earthquake	5-10 years	Design Engineering	FEMA Grant Funding, Bonds, Sewer Usage Fees, Sewer Connection Fees

Tier 1	B1	3.1.2	Develop and implement a design strategy to mitigate the effects of liquefaction on the trunk main in areas that have very high to high liquefaction potential	• Reduces the risk of trunk main failure • Avoids significant loss of services • Benefits significant service area • Reduces public health and safety risk and environmental damage from uncontrolled release of wastewater	• Capital costs • Construction complexities • Long-term goal	No progress. Will be Maintained in 2021 LHMP.	Earthquake	5-10 years	Design Engineering	FEMA Grant Funding, Bonds, Sewer Usage Fees, Sewer Connection Fees
		3.3.2	Develop and implement a design strategy to mitigate the effects of high stream flows on the collection system for the Lilley Creek crossing at West Thompson Avenue	• Reduces risk of collection system failure • Avoids loss of services • Reduces public health and safety risk and environmental damage from uncontrolled release of wastewater	• Capital costs • Possible riparian impacts, permitting challenges, and/or increased long-term maintenance depending on mitigation approach.	No progress. Will be Maintained in 2021 LHMP.	Flood	5-10 years	Design Engineering	FEMA Grant Funding, Bonds, Sewer Usage Fees, Sewer Connection Fees
		3.2.2	Develop and implement a design strategy to mitigate the effects of a landslide along Buena Vista Avenue	• Reduces the risk of collection system failure • Avoids loss of services • Reduces public health and safety risk and environmental damage from uncontrolled release of wastewater	• Capital cost • Limited service area affected • Road encroached by homes results in poor accessibility	No progress. Will be Maintained in 2021 LHMP.	Earthquake	5-10 years	Design Engineering	FEMA Grant Funding, Bonds, Sewer Usage Fees, Sewer Connection Fees
		3.3.4	Develop and implement a strategy to mitigate the effects of storm water inflow and infiltration on the collection system during significant rain storms	• Reduces the risk of releasing inadequately or untreated wastewater • can be completed within existing authority	• Capital cost • Extended implementation timeline	**NEW**	Flood	5-10 years	Emergency Response	FEMA Grant Funding, Bonds
		3.1.13	Quantify liquefaction hazards in areas of Moderate, High, and Very High liquefaction susceptibility along the collection system pipelines.	• Provides cost-effective constraint to regional widespread liquefaction mapping by others. • Benefits significant service area • Informs future mitigation projects.	• Facilitates mitigation efforts, but does not in itself mitigate any hazard.	**NEW**	Earthquake	5-10 years	Design Engineering	FEMA Grant Funding, Bonds, Sewer Usage Fees, Sewer Connection Fees
		3.1.15	Evaluate and, if needed, design and mitigate seismic/flood-related damage to the trunk main from the Hooker Creek crossing.	• Reduces the risk of trunk main failure • Avoids significant loss of service • Benefits significant service area • Reduces public health and safety risk and environmental damage from uncontrolled release of wastewater.	• Capital costs • Potential construction complexities • Increased maintenance	**NEW**	Earthquake	5-10 years	Design Engineering	FEMA Grant Funding, Bonds, Sewer Usage Fees, Sewer Connection Fees
		3.1.16	Evaluate and, if needed, design and mitigate the liquefaction hazard to the trunk main along Sonoma Creek between Madrone Road and Hooker Creek.	• Reduces the risk of trunk main failure • Avoids significant loss of service • Benefits significant service area • Reduces public health and safety risk and environmental damage from uncontrolled release of wastewater.	• Capital costs • Potential construction complexities • Increased maintenance	**NEW**	Earthquake	5-10 years	Design Engineering	FEMA Grant Funding, Bonds, Sewer Usage Fees, Sewer Connection Fees
		3.1.17	Evaluate and, if needed, design and mitigate the liquefaction and/or high stream flow hazard to the trunk main at the Fowler Creek crossing west of the WWTP.	• Reduces the risk of trunk main failure • Avoids significant loss of service to the Temelec community • Benefits significant service area • Reduces public health and safety risk and environmental damage from uncontrolled release of wastewater	• Capital costs • Potential construction complexities • Increased maintenance	**NEW**	Earthquake	5-10 years	Design Engineering	FEMA Grant Funding, Bonds, Sewer Usage Fees, Sewer Connection Fees
		3.1.18	Evaluate and, if needed, design and mitigate the liquefaction hazard to the trunk main at the Sonoma Creek crossing west of the WWTP.	• Reduces the risk of trunk main failure • Avoids significant loss of service to the Temelec community • Benefits significant service area • Reduces public health and safety risk and environmental damage from uncontrolled release of wastewater	• Capital costs • Poential construction complexities • Increased maintenance	**NEW**	Earthquake	5-10 years	Design Engineering	FEMA Grant Funding, Bonds, Sewer Usage Fees, Sewer Connection Fees
		3.4.2	Develop and implement a post-fire inspection plan systemwide.	• Reduces the risk of collection system failure. • Avoids loss of service. • Reduces public health and safety risk and environmental damage from uncontrolled release of wastewater.	• Facilitates mitigation efforts, but does not in itself mitigate any hazard. • Ongoing effort and costs to maintain plan and train staff on implementation	**NEW**	Fire	5-10 years	Emergency Response	FEMA Grant Funding, Bonds
		1.1.2	Establish emergency on-call contracts with contractors and suppliers for rapid response and delivery in an emergency.	• Critical emergency response • Critical for reducing post-event restoration time • Minimizes significant loss of services • Reduces public health and safety risk and environmental damage from uncontrolled release of wastewater	• Ongoing effort and costs to maintain plan and train staff on implementation	**NEW**	Earthquake, Fire, Flood	5-10 years	Emergency Response	FEMA Grant Funding, Bonds
		1.1.3	Develop formal mutual aid contracts with other municipalities in the region and state.	• Critical emergency response • Critical for reducing post-event restoration time • Minimizes significant loss of services • Reduces public health and safety risk and environmental damage from uncontrolled release of wastewater	• Ongoing effort and costs to maintain plan and train staff on implementation	**NEW**	Earthquake, Fire, Flood	5-10 years	Emergency Response	FEMA Grant Funding, Bonds
		2.1.3	Assess the source of water damage to MCC-5 and MCC-6 and repair as needed.	• Reduces risk of wastewater treatment disruption. • Reduces public health and safety risk and environmental damage from release of inadequately treated wastewater.	• Ongoing effort and costs to maintain plan and train staff on implementation	**NEW**	Earthquake	5-10 years	Water/Wastewater Operations and Maintenance	Sewer Usage Fees, Sewer Connection Fees

	2.2.1	Develop an operational strategy to mitigate flood hazard wastewater treatment plant facilities located in the 100-year floodplain.	• Reduces risk of wastewater treatment disruption. • Reduces public health and safety risk and environmental damage from release of inadequately treated wastewater. • Low cost high return measure	• Ongoing effort and costs to maintain plan and train staff on implementation	**NEW**	Flood	10+ years	Design Engineering	FEMA Grant Funding, Bonds, Sewer Usage Fees, Sewer Connection Fees
	3.1.7	Conduct site-specific studies to better evaluate seismic related vulnerabilities and further define the scope of capital project mitigation actions.	• Better informs an understanding of specific vulnerabilities and provides additional information to further refine mitigation approach • Facilitates and streamlines mitigation design efforts	• Facilitates mitigation efforts, but does not in itself mitigate any hazard	In progress from 2016 LHMP. Will be Maintained in 2021 LHMP.	Earthquake	10+ years	Design Engineering	FEMA Grant Funding, Bonds, Sewer Usage Fees, Sewer Connection Fees
Tier 2	3.1.11	Seismically retrofit suspended ceiling over office area and water quality lab.	• Reduces risk of disrupted treatment operations • Low cost	• Capital costs • Construction complexities • Long-term goal	No progress. Will be Maintained in 2021 LHMP.	Earthquake	10+ years	Water/Wastewater Operations and Maintenance	Sewer Usage Fees, Sewer Connection Fees
	3.1.4	Develop and implement a design strategy to mitigate the effects of liquefaction on the trunk main in areas that have moderate liquefaction potential	• Reduces the risk of trunk main failure • Avoids significant loss of services • Benefits significant service area • Reduces public health and safety risk and environmental damage from uncontrolled release of wastewater	• Capital costs • Construction complexities • Long-term goal	No progress. Will be Maintained in 2021 LHMP.	Earthquake	10+ years	Design Engineering	FEMA Grant Funding, Bonds, Sewer Usage Fees, Sewer Connection Fees
	4.1.1	Develop and implement an operational strategy to mitigate the effects of climate change to the outfall pipe.	• Reduces the risk of inability to discharge recycled water into sloughs.	• Uncertainty in timeframe for which recycled water pipelines may be submerged.	**NEW**	Climate Change	10+ years	Design Engineering	FEMA Grant Funding, Bonds, Sewer Usage Fees, Sewer Connection Fees
	3.1.10	Seismically retrofit chlorine building including chlorinators, piping, and rail system.	• Reduces risk of disinfection system failure during most extreme seismic events • Avoids significant loss of services • Benefits significant service area • Reduces public health and safety risk and environmental damage from uncontrolled release of airborne toxin	• Capital costs • Targets only the most extreme seismic events	No progress. Will be Maintained in 2021 LHMP.	Earthquake	10+ years	Water/Wastewater Operations and Maintenance	Sewer Usage Fees, Sewer Connection Fees
	3.1.5	Develop and implement a design strategy to mitigate the effects of liquefaction on the collection system (non-trunk) in areas that have moderate liquefaction potential	• Reduces the risk of collection system failure • Avoids significant loss of services • Benefits significant service area • Reduces public health and safety risk and environmental damage from uncontrolled release of wastewater	• Capital costs • Long-term goal	No progress. Will be Maintained in 2021 LHMP.	Earthquake	10+ years	Design Engineering	FEMA Grant Funding, Bonds, Sewer Usage Fees, Sewer Connection Fees
	4.2.1	Evaluate and, if needed, design and mitigate the liquefaction hazard to the recycled water pipeline at the western Schell Creek crossing at the WWTP.	• Reduces the risk of inability to discharge recycled water into sloughs.	• Capital costs • Potential construction complexities • Increased maintenance	**NEW**	Earthquake	10+ years	Design Engineering	FEMA Grant Funding, Bonds, Sewer Usage Fees, Sewer Connection Fees
Plan Actions		CAP35: Implement Inflow/Infiltration Monitoring and Reduction Program	TBD - Waiting for Climate Adaptation Plan (CAP) to be finalized before CAP actions are prioritzied and benefits and costs are assessed.	TBD - Waiting for Climate Adaptation Plan (CAP) to be finalized before CAP actions are prioritzied and benefits and costs are assessed.	**NEW**	Climate Change	10+ years	Energy Resources	FEMA Grant Funding, Bonds
		CAP37: Eliminate Sonoma Valley WWTP Hydraulic Constraints due to Sea Level Rise	TBD - Waiting for Climate Adaptation Plan (CAP) to be finalized before CAP actions are prioritzied and benefits and costs are assessed.	TBD - Waiting for Climate Adaptation Plan (CAP) to be finalized before CAP actions are prioritzied and benefits and costs are assessed.	**NEW**	Climate Change	10+ years	Energy Resources	FEMA Grant Funding, Bonds
		CAP37: Improve or Adapt Operations of Reuse Supply Delivery to Management Units	TBD - Waiting for Climate Adaptation Plan (CAP) to be finalized before CAP actions are prioritzied and benefits and costs are assessed.	TBD - Waiting for Climate Adaptation Plan (CAP) to be finalized before CAP actions are prioritzied and benefits and costs are assessed.	**NEW**	Climate Change	10+ years	Energy Resources	FEMA Grant Funding, Bonds

***Climate Adaptation		CAP38: Expand Opportunities for Sonoma Valley Reuse	TBD - Waiting for Climate Adaptation Plan (CAP) to be finalized before CAP actions are prioritzied and benefits and costs are assessed.	TBD - Waiting for Climate Adaptation Plan (CAP) to be finalized before CAP actions are prioritzied and benefits and costs are assessed.	**NEW**	Climate Change	10+ years	Energy Resources	FEMA Grant Funding, Bonds
		CAP39: Increase Flood Protection at Sonoma Valley WWTP	TBD - Waiting for Climate Adaptation Plan (CAP) to be finalized before CAP actions are prioritzied and benefits and costs are assessed.	TBD - Waiting for Climate Adaptation Plan (CAP) to be finalized before CAP actions are prioritzied and benefits and costs are assessed.	**NEW**	Climate Change	10+ years	Energy Resources	FEMA Grant Funding, Bonds
		CAP40: Implement SCADA Master Plan and Automation	TBD - Waiting for Climate Adaptation Plan (CAP) to be finalized before CAP actions are prioritzied and benefits and costs are assessed.	TBD - Waiting for Climate Adaptation Plan (CAP) to be finalized before CAP actions are prioritzied and benefits and costs are assessed.	**NEW**	Climate Change	10+ years	Energy Resources	FEMA Grant Funding, Bonds
		CAP41: Develop In-Line or Off-Line Collection System Storage	TBD - Waiting for Climate Adaptation Plan (CAP) to be finalized before CAP actions are prioritzied and benefits and costs are assessed.	TBD - Waiting for Climate Adaptation Plan (CAP) to be finalized before CAP actions are prioritzied and benefits and costs are assessed.	**NEW**	Climate Change	10+ years	Energy Resources	FEMA Grant Funding, Bonds

***Responsible Entity: Sections and Divisions listed in this column are shown in Appendix G: Water Agency Organizational Charts**

****Potential Funding: External agencies and programs listed in this column are described in Section 6.**

***** These actions serve as a placeholder and will be prioritized and incorporated as Tier 1 or Tier 2 actions in the next LHMP update, when the CAP is finalized.**

With this approach, Tier 1 actions will generally be implemented with greater priority. However, some Tier 2 actions may be implemented ahead of more critical Tier 1 actions due to such factors as the availability of different resources or opportunities. The SVCSD, as part of its maintenance program, has undertaken some of the objectives identified in Section 5. The most noteworthy being the stockpiling of standby materials and equipment.

6.1 Integration of the LHMP into Other Planning Mechanism

Sonoma Water has updated portions of its emergency response plan to include actions related to SVCSD. These actions include enhancing Sonoma Water's Emergency Operations Center and ensuring emergency backup power is available for critical facilities (including SVCSD).

On behalf of the SVCSD, mitigation actions involving capital projects will be incorporated into Sonoma Water's annual Capital Improvement Plan as funding is scheduled to occur. The SVCSD will actively work towards identifying outside funding sources for these projects such as FEMA's pre-disaster mitigation program and hazard mitigation grants program. Depending on the level of funding, it is anticipated that the SVCSD will initiate implementation of the Priority A1 mitigation actions within 5 years following the adoption of the plan.

Mitigation actions listed in Table 20 that involve capital projects will be integrated into the Water Agency's annual Capital Projects Plan (CPP) as funding is scheduled to occur. This will support identification of opportunities to accomplish mitigation actions as part of other efforts, programmed work, or necessary maintenance. As the highest priority mitigation actions are achieved, the implementation schedule and planning-level budget estimates for the next tier actions will be developed in future revisions to the CPP in consultation with the Water Agency's management, contractors, and the public. Many mitigation actions carried forward from the 2016 LHMP are already integrated into the CPP.

Additionally, the District will continue to consider funding sources through its maintenance budget and a possible reliability surcharge within the District's rate structure.

As with the 2016 LHMP's, the District will also continue to actively identify external funding sources for the 2021 LHMP mitigation actions, including FEMA's pre-disaster mitigation program (PDM) and Hazard Mitigation Grant Program (HMGP), FEMA's Public Assistance (PA) mitigation opportunities during disaster recovery operations, the National Oceanic Atmospheric Administration (NOAA), the California Department of Water Resources (CA DWR), the California Department of Forestry and Fire Protection (Cal FIRE), Federal and State loan programs, and other resources.

7. Plan Maintenance

To ensure the effectiveness of the goals and objectives, this plan relies on an ongoing program of assessing updated conditions to verify appropriate mitigation focus and priority. This process will be managed with monitoring and maintenance of this hazard mitigation plan through a five-year update cycle. However, changes to prioritization and implementation may be prompted within that time frame by the occurrence of actual hazard events.

7.1 Monitoring, Evaluating, and Updating the Plan

Monitoring the Plan

The SVCSD will keep the plan alive through continued monitoring of the plan goals and objectives. The SVCSD will incorporate the hazard mitigation plan into other District plans, policies, and programs, including its yearly CIP planning process for projects that can be implemented over the next five years to monitor progress towards the goals of the hazard mitigation plan. Because of the involvement of the SVCSD's department heads of Planning, Operations, Maintenance, and Capital Improvements in the development of the plan, the entire executive management of the SVCSD is committed to implementing the goals and objectives of the plan. The department heads will meet annually to review the current LHMP.

- When implementation of the plan will be monitored: Annually
- Who will monitor implementation of the plan: Department heads, led by the deputy chief engineer
- How implementation of the plan will be monitored: Members of the LHMP team will review the following:
    - Hazard events that occurred within the District's boundaries in the past year, including the scale of impact.
    - Mitigation activities in the Plan which have been implemented and are achieving success.
    - The timeline for implementation of mitigation activities, and whether the timeline should be amended.
    - Any mitigation activities prioritized for the past year which have not been completed.
    - The need for any new or revised mitigation actions.

Evaluating the Plan

- When the plan will be evaluated: At least annually

- Who will evaluate the plan: The chief engineer of the Engineering division. The Deputy Chief Engineer will lead the effort to convene the planning team meetings. The Deputy Chief Engineer will organize a meeting with members from the Technical Review Team discussed in Chapter 2 to review the mitigation actions, and evaluate if the goals, objectives, and actions have been met and what potential changes need to be made in order to increase the effectiveness of the LHMP.
- How the plan will be evaluated: The team led by the chief engineer will identify areas such as climate change research and mitigation where the plan can be improved. New studies and other resources that can be used to assess risks will be implemented into the LHMP accordingly. Members of the LHMP team will review the following:
    - Hazard events that occurred within the District's boundaries in the past year, including the scale of impact.
    - Any changes or potential for changes in funding options for mitigation activities.
    - Any new scientific data or mapping that informs the information in the Plan.
    - Any new or revised planning programs or other initiatives applicable to SVCSD that involve hazard mitigation.

The LHMP's effectiveness will be assessed at least annually.

Updating the Plan

As required by DMA2000, this plan will be updated every five years. The SVCSD will also update the plan if there is a significant change in the basic assumptions (for example, a major hazard event that highlights vulnerabilities in the system not anticipated at the present time). The SVCSD will apply for grant funding at least 16-18 months prior to the plan expiring in order to help cover the cost to update the LHMP.

- How the plan will be updated: The Grant Manager will assign a Grant Specialist to apply for grant funds for the update. The Chief Engineer and the Grant Manager will create the Core Planning Team (CPT) for the update, including an engineer who will update the technical portions of the plan and determine if a consultant will need to be hired. The Grant Specialist will be in charge of facilitating the update of the plan and ensuring it is updated in accordance with 44 CFR §201.6.
- When the plan will be updated: Every 5 years. We will apply for grant funding at least 2 years prior to the plan expiring. We will also update the plan if anything significant requires changes.

- Who will update the plan: The CPT and potentially a consultant will be responsible for updating the plan.

7.2 Continued Public Involvement

The SVCSD, with its decision to incorporate the hazard mitigation plan in its yearly CIP planning process, has ensured continued public involvement in this plan. The CIP approval is an open public process. Our planning process will begin by developing an outreach plan to engage stakeholders and the public in the mitigation planning process. Stakeholders will include Sonoma County Office of Emergency Services, Sonoma County Department of Public Works, Sonoma County Regional Climate Protection Authority; cities/counties/local governments; state and federal agencies; Water Agency water contractors; non-government organizations, service organizations, and the local business community; and the general public.

As part of the approval process the CIP is presented to the SVCSD's Board of Directors in an open public meeting and by virtue of this, progress towards achieving SVCSD's goals and objectives identified in the hazard mitigation plan will also be open for public review and comment. Outreach methods will include public meetings, printed materials, email and websites, surveys, social media, news media, presentations to governing bodies, community events, among other methods.

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Appendix A

Figure(s)	Description
SV 1	Collection & Recycled Water System
SV 2 – 11	Geology
SV 12 – 21	Quaternary Deposits
SV 22 – 31	Liquefaction Susceptibility
SV 32 – 41	Flood Zone
SV 42 – 51	Fire Hazard Zone
SV 52	Historic Wildfires

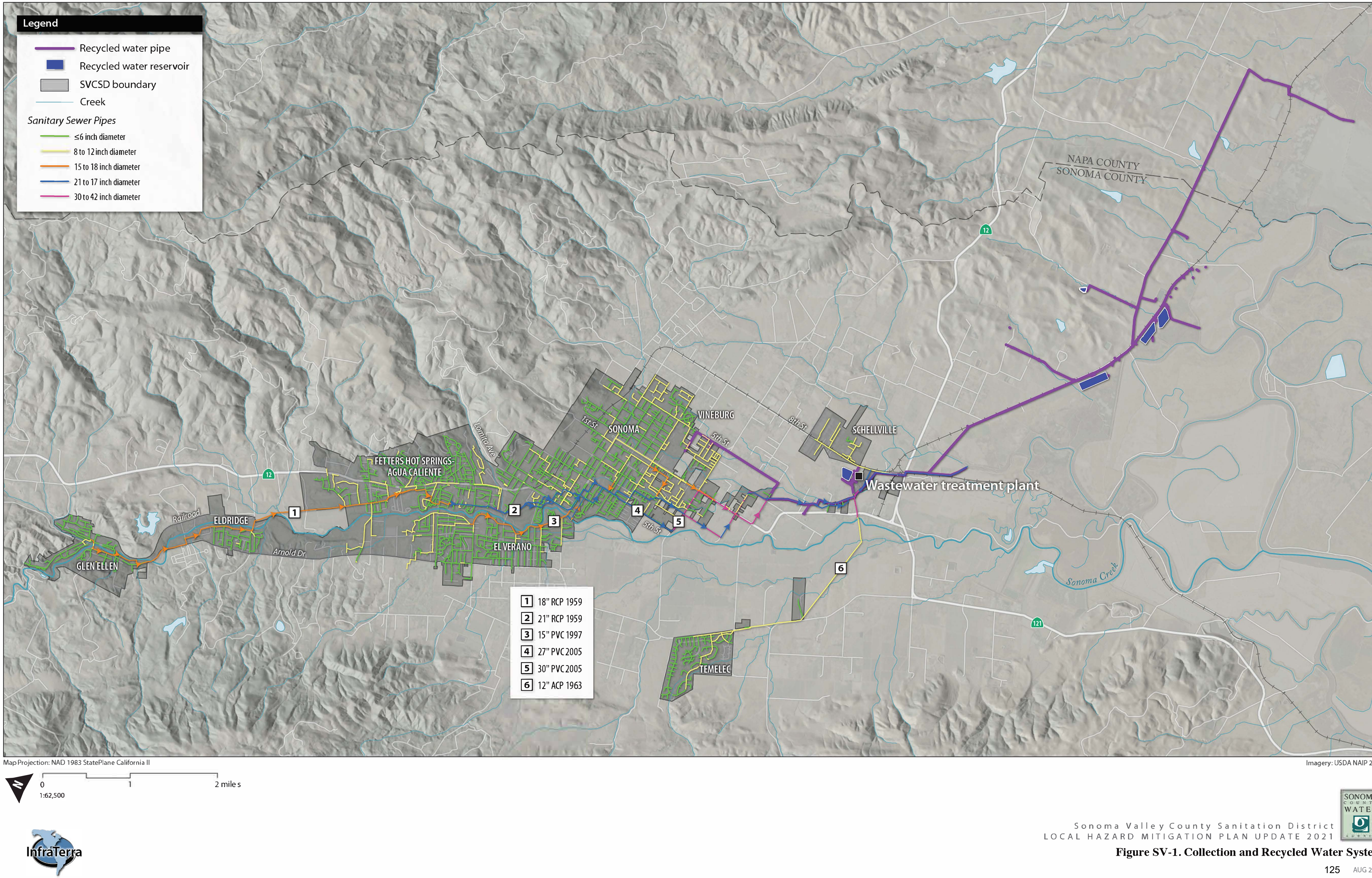

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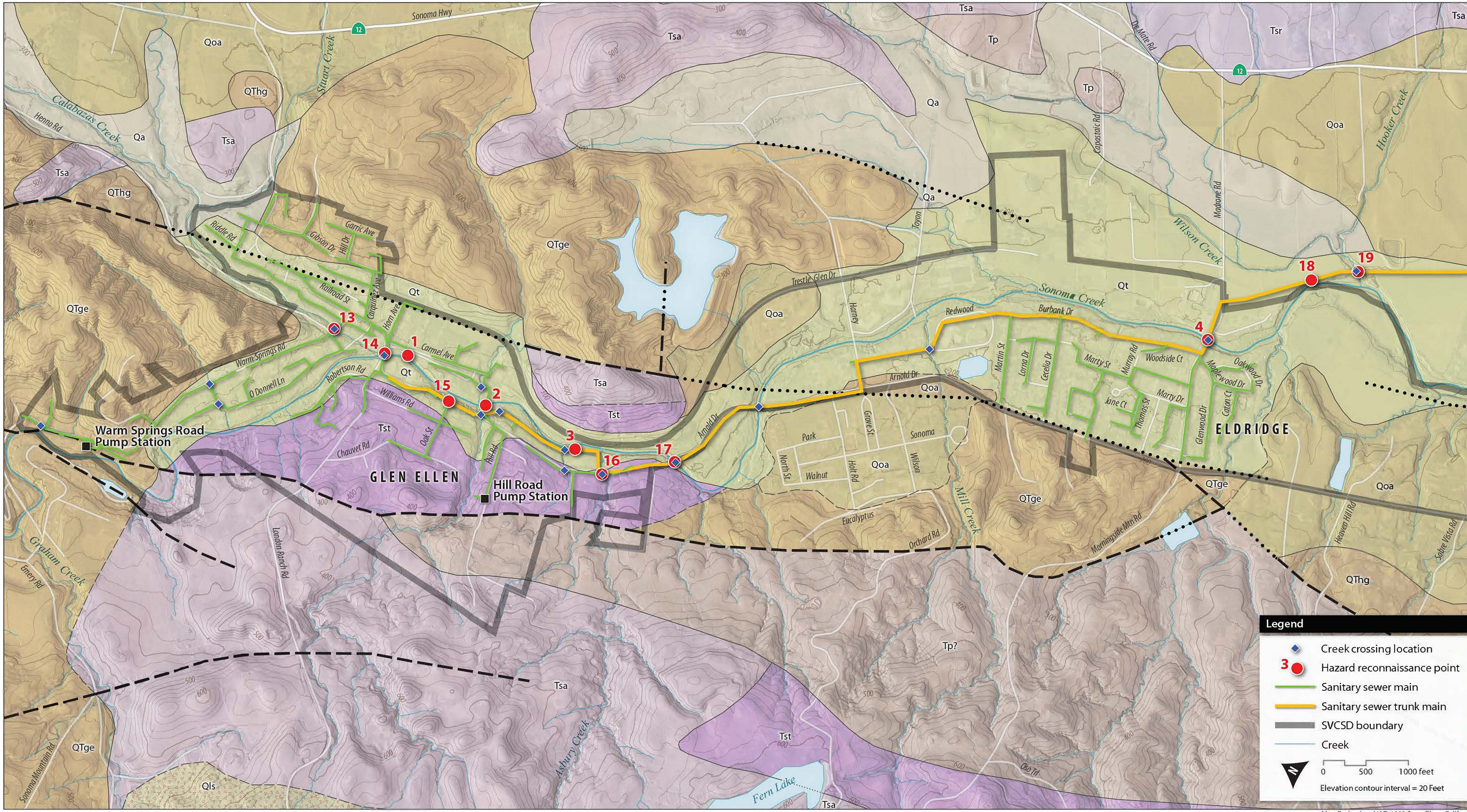
Figure SV-1. Collection and Recycled Water System

 AUG 2021



Map Projection: NAD 1983 State Plane California II
Imagery: USDA NAIP 2021; Geology and Faults: Graymer et al., 2007

Geology and Faults

- Geologic contact, dashed where approximate, dotted where concealed
- Fault, dashed where approximate, dotted where concealed

Qa	Alluvium (Holocene and late Pleistocene)
Qt	Terrace deposits (Holocene and late Pleistocene)
Qls	Landslide deposits (Holocene and late Pleistocene)
Qoa	Alluvium (late and early Pleistocene)
Qtge	Glen Ellen Formation (early Pleistocene? and Pliocene)
QThg	Huichica and Glen Ellen Formations (early Pleistocene? And Pliocene)
Tsr	Rhyolite flows
Tsa	Andesite to basalt lava flows
Tst	Pumiceous ash-flow tuff
Tp	Petaluma Formation (early Pliocene and late Miocene)

InfraTerra

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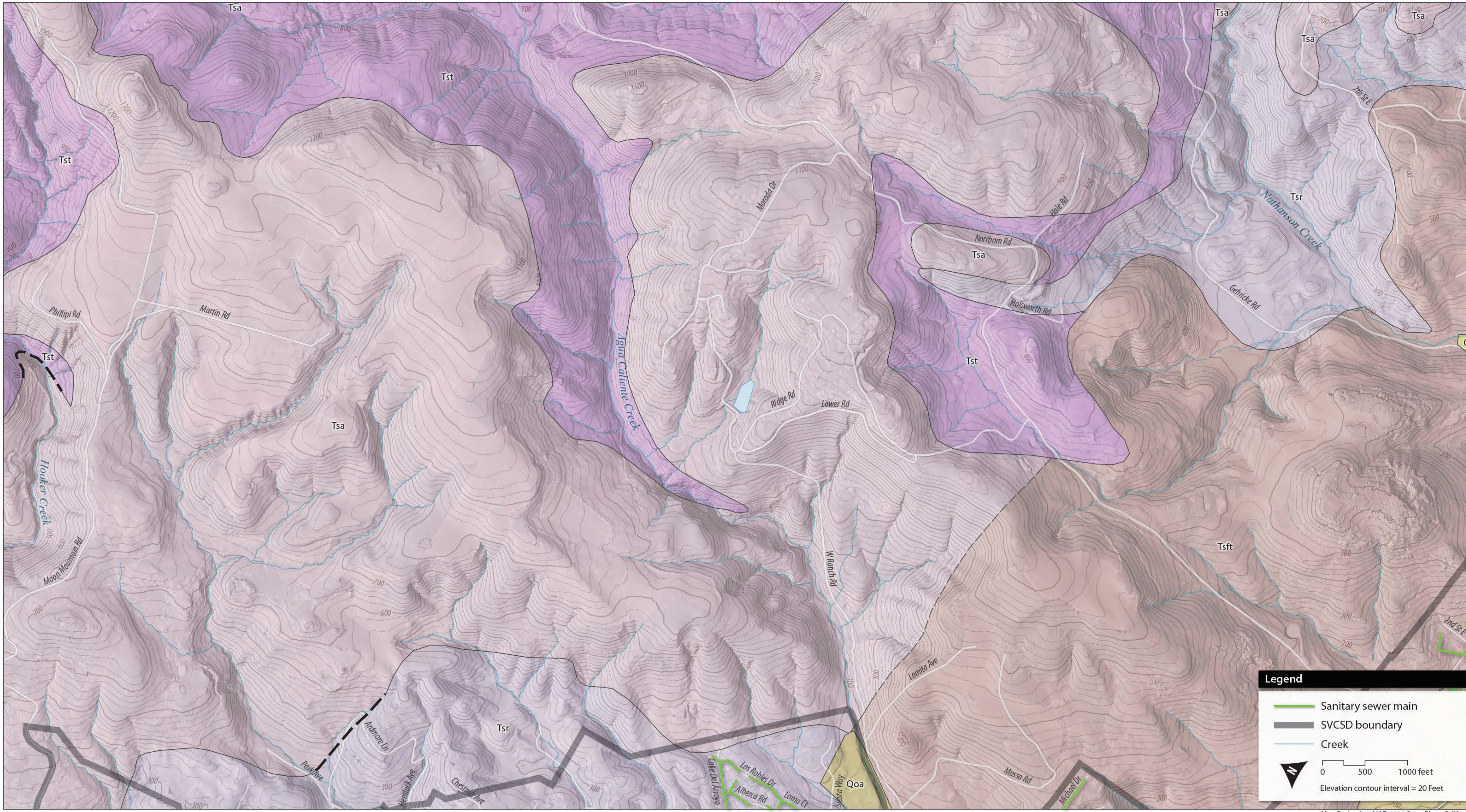
Figure SV-2. Geology (Area 1)



Map Projection: NAD 1983 State Plane California II
Imagery: USDA NAIP 2021; Geology and Faults: Graymer et al., 2007

Geology and Faults

- Geologic contact, dashed where approximate, dotted where concealed
- Fault, dashed where approximate, dotted where concealed

Qf	Alluvial fan deposits (Holocene and late Pleistocene)
Qoa	Alluvium (late and early Pleistocene)
Tsr	Rhyolite flows
Tsa	Andesite to basalt lava flows
Tst	Pumiceous ash-flow tuff
Tsft	Tuff

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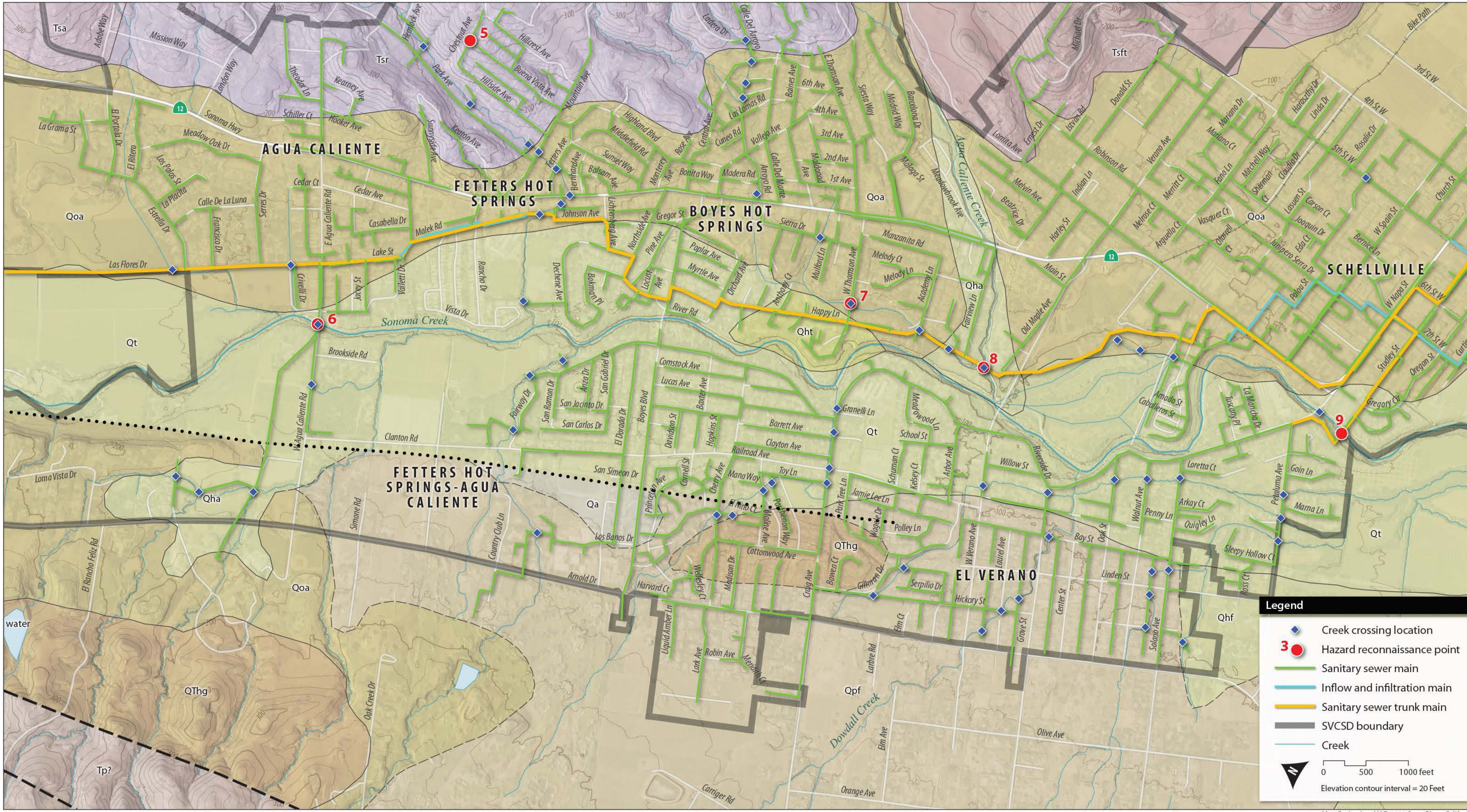
Figure SV-3. Geology (Area 2)

 AUG 2021



Map Projection: NAD 1983 State Plane California II
Imagery: USDA NAIP 2021; Geology and Faults: Graymer et al., 2007

InfraTerra

Geology and Faults

Geologic contact, dashed where approximate, dotted where concealed

Fault, dashed where approximate, dotted where concealed

Qha	Alluvium (late and early Pleistocene)
Qht	Alluvium (late and early Pleistocene)
Qhf	Glen Ellen Formation (early Pleistocene? and Pliocene)
Qa	Alluvium (Holocene and late Pleistocene)
Qt	Terrace deposits (Holocene and late Pleistocene)
Qpf	Alluviual fan deposits (late Pleistocene)
Qoa	Alluvium (late and early Pleistocene)
QThg	Huichica and Glen Ellen Formations (early Pleistocene? And Pliocene)
Tsr	Rhyolite flows
Tsa	Andesite to basalt lava flows
Tstf	Tuff
Tp	Petaluma Formation (early Pliocene and late Miocene)

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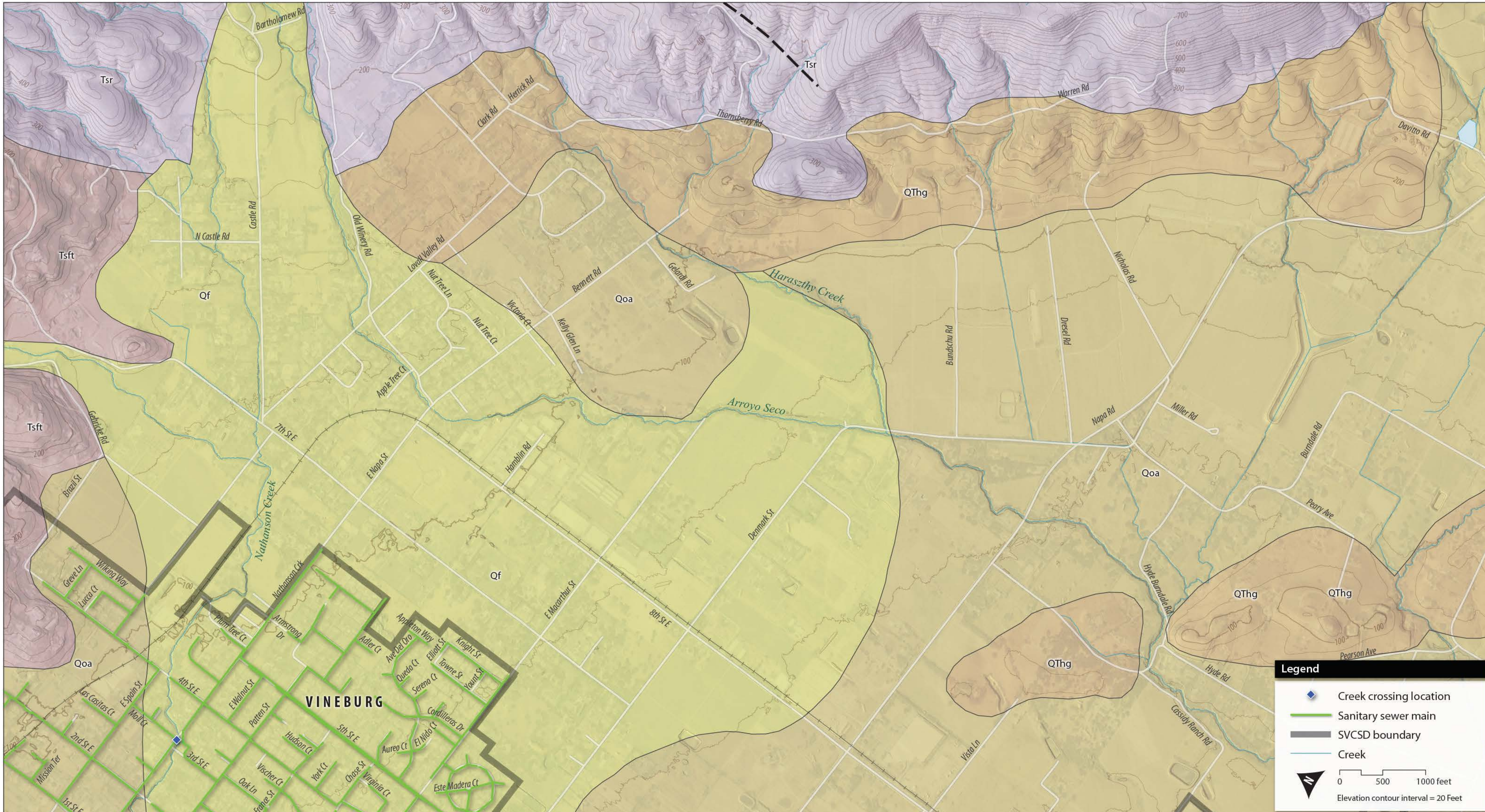
Figure SV-4. Geology (Area 3)



Map Projection: NAD 1983 State Plane California II
Imagery: USDA NAIP 2021; Geology and Faults: Graymer et al., 2007

InfraTerra

Geology and Faults

- Geologic contact, dashed where approximate, dotted where concealed
- Fault, dashed where approximate, dotted where concealed

Qf	Alluvial fan deposits (Holocene and late Pleistocene)
Qoa	Alluvium (late and early Pleistocene)
QThg	Huichica and Glen Ellen Formations (early Pleistocene? And Pliocene)
Tsr	Rhyolite flows
Tsft	Tuff

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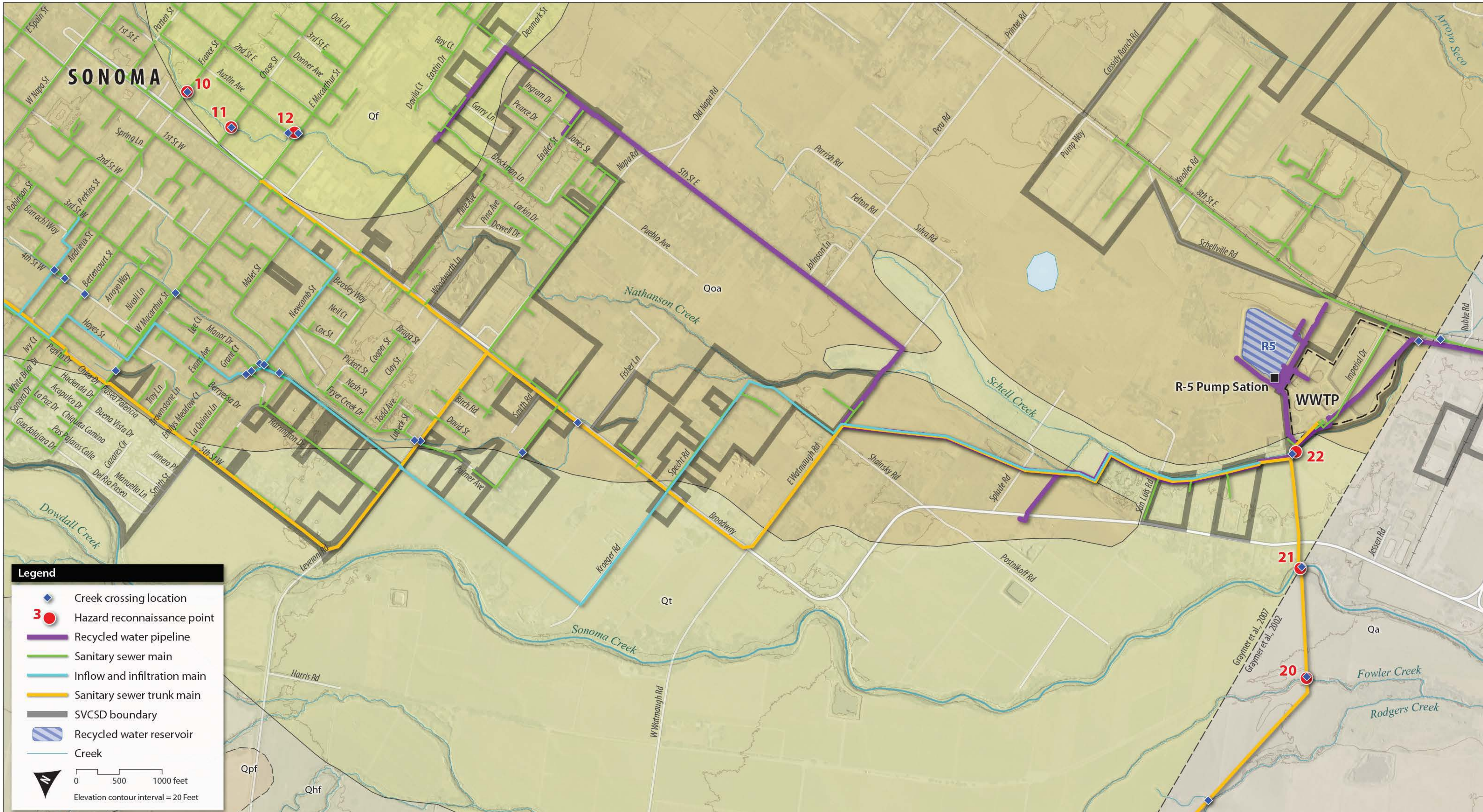
Figure SV-5. Geology (Area 4)



Map Projection: NAD 1983 State Plane California II
Imagery: USDA NAIP 2021; Geology and Faults: Graymer et al., 2002 and Graymer et al., 2007

Geology and Faults

- Geologic contact, dashed where approximate, dotted where concealed
- Fault, dashed where approximate, dotted where concealed

Qa	Alluvium (Holocene and late Pleistocene)
Qhf	Alluvial fan deposits (Holocene)
Qt	Terrace deposits (Holocene and late Pleistocene)
Qoa	Alluvium (late and early Pleistocene)
Qtge	Glen Ellen Formation (early Pleistocene? and Pliocene)
Qf	Alluviual fan deposits (Holocene and late Pleistocene)
Qpf	Alluvial fan deposits (late Pleistocene)
Qoa	Alluvium (late and early Pleistocene)

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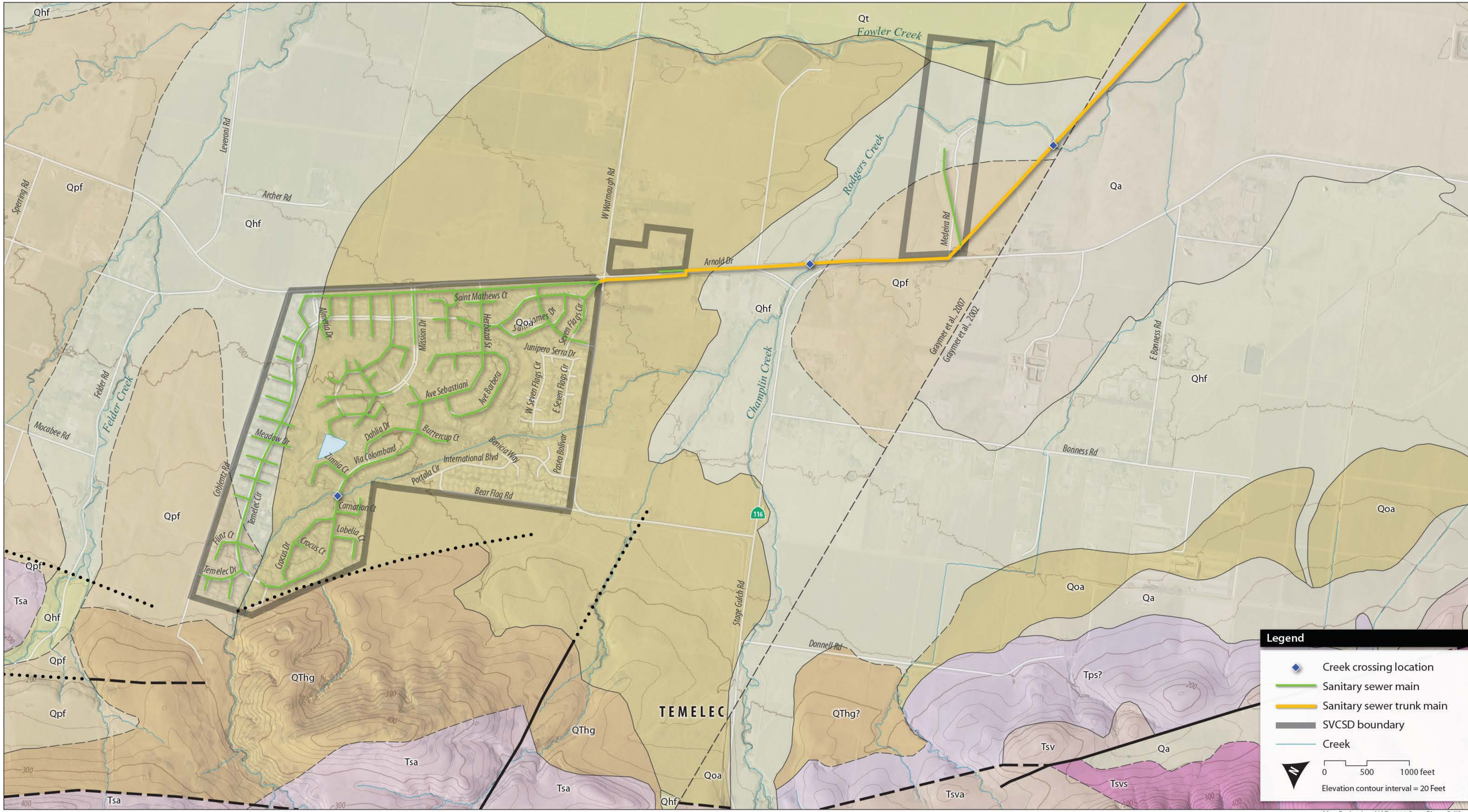
Figure SV-6. Geology (Area 5)



Map Projection: NAD 1983 State Plane California II
Imagery: USDA NAIP 2021; Geology and Faults: Graymer et al., 2002 and Graymer et al., 2007

InfraTerra

Geology and Faults

- Geologic contact, dashed where approximate, dotted where concealed
- Fault, dashed where approximate, dotted where concealed

Qt	Terrace deposits (Holocene and late Pleistocene)
Qhf	Alluvial fan deposits (Holocene)
Qpf	Alluvial fan deposits (late Pleistocene)
Qa	Alluvium (Holoce and late Pleistocene)
Qoa	Alluvium (late and early Pleistocene)
QThg	Huichica and Glen Ellen Formations (early Pleistocene? and Pliocene)
Tsv	Sonoma Volcanics (Pliocene and late Miocene)
Tsva	Andesite to basalt flows
Tsvt	Ash-flow tuff
Tsvs	Volcanic sand and gravel
Tps	Mudrock, sandstone, and conglomerate

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Figure SV-7. Geology (Area 6)

Map Projection: NAD 1983 State Plane California II
Imagery: USDA NAIP 2021; Geology and Faults: Graymer et al., 2002 and Graymer et al., 2007

Geology and Faults

Geologic contact, dashed where approximate, dotted where concealed

- Qhf Alluvial fan deposits (Holocene)
- Qhbm Bay mud deposits (Holocene)
- Qa Alluvium (Holocene and late Pleistocene)
- Qoa Alluvium (late and early Pleistocene)
- Qpf Alluvial fan deposits (late Pleistocene)
- QTh Huichica Formation (early Pleistocene and Pliocene)
- QThg Huichica and Glen Ellen Formations (early Pleistocene? and Pliocene)
- Tsr Rhyolite flows
- Tst Pumiceous ash-flow tuff

InfraTerra

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Figure SV-8. Geology (Area 7)

Map Projection: NAD 1983 State Plane California II
Imagery: USDA NAIP 2021; Geology and Faults: Graymer et al., 2002 and Graymer et al., 2007

Geology and Faults

- Geologic contact, dashed where approximate, dotted where concealed

Qhbm	Bay mud deposits (Holocene)
Qa	Alluvium (Holocene and late Pleistocene)
Qoa	Alluvium (late and early Pleistocene)

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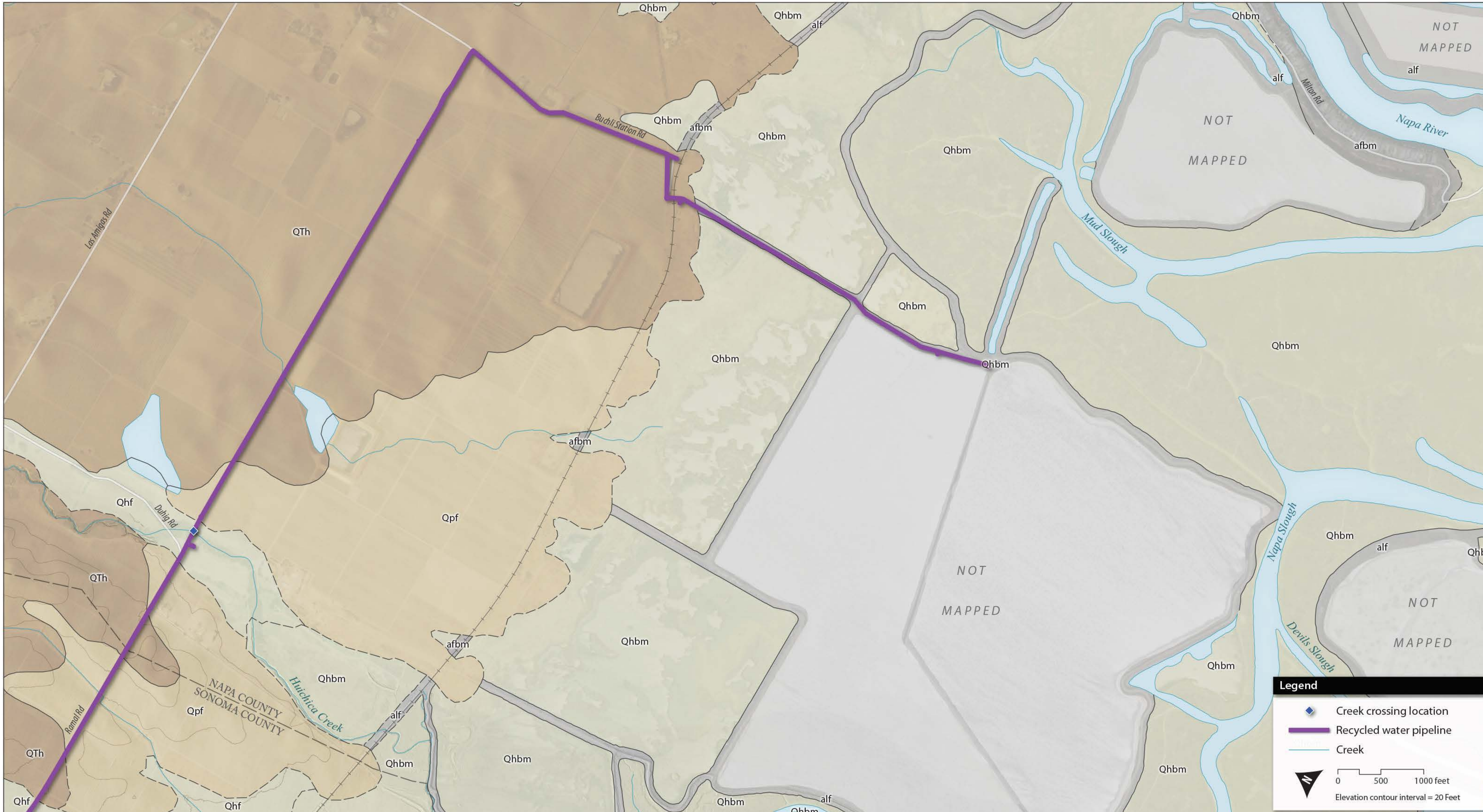
Figure SV-9. Geology (Area 8)



Map Projection: NAD 1983 State Plane California II
Imagery: USDA NAIP 2021; Geology and Faults: Graymer et al., 2007

Geology and Faults

Geologic contact, dashed where approximate, dotted where concealed

afbm	Artificial fill over bay mud (Historic)
alf	Artificial levee fill (Historic)
Qhf	Alluvial fan deposits (Holocene)
Qhbm	Bay mud deposits (Holocene)
Qpf	Alluvial fan deposits (late Pleistocene)
QTh	Huichica Formation (early Pleistocene and Pliocene)

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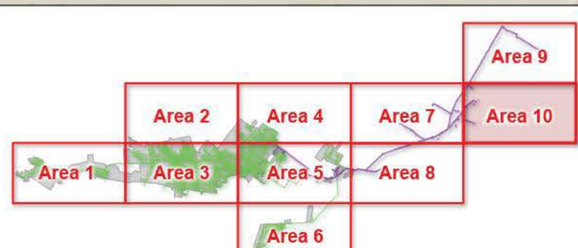
Figure SV-10. Geology (Area 9)

Map Projection: NAD 1983 State Plane California II
Imagery: USDA NAIP 2021; Geology and Faults: Graymer et al., 2007



InfraTerra

Geology and Faults

Geologic contact, dashed where approximate, dotted where concealed

alf	Artificial levee fill (Historic)
Qhf	Alluvial fan deposits (Holocene)
Qhbm	Bay mud deposits (Holocene)
Qpf	Alluvial fan deposits (late Pleistocene)

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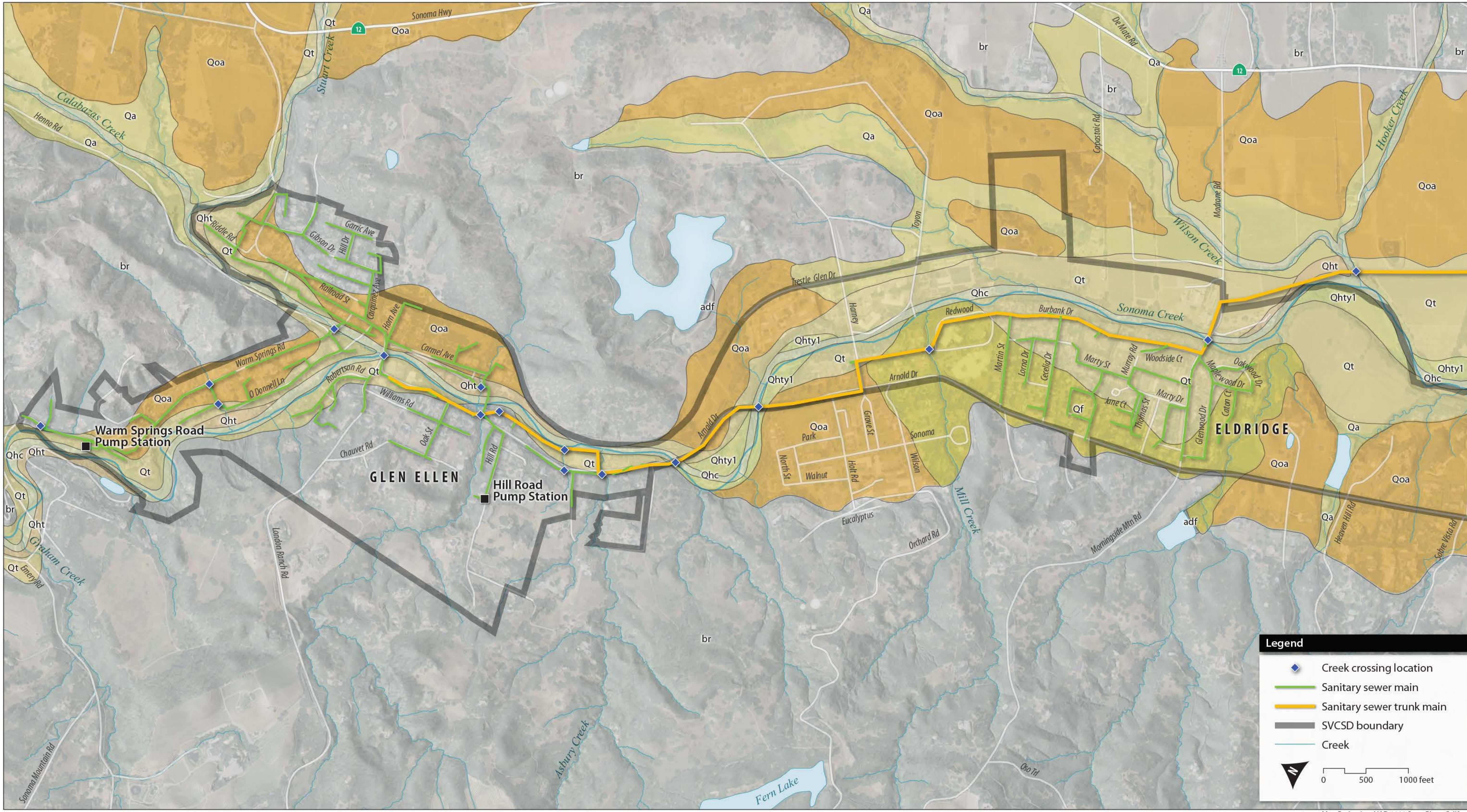
Figure SV-11. Geology (Area 10)



Map Projection: NAD 1983 State Plane California II
Imagery: USDA NAIP 2021; Geology: Witter et al., 2006

InfraTerra

Quaternary Deposits

—— — Geologic contact, dashed where approximate

Qhc	Historical stream channel deposits
Qhty1	Latest Holocene stream terrace deposits
Qht	Holocene stream terrace deposits
Qf	Latest Pleistocene to Holocene alluvial fan deposits
Qt	Latest Pleistocene to Holocene stream terrace deposits
Qa	Latest Pleistocene to Holocene alluvial deposits, undifferentiated
Qoa	Early to late Pleistocene alluvial deposits, undifferentiated
br	Bedrock

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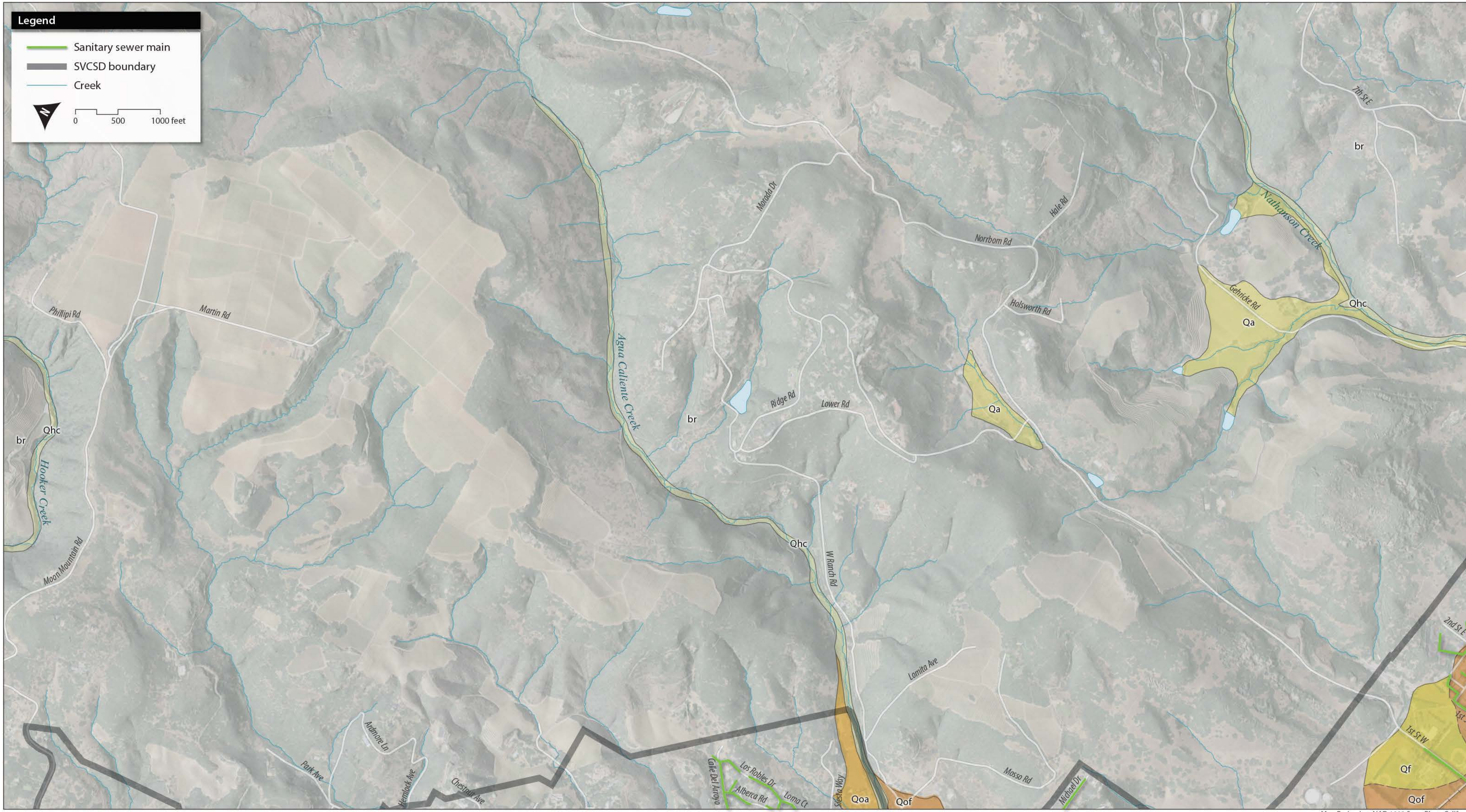
Figure SV-12. Quaternary Deposits (Area 1)



Quaternary Deposits

Geologic contact, dashed where approximate

Qhc	Historical stream channel deposits
Qf	Latest Pleistocene to Holocene alluvial fan deposits
Qa	Latest Pleistocene to Holocene alluvial deposits, undifferentiated
Qof	Early to late Pleistocene alluvial fan deposits
Qoa	Early to late Pleistocene alluvial deposits, undifferentiated
br	Bedrock

InfraTerra

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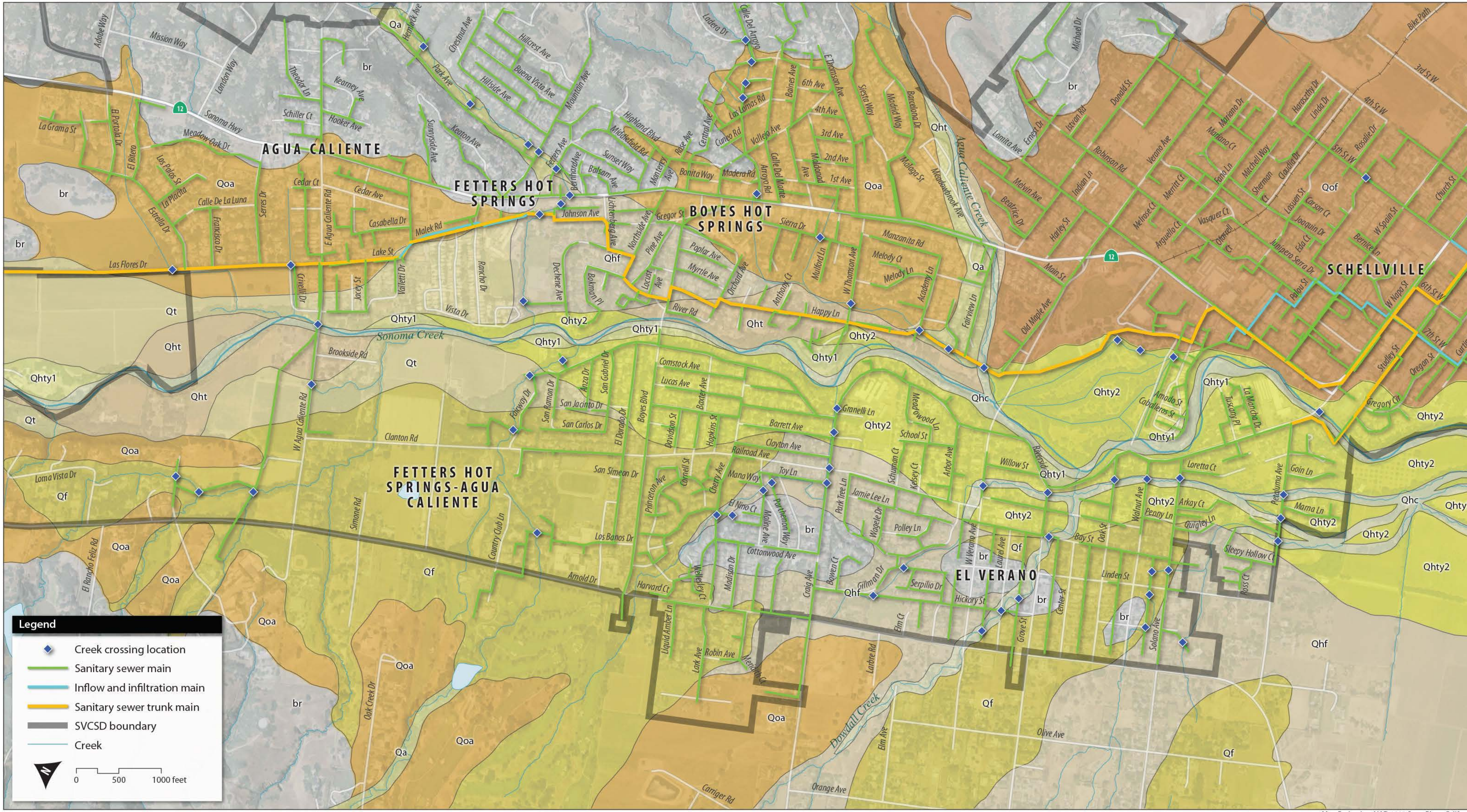
Figure SV-13. Quaternary Deposits (Area 2)



Map Projection: NAD 1983 State Plane California II
Imagery: USDA NAIP 2021; Geology: Witter et al., 2006

Quaternary Deposits

Geologic contact, dashed where approximate

Qhc	Historical stream channel deposits
Qhly	Latest Holocene alluvial fan levee deposits
Qhty1	Latest Holocene stream terrace deposits
Qhty2	Latest Holocene stream terrace deposits
Qhf	Holocene alluvial fan deposits
Qht	Holocene stream terrace deposits
Qf	Latest Pleistocene to Holocene alluvial fan deposits
Qt	Latest Pleistocene to Holocene stream terrace deposits
Qa	Latest Pleistocene to Holocene alluvial deposits, undifferentiated
Qof	Early to late Pleistocene alluvial fan deposits
Qoa	Early to late Pleistocene alluvial deposits, undifferentiated
br	Bedrock

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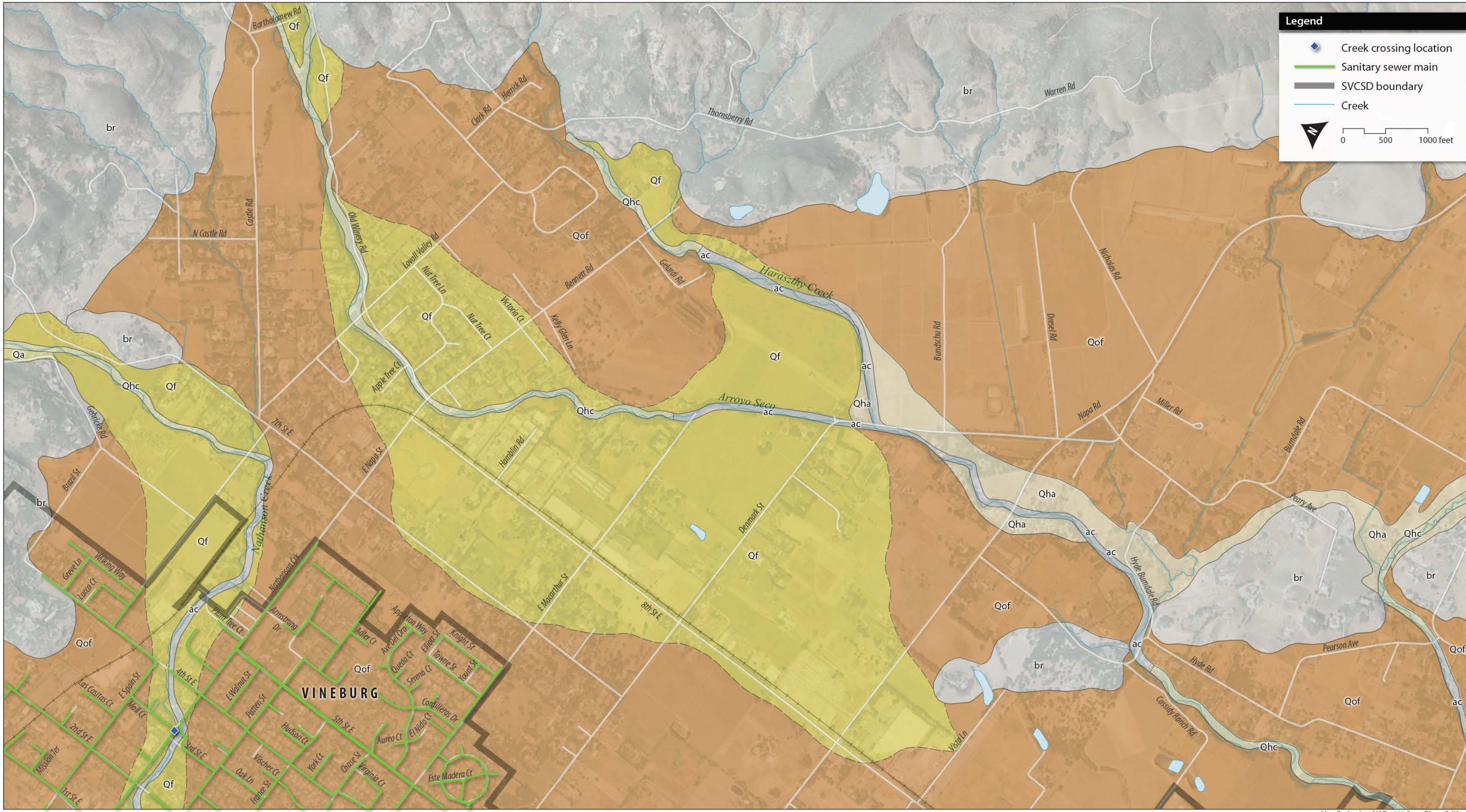
Figure SV-14. Quaternary Deposits (Area 3)



Map Projection: NAD 1983 State Plane California II
Imagery: USDA NAIP 2021; Geology: Witter et al., 2006

InfraTerra

Quaternary Deposits

Geologic contact, dashed where approximate

ac	Artificial stream channel (historic)
Qhc	Historical stream channel deposits
Qha	Holocene alluvial fan deposits, undifferentiated
Qf	Latest Pleistocene to Holocene alluvial fan deposits
Qa	Latest Pleistocene to Holocene alluvial deposits, undifferentiated
Qof	Early to late Pleistocene alluvial fan deposits
br	Bedrock

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Figure SV-15. Quaternary Deposits (Area 4)

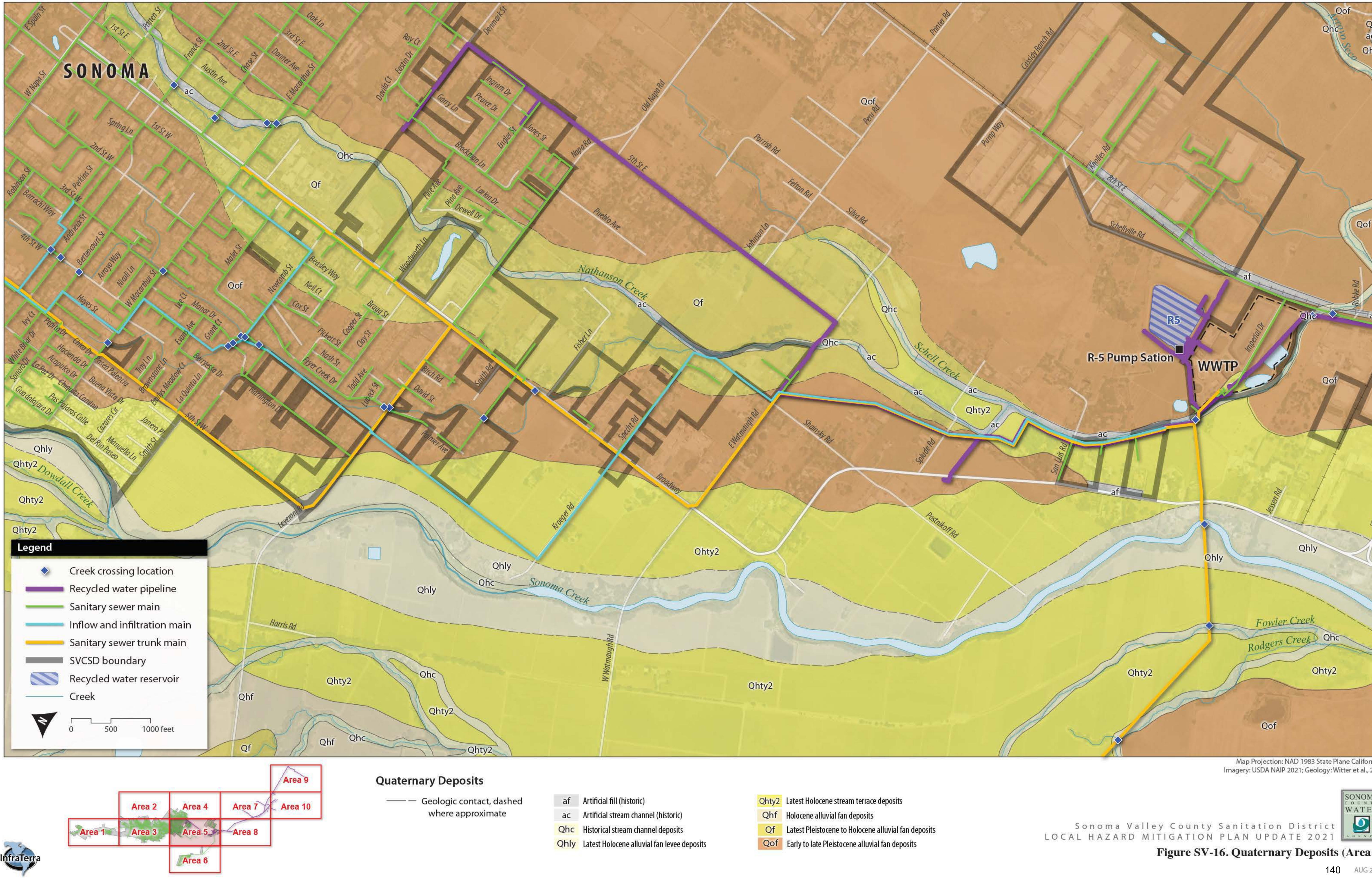

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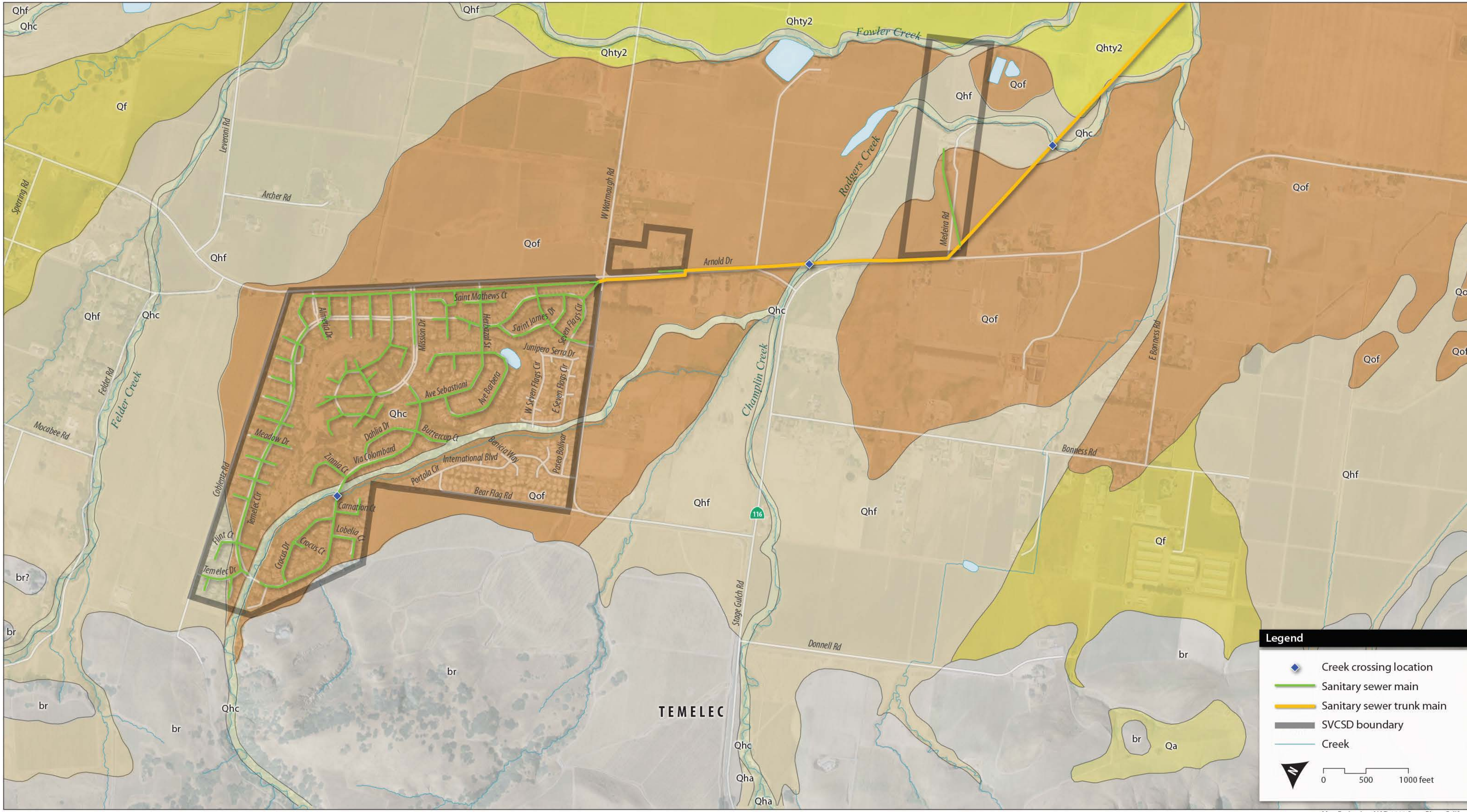
Figure SV-16. Quaternary Deposits (Area 5)



Map Projection: NAD 1983 State Plane California II
Imagery: USDA NAIP 2021; Geology: Witter et al., 2006

Quaternary Deposits

— — — Geologic contact, dashed where approximate

Qhc	Historical stream channel deposits
Qhty2	Latest Holocene stream terrace deposits
Qhf	Holocene alluvial fan deposits
Qht	Holocene stream terrace deposits
Qha	Holocene alluvial fan deposits, undifferentiated
Qf	Latest Pleistocene to Holocene alluvial fan deposits
Qa	Latest Pleistocene to Holocene alluvial deposits, undifferentiated
Qof	Early to late Pleistocene alluvial fan deposits
br	Bedrock

InfraTerra

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Figure SV-17. Quaternary Deposits (Area 6)

Map Projection: NAD 1983 State Plane California II
Imagery: USDA NAIP 2021; Geology: Witter et al., 2006

Quaternary Deposits

Geologic contact, dashed where approximate

af	Artificial fill (historic)
alf	Artificial levee fill (historic)
Qhc	Historical stream channel deposits
Qhbm	Holocene San Francisco Bay mud
Qhf	Holocene alluvial fan deposits
Qha	Holocene alluvial fan deposits, undifferentiated
Qpf	Latest Pleistocene alluvial fan deposits
Qof	Early to late Pleistocene alluvial fan deposits
br	Bedrock

InfraTerra

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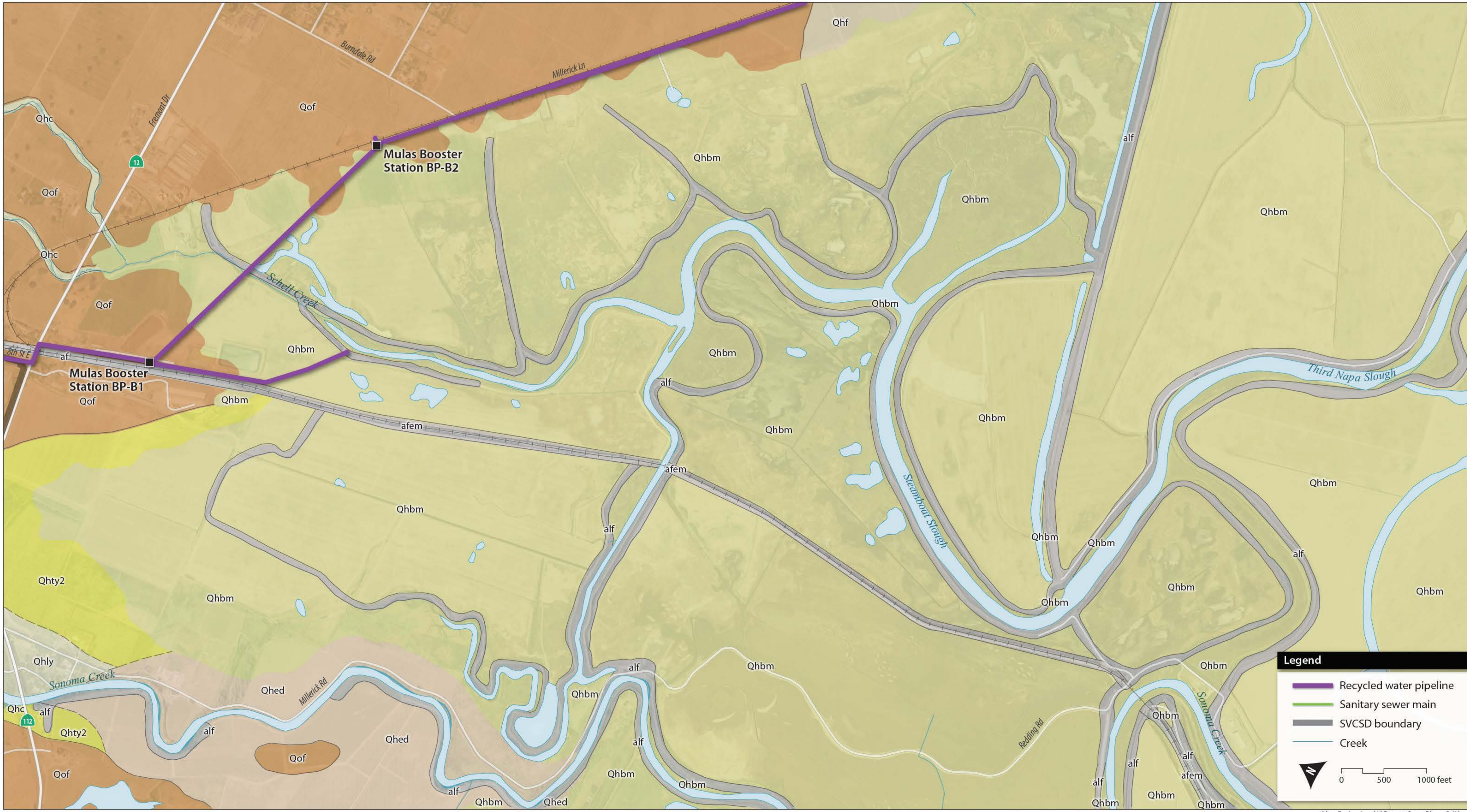
Figure SV-18. Quaternary Deposits (Area 7)



Map Projection: NAD 1983 State Plane California II
Imagery: USDA NAIP 2021; Geology: Witter et al., 2006

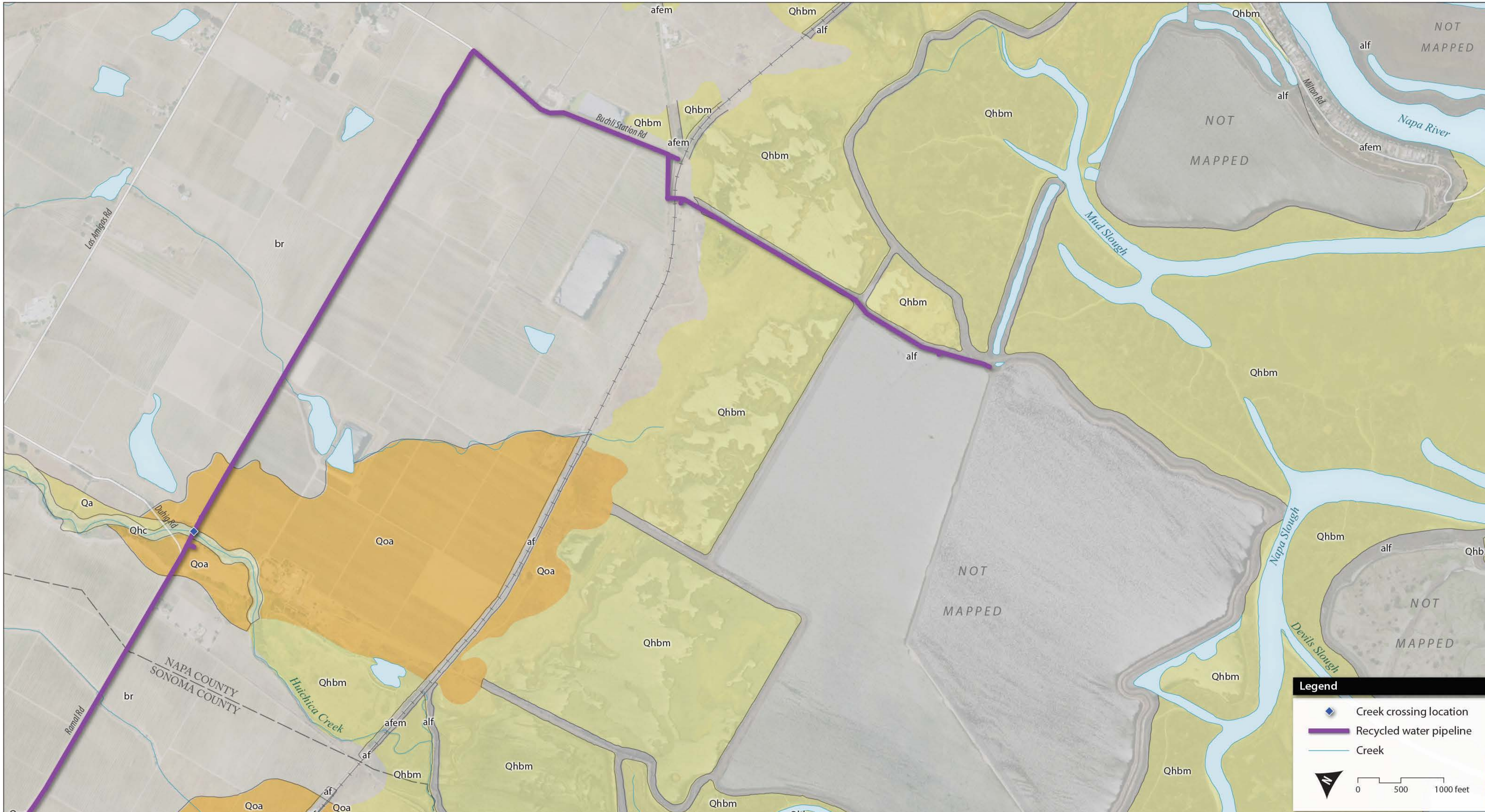
Quaternary Deposits

Geologic contact, dashed where approximate

af	Artificial fill (historic)
alf	Artificial levee fill (historic)
Qhc	Historical stream channel deposits
Qhly	Latest Holocene alluvial fan levee deposits
Qhty2	Latest Holocene stream terrace deposits
Qhbm	Holocene San Francisco Bay mud
Qhed	Holocene estuarine delta deposits
Qhf	Holocene alluvial fan deposits
Qof	Early to late Pleistocene alluvial fan deposits

InfraTerra

Figure SV-19. Quaternary Deposits (Area 8)



Map Projection: NAD 1983 State Plane California II
Imagery: USDA NAIP 2021; Geology: Witter et al., 2006

Quaternary Deposits

—— — Geologic contact, dashed where approximate

af	Artificial fill (historic)
alf	Artificial levee fill (historic)
Qhc	Historical stream channel deposits
Qhbm	Holocene San Francisco Bay mud
Qa	Latest Pleistocene to Holocene alluvial deposits, undifferentiated
Qoa	Early to late Pleistocene alluvial deposits, undifferentiated
br	Bedrock

InfraTerra

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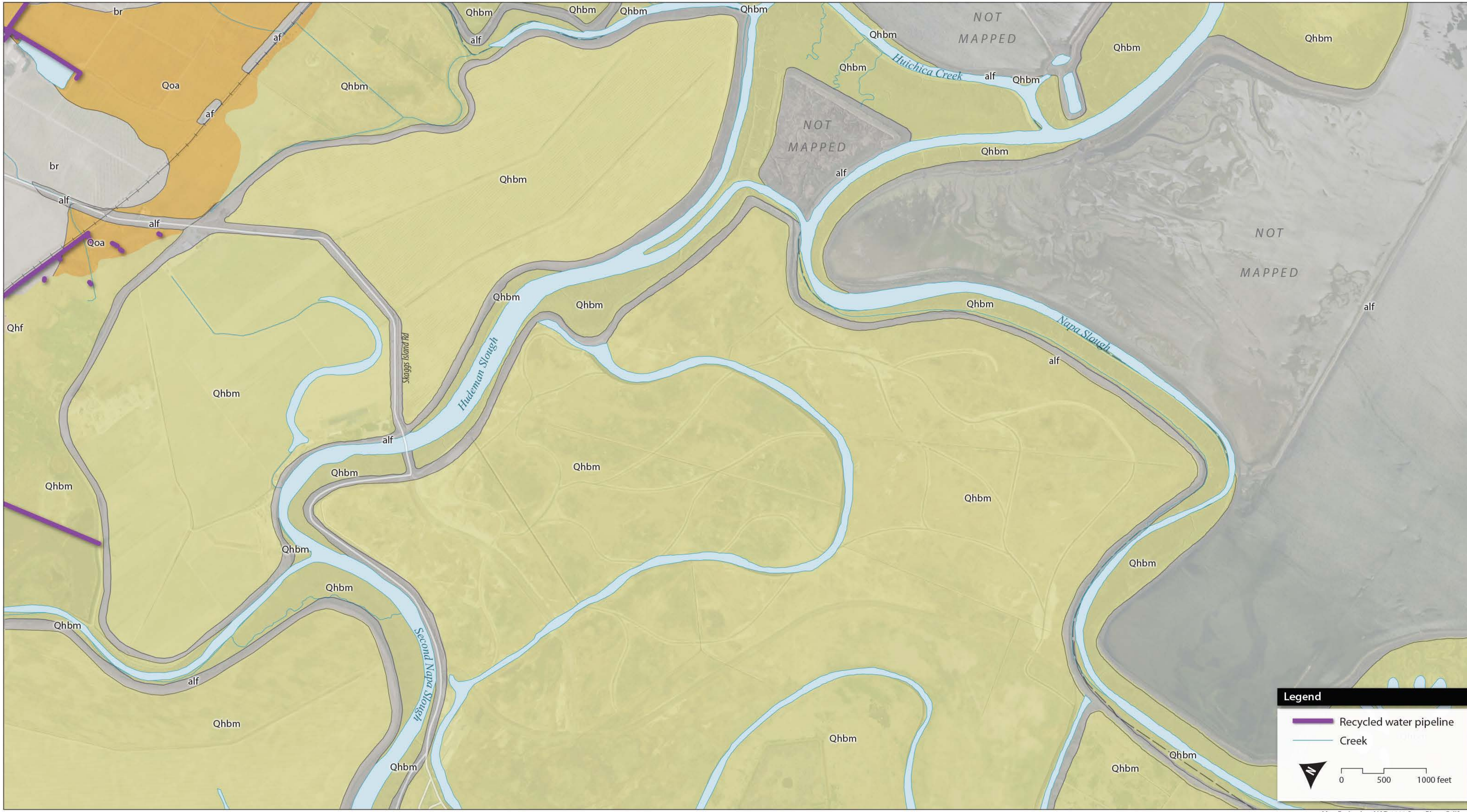
Figure SV-20. Quaternary Deposits (Area 9)

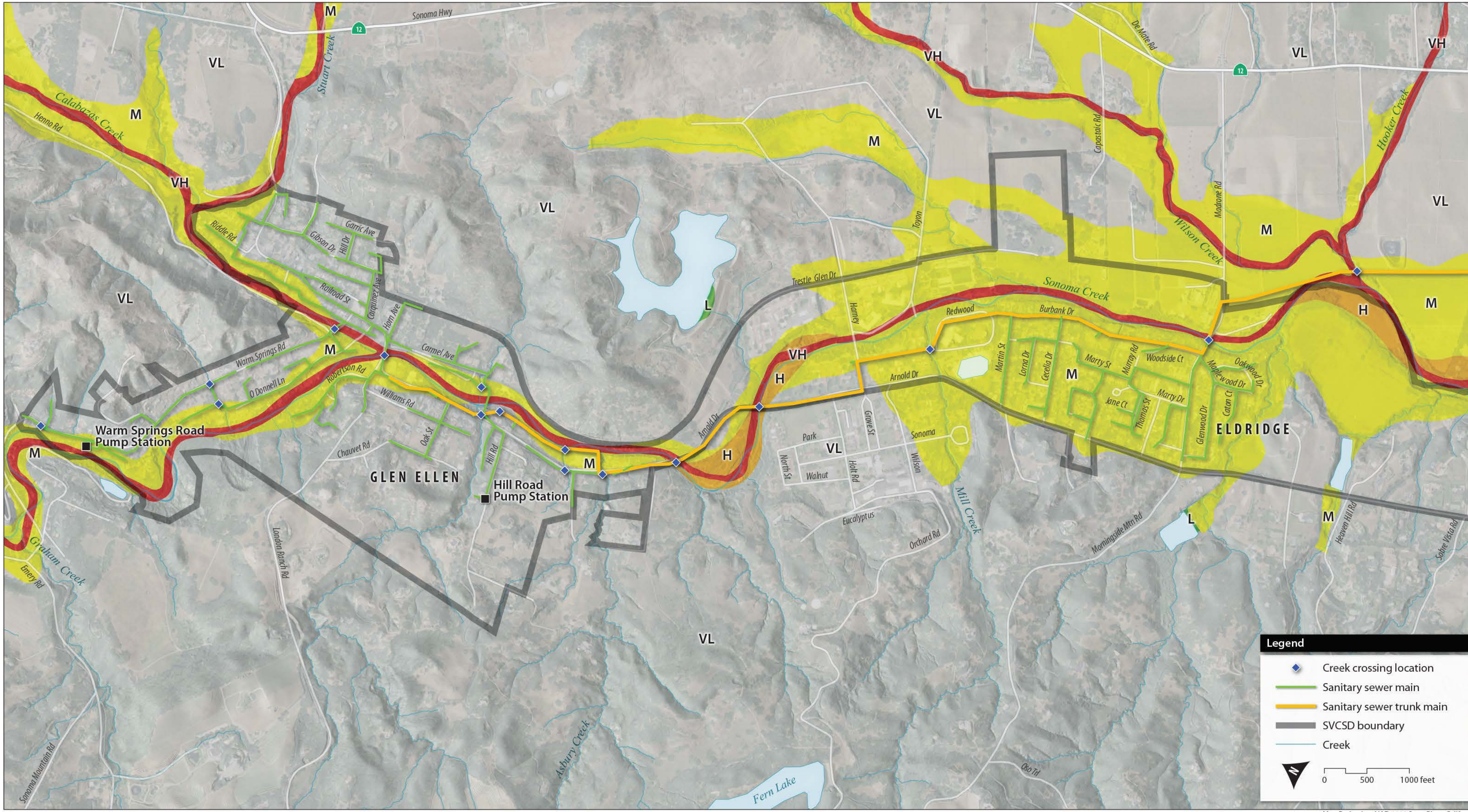


Map Projection: NAD 1983 State Plane California II
Imagery: USDA NAIP 2021; Geology: Witter et al., 2006

Quaternary Deposits

- Geologic contact, dashed where approximate
- af Artificial fill (historic)
- alf Artificial levee fill (historic)
- Qhbm Holocene San Francisco Bay mud
- Qhf Holocene alluvial fan deposits
- Qoa Early to late Pleistocene alluvial deposits, undifferentiated
- br Bedrock

Figure SV-21. Quaternary Deposits (Area 10)



Map Projection: NAD 1983 State Plane California II
Imagery: USDA NAIP 2021; Liquefaction: Witter et al., 2006

InfraTerra

Liquefaction Susceptibility

VH Very high | H High | M Moderate | L Low | VL Very low (no color)

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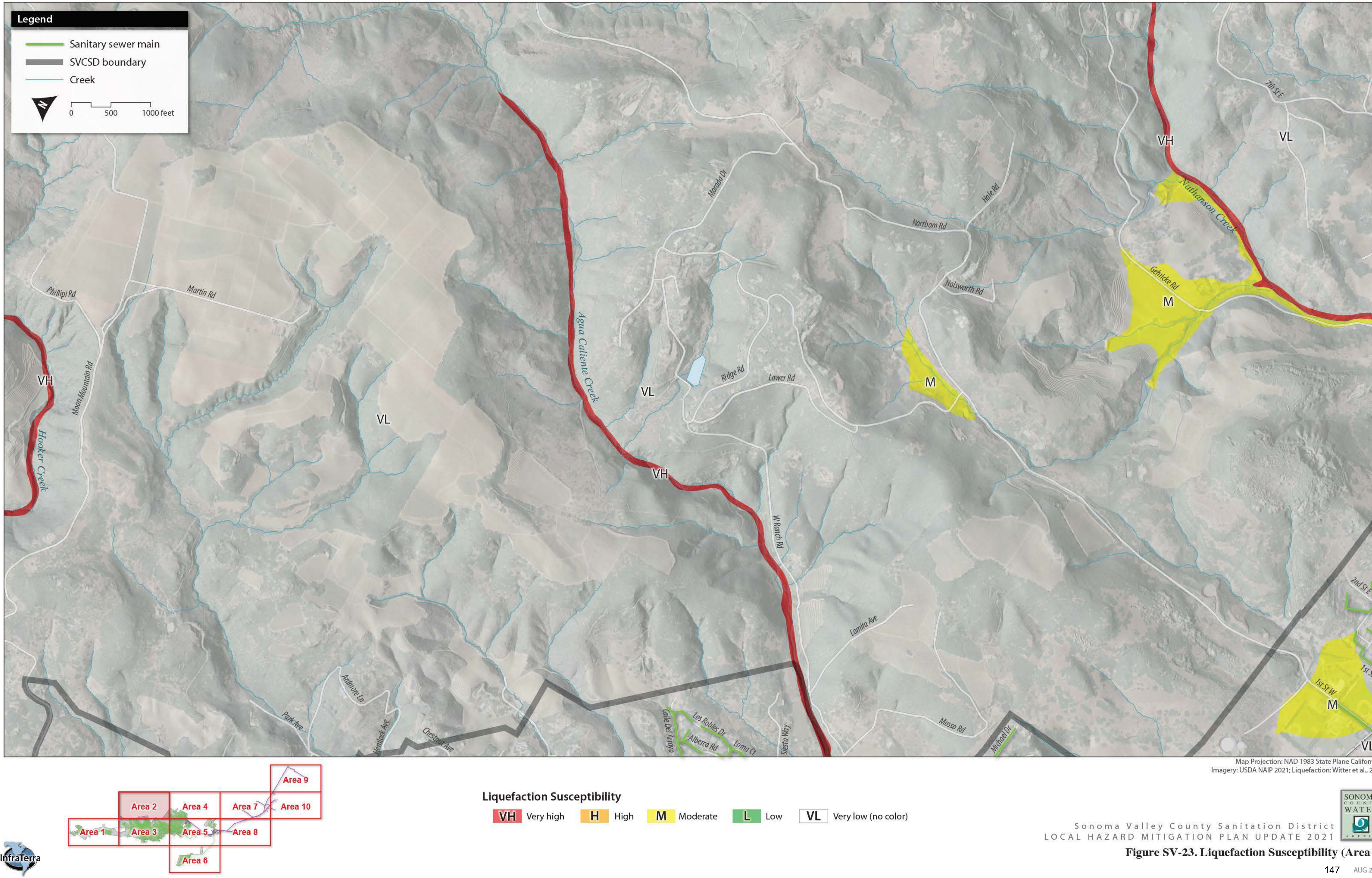
Figure SV-22. Liquefaction Susceptibility (Area 1)



Map Projection: NAD 1983 State Plane California II
Imagery: USDA NAIP 2021; Liquefaction: Witter et al., 2006

Liquefaction Susceptibility

VH Very high | H High | M Moderate | L Low | VL Very low (no color)

InfraTerra

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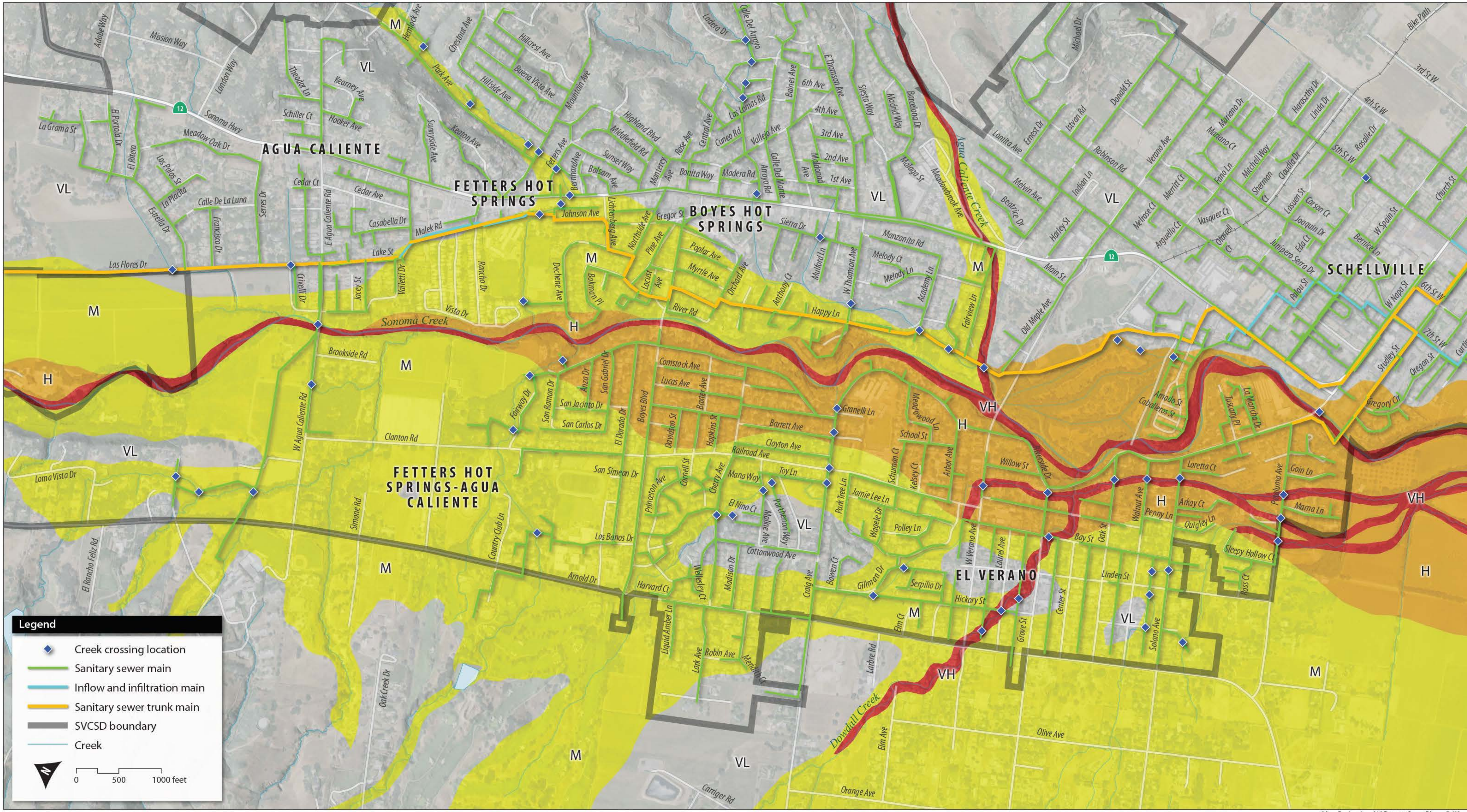
Figure SV-23. Liquefaction Susceptibility (Area 2)



Map Projection: NAD 1983 State Plane California II
Imagery: USDA NAIP 2021; Liquefaction: Witter et al., 2006

Liquefaction Susceptibility

VH Very high | H High | M Moderate | L Low | VL Very low (no color)

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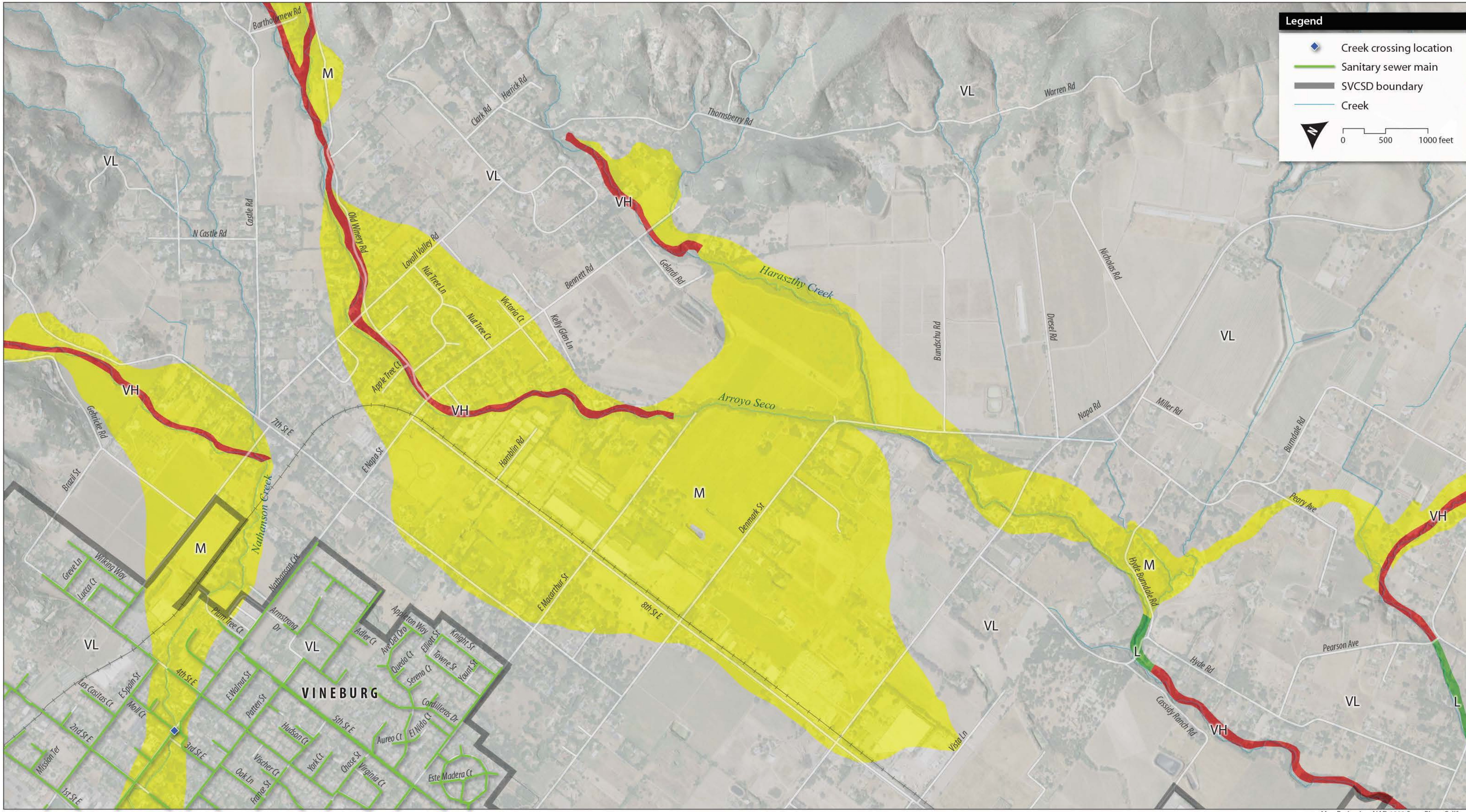
Figure SV-24. Liquefaction Susceptibility (Area 3)



Liquefaction Susceptibility

VH Very high | H High | M Moderate | L Low | VL Very low (no color)

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Figure SV-25. Liquefaction Susceptibility (Area 4)

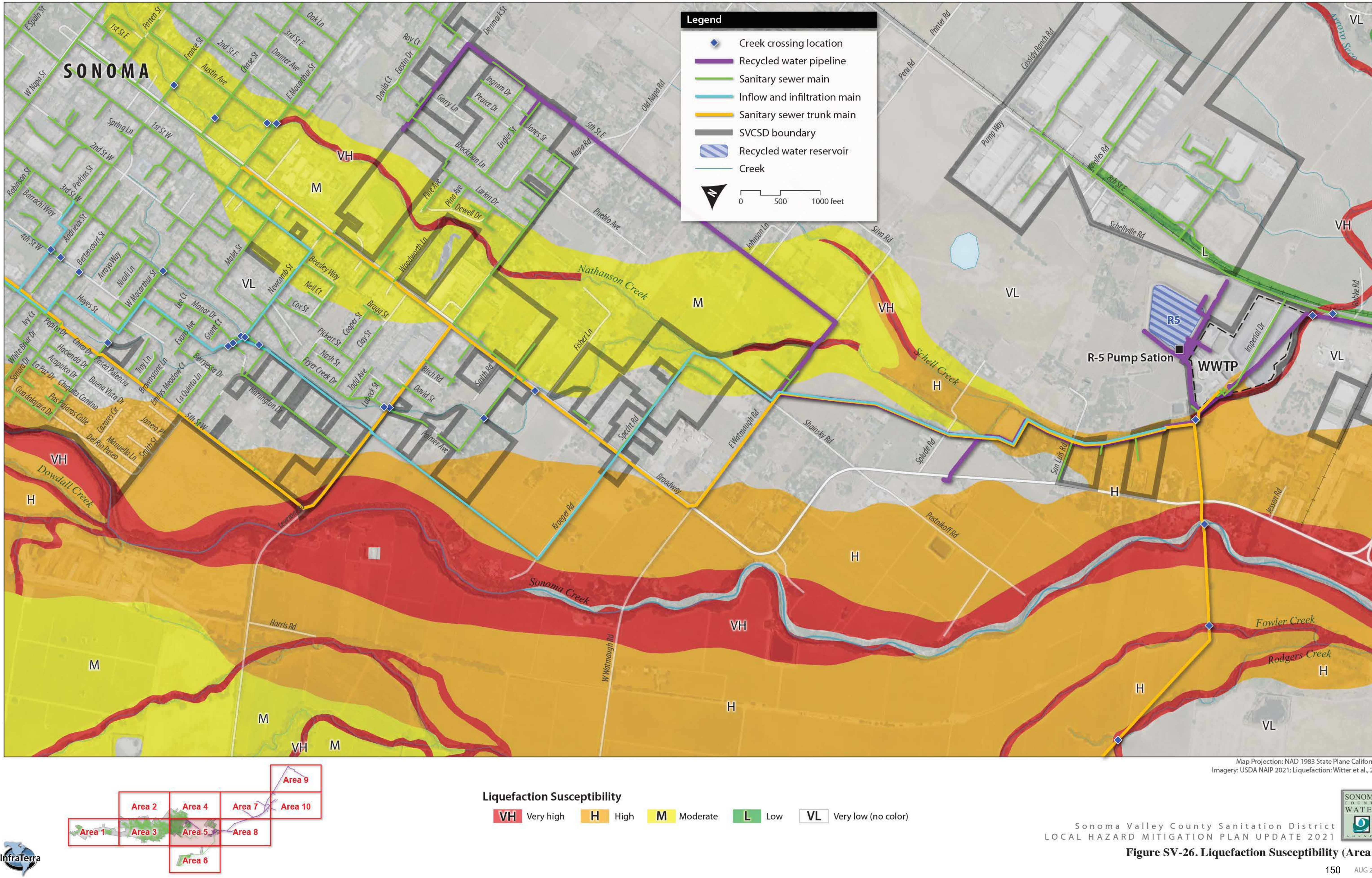

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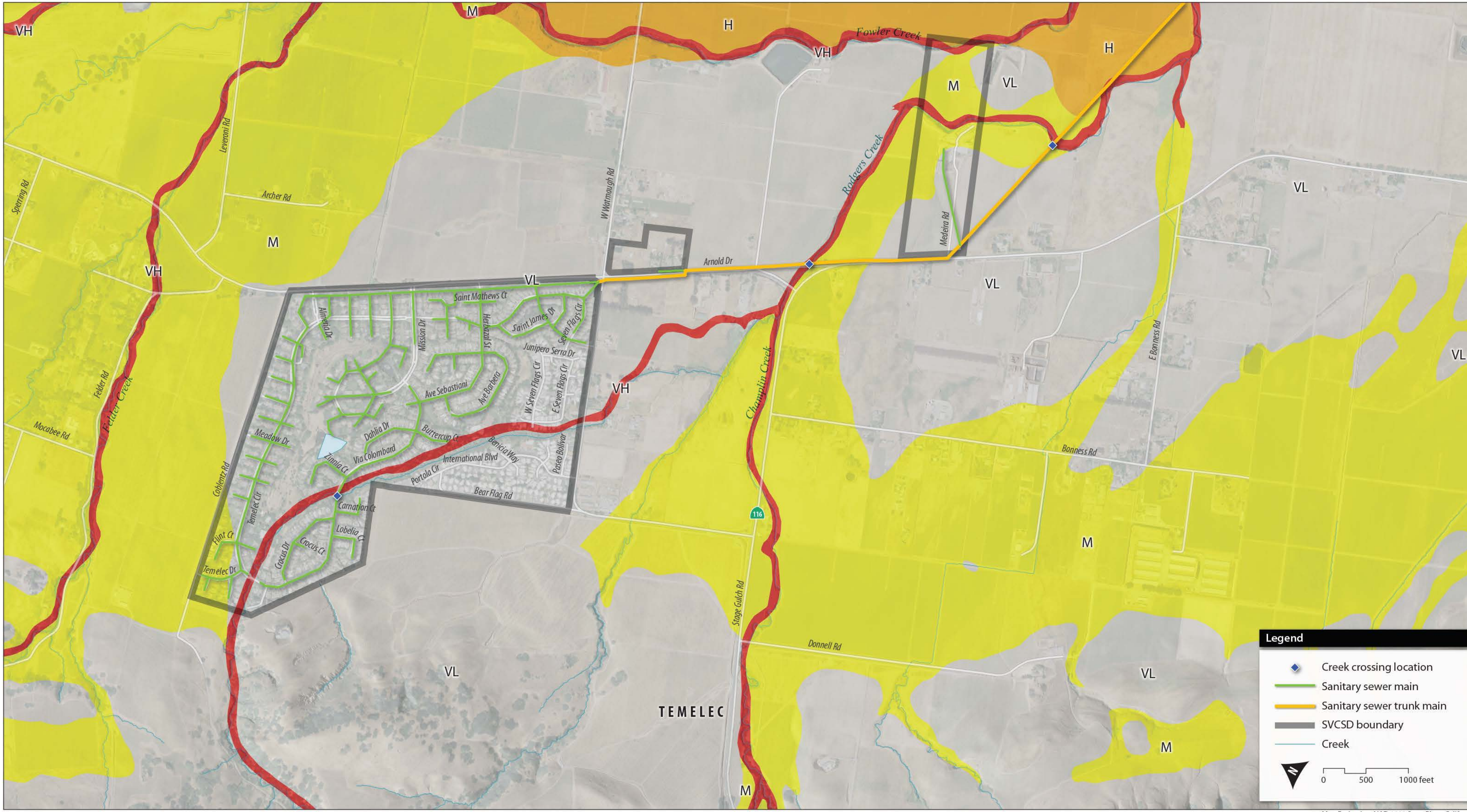
Figure SV-26. Liquefaction Susceptibility (Area 5)



Liquefaction Susceptibility

VH Very high | H High | M Moderate | L Low | VL Very low (no color)

InfraTerra

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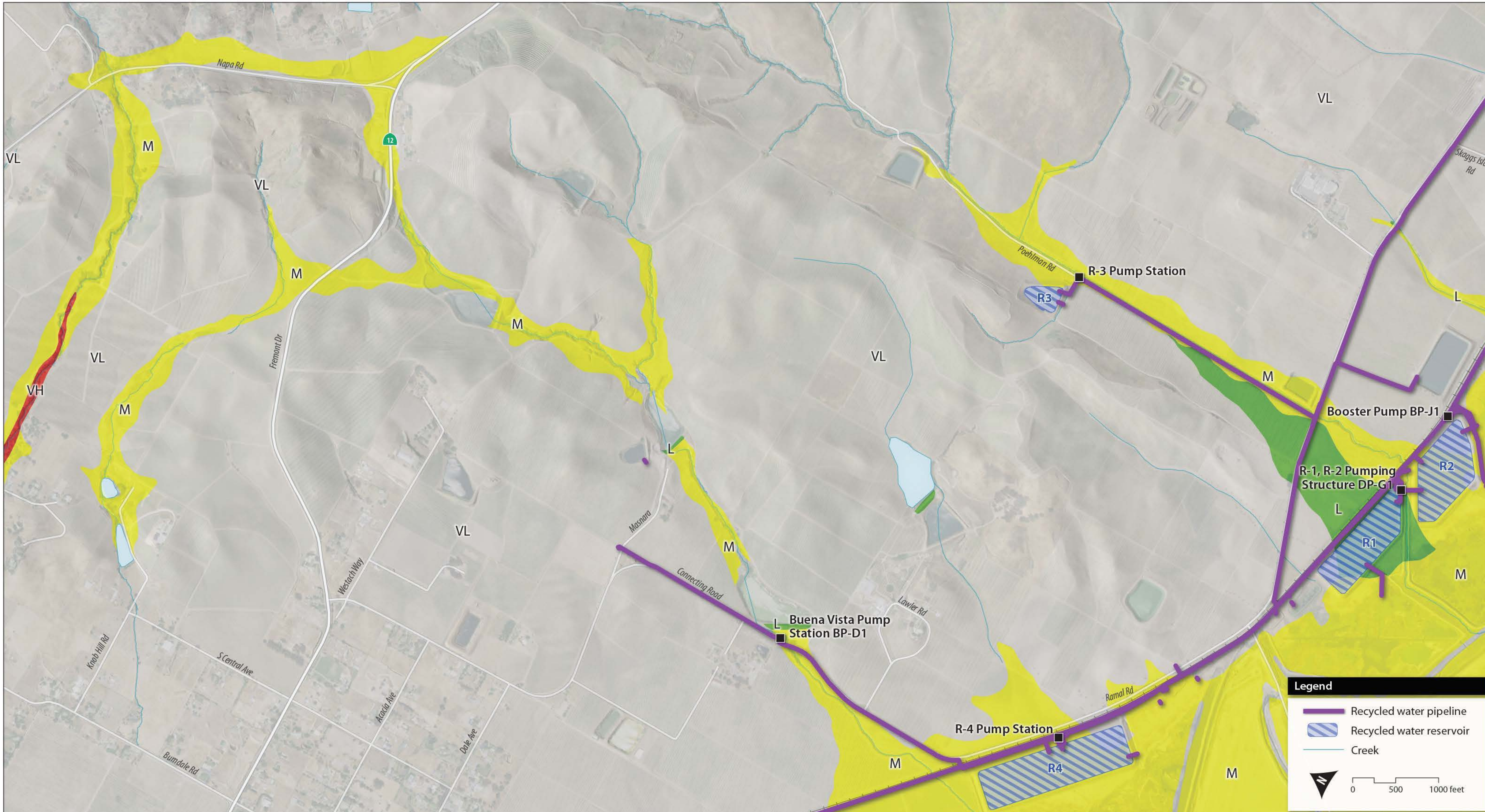
Figure SV-27. Liquefaction Susceptibility (Area 6)



Map Projection: NAD 1983 State Plane California II
Imagery: USDA NAIP 2021; Liquefaction: Witter et al., 2006

Liquefaction Susceptibility

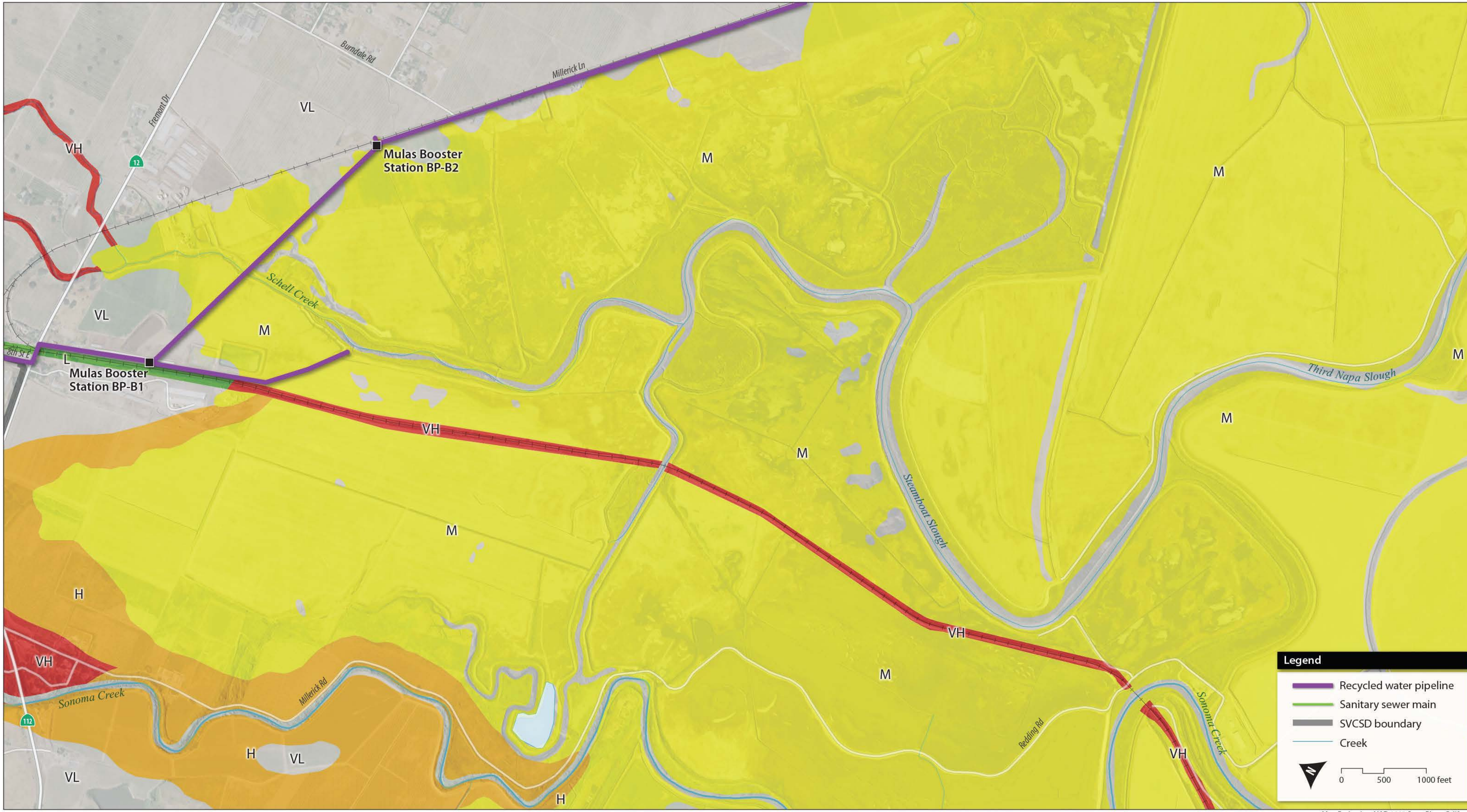
VH Very high | H High | M Moderate | L Low | VL Very low (no color)

InfraTerra

SONOMA COUNTY WATER AGENCY

Sonoma Valley County Sanitation District
LOCAL HAZARD MITIGATION PLAN UPDATE 2021

Figure SV-28. Liquefaction Susceptibility (Area 7)



Map Projection: NAD 1983 State Plane California II
Imagery: USDA NAIP 2021; Liquefaction: Witter et al., 2006

Liquefaction Susceptibility

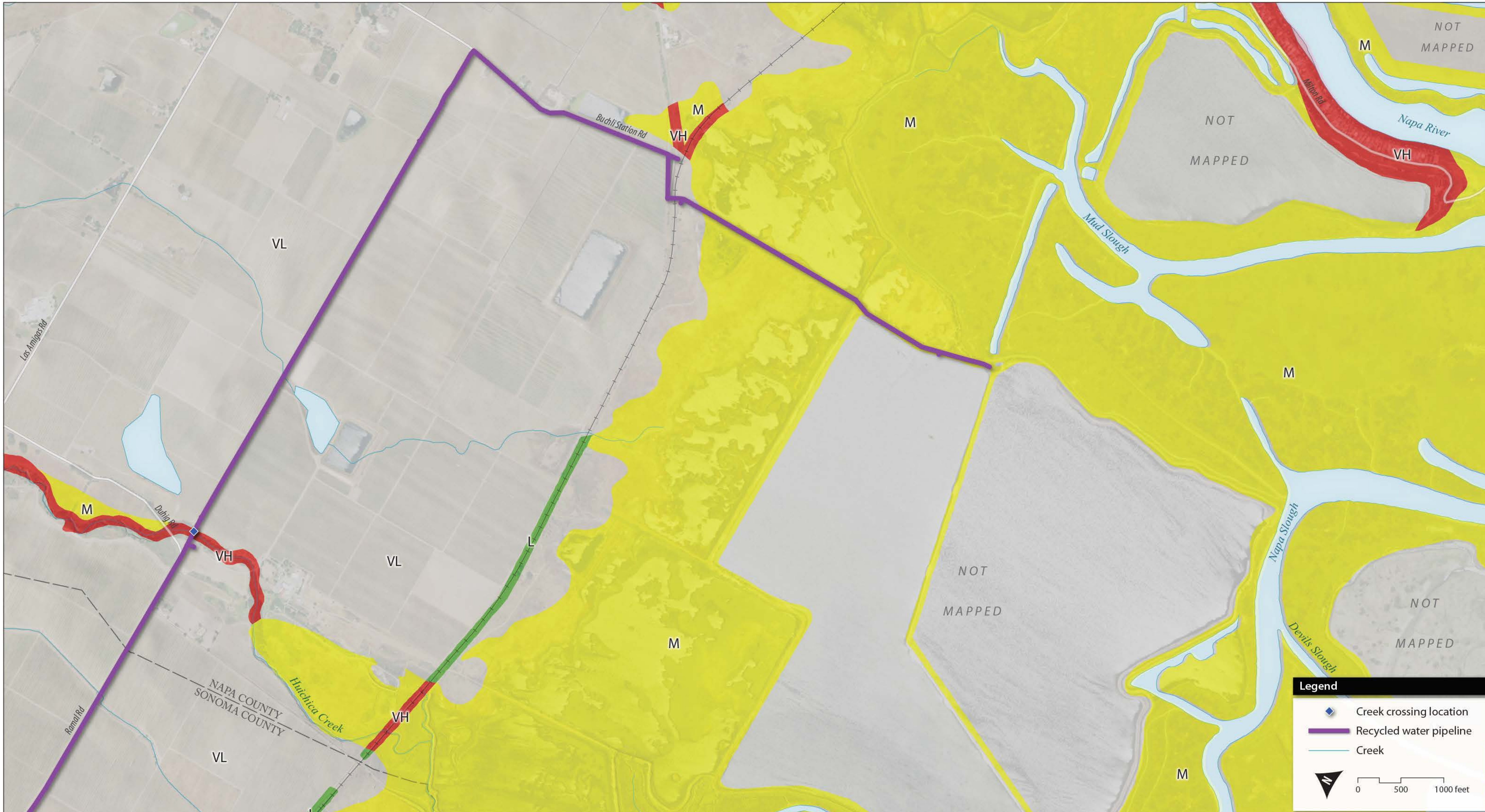
VH Very high | H High | M Moderate | L Low | VL Very low (no color)

InfraTerra

SONOMA COUNTY WATER AGENCY

Sonoma Valley County Sanitation District
LOCAL HAZARD MITIGATION PLAN UPDATE 2021

Figure SV-29. Liquefaction Susceptibility (Area 8)

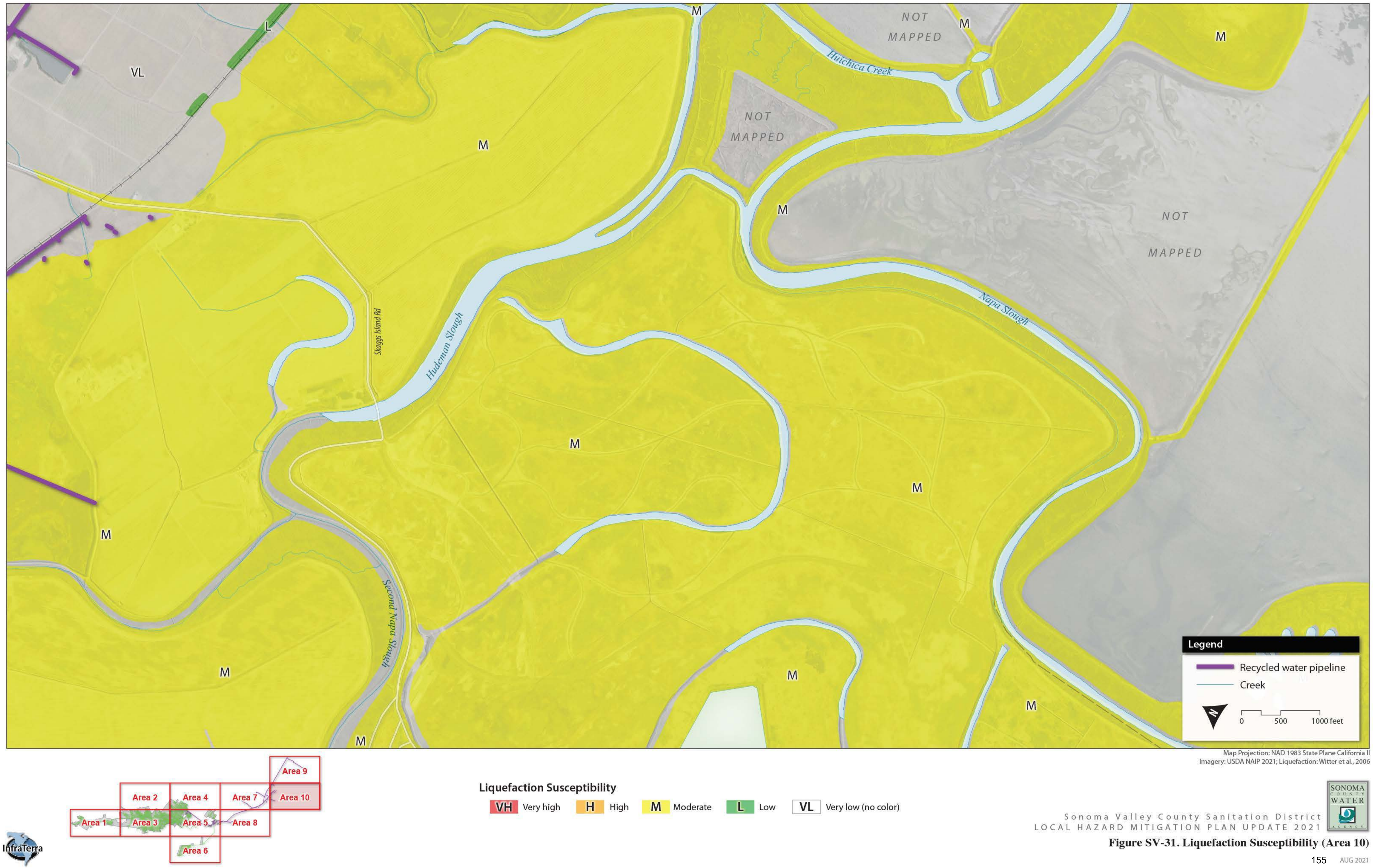


Map Projection: NAD 1983 State Plane California II
Imagery: USDA NAIP 2021; Liquefaction: Witter et al., 2006

Liquefaction Susceptibility

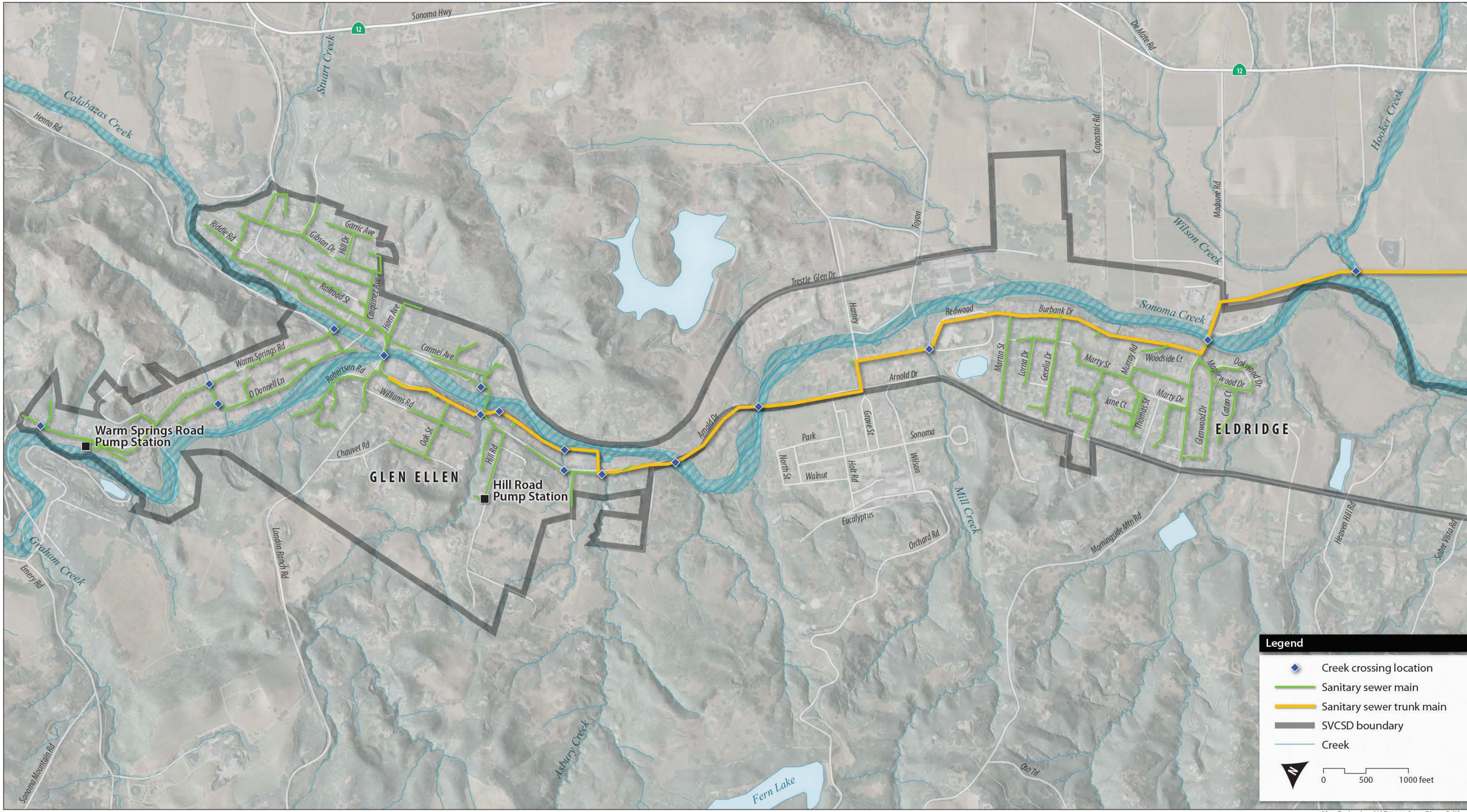
VH Very high | H High | M Moderate | L Low | VL Very low (no color)

Figure SV-30. Liquefaction Susceptibility (Area 9)



Sonoma Valley County Sanitation District
LOCAL HAZARD MITIGATION PLAN UPDATE 2021

Figure SV-31. Liquefaction Susceptibility (Area 10)



Map Projection: NAD 1983 State Plane California II
Imagery: USDA NAIP 2021; Flood: FEMA

InfraTerra

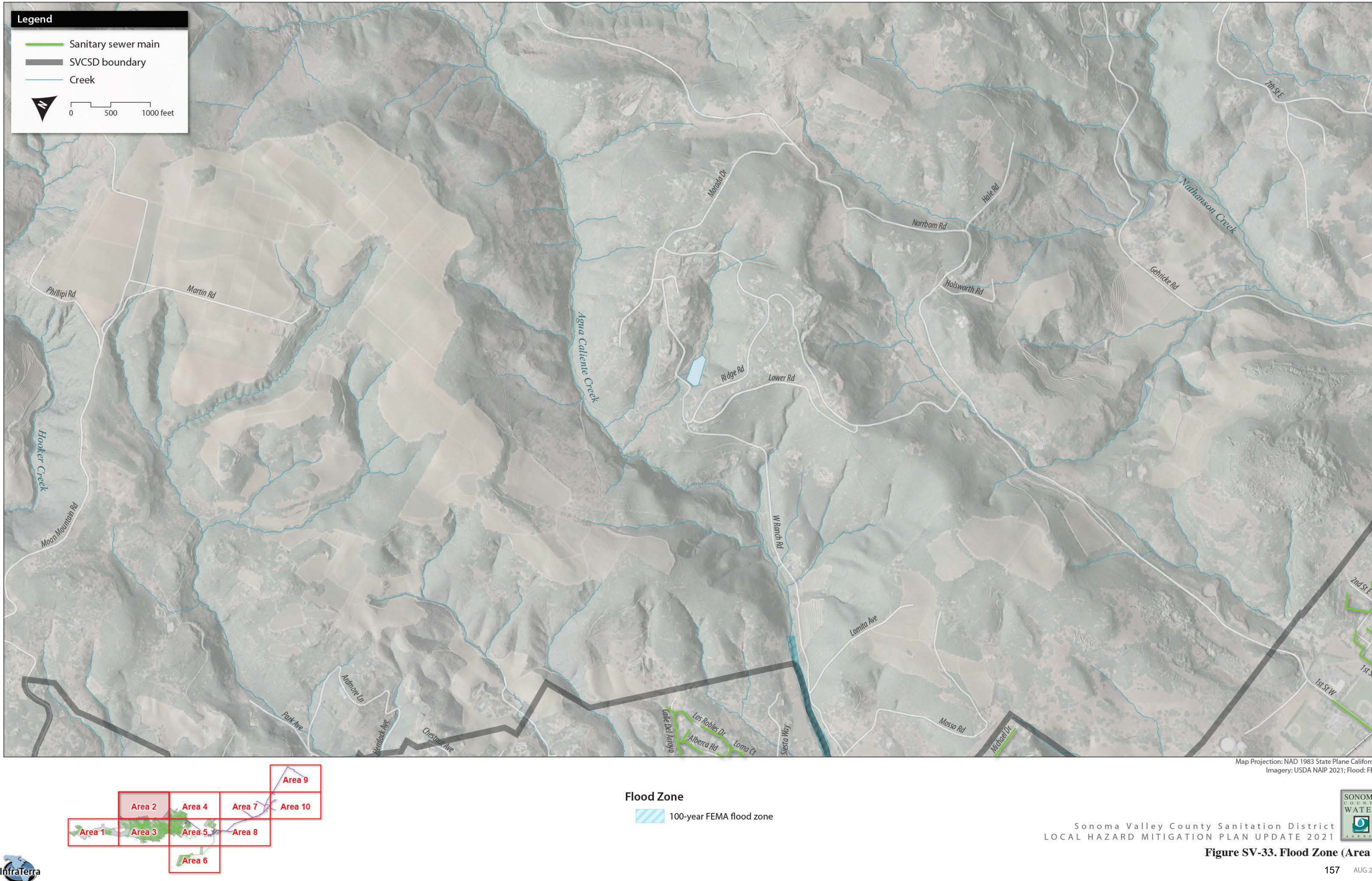
Flood Zone

100-year FEMA flood zone

SONOMA COUNTY WATER AGENCY

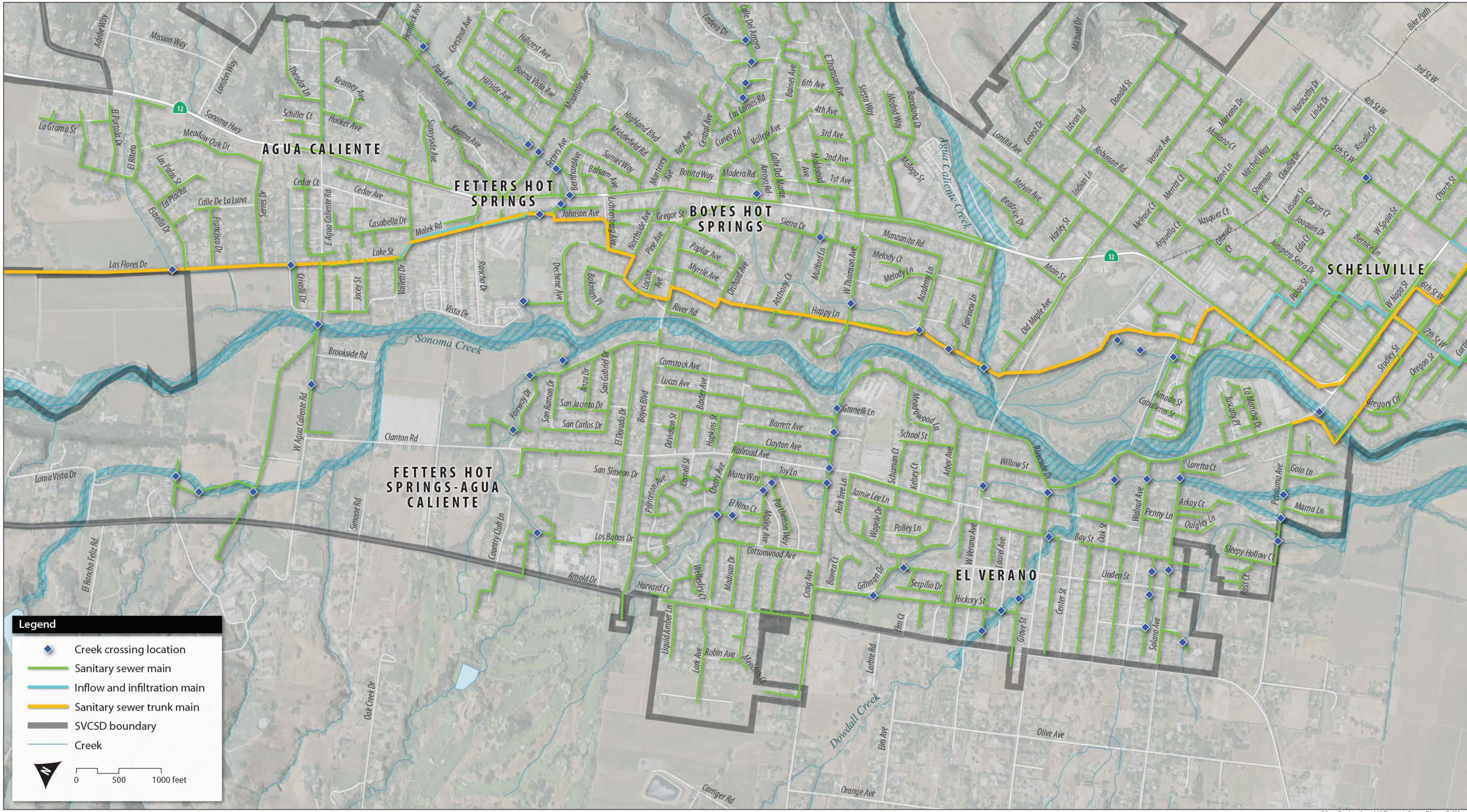
Sonoma Valley County Sanitation District
LOCAL HAZARD MITIGATION PLAN UPDATE 2021

Figure SV-32. Flood Zone (Area 1)



Sonoma Valley County Sanitation District
LOCAL HAZARD MITIGATION PLAN UPDATE 2021

Figure SV-33. Flood Zone (Area 2)



Map Projection: NAD 1983 State Plane California II
Imagery: USDA NAIP 2021; Flood: FEMA

Flood Zone

100-year FEMA flood zone

Sonoma Valley County Sanitation District
LOCAL HAZARD MITIGATION PLAN UPDATE 2021

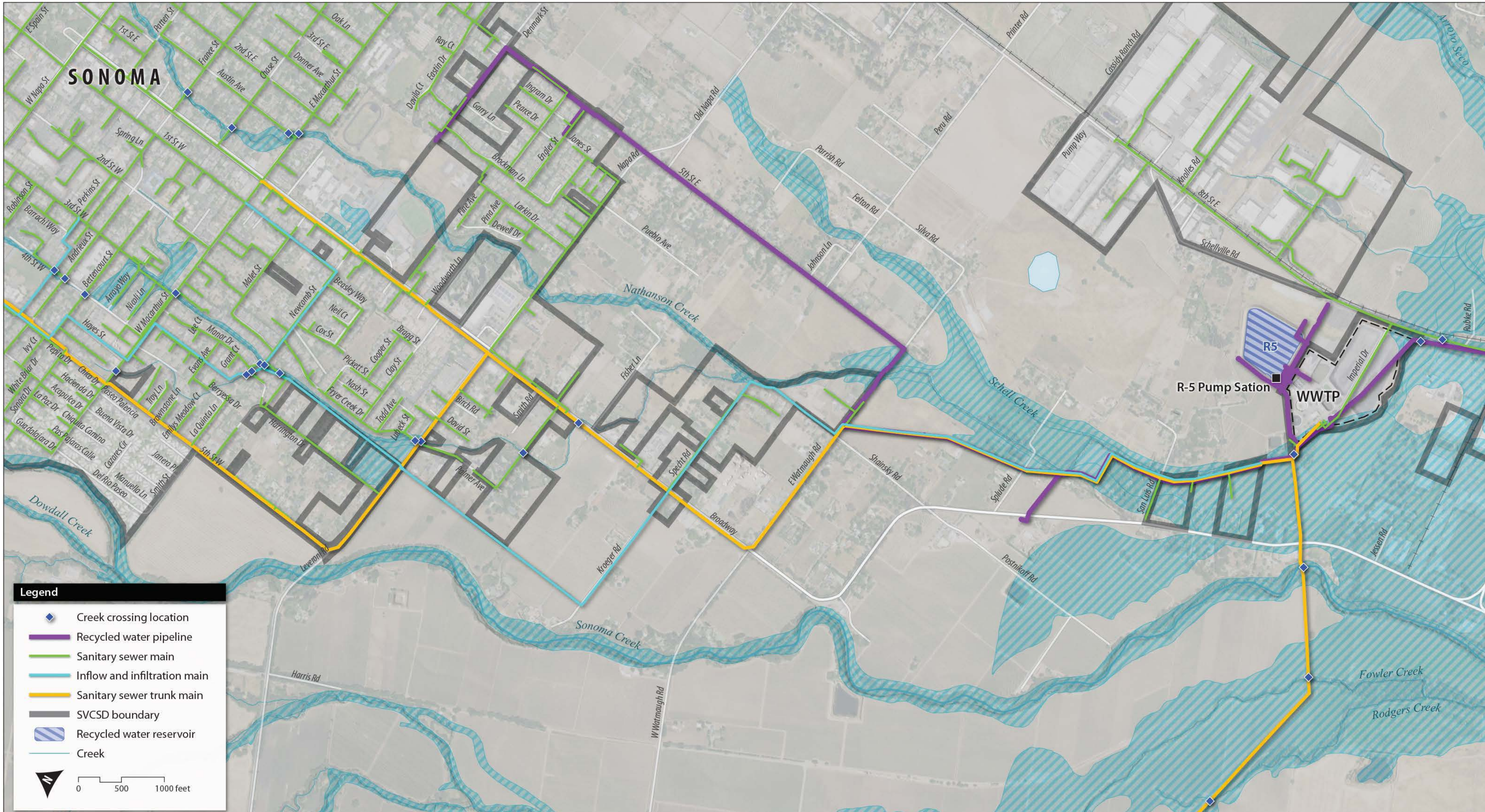
Figure SV-34. Flood Zone (Area 3)

Flood Zone

100-year FEMA flood zone

Sonoma Valley County Sanitation District
LOCAL HAZARD MITIGATION PLAN UPDATE 2021

Figure SV-35. Flood Zone (Area 4)



Flood Zone

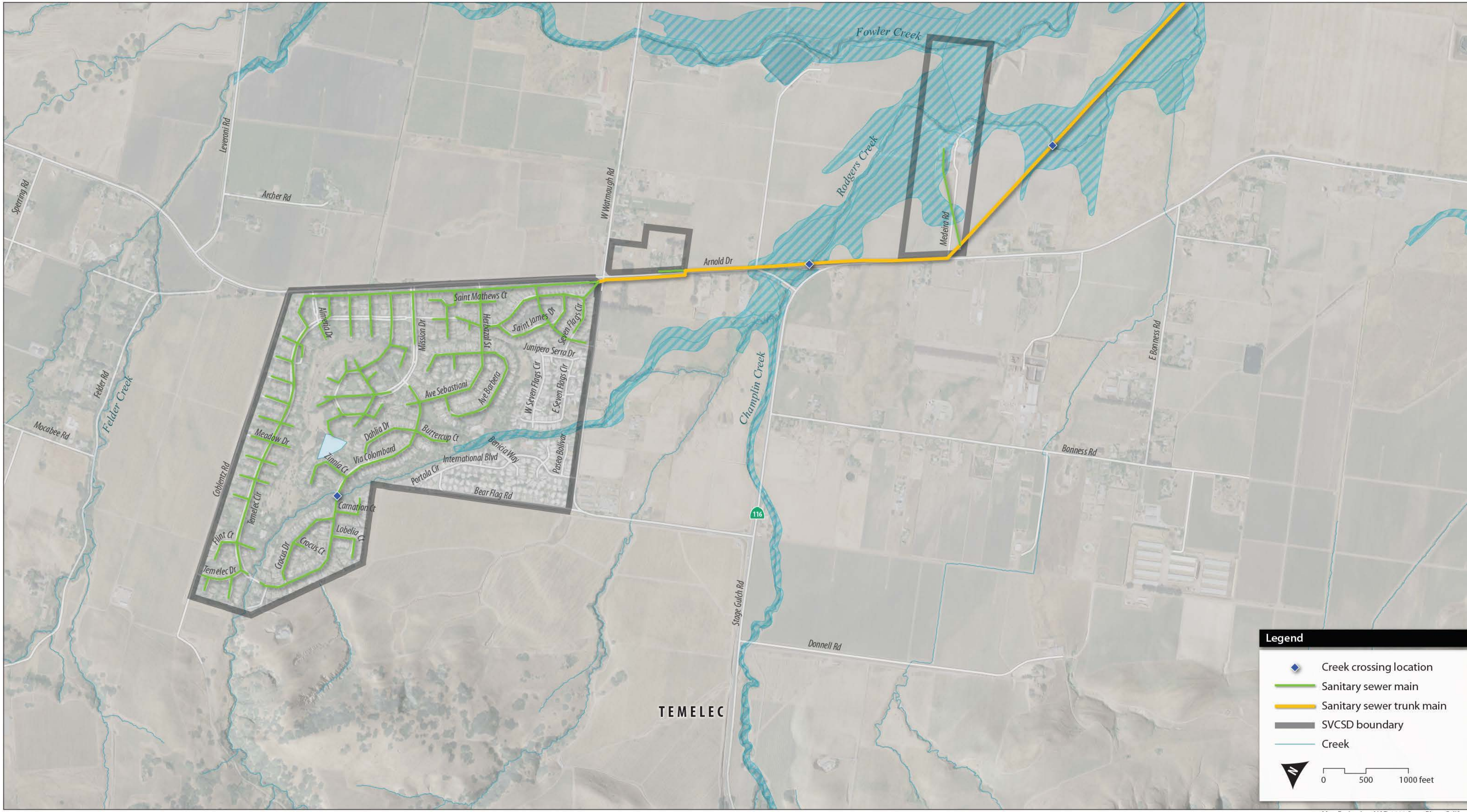
100-year FEMA flood zone

InfraTerra

Sonoma Valley County Sanitation District
LOCAL HAZARD MITIGATION PLAN UPDATE 2021

SONOMA COUNTY WATER AGENCY

Figure SV-36. Flood Zone (Area 5)



Map Projection: NAD 1983 State Plane California II
Imagery: USDA NAIP 2021; Flood: FEMA

InfraTerra

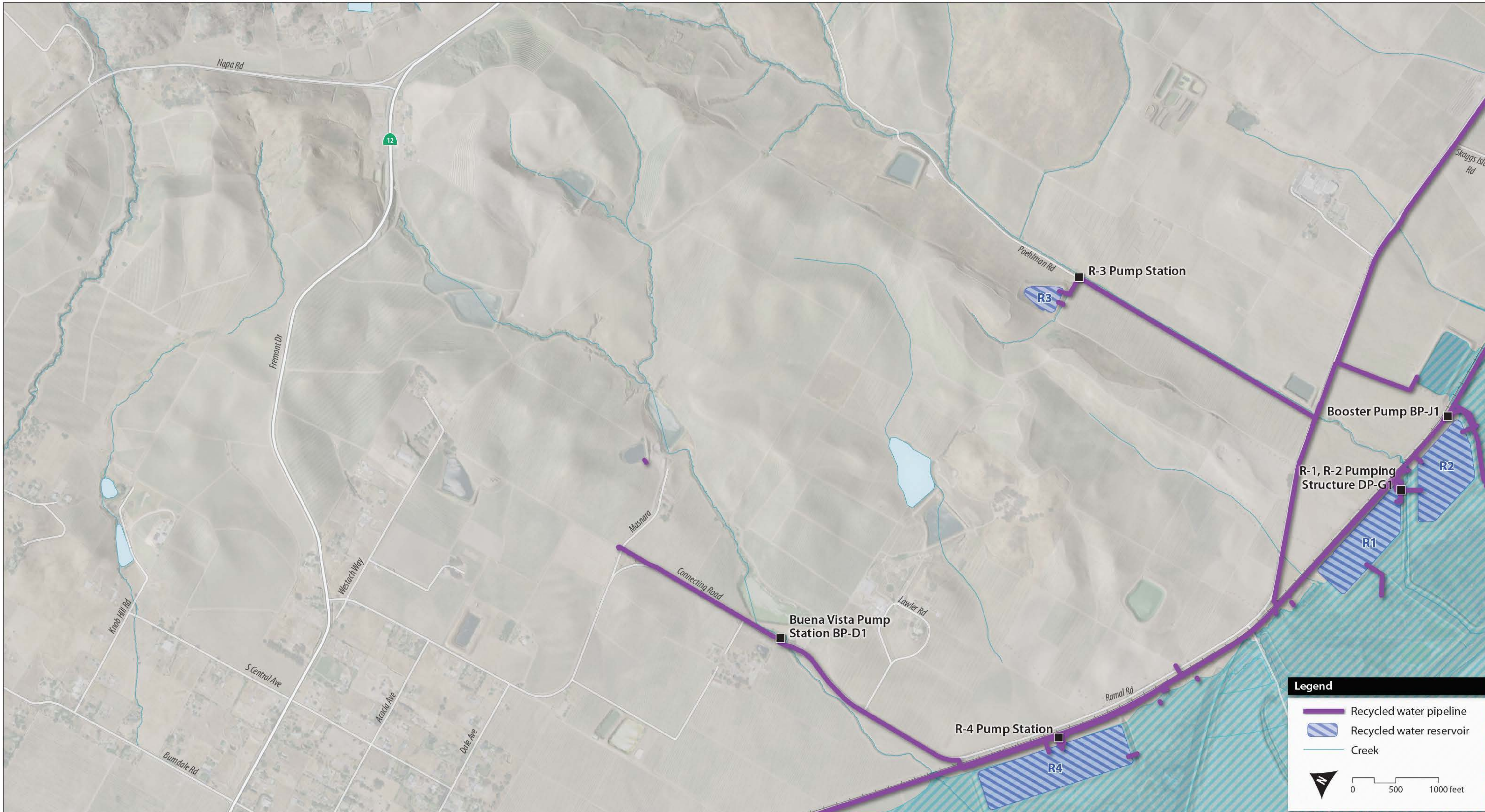
Flood Zone

100-year FEMA flood zone

SONOMA COUNTY WATER AGENCY

Sonoma Valley County Sanitation District
LOCAL HAZARD MITIGATION PLAN UPDATE 2021

Figure SV-37. Flood Zone (Area 6)



Map Projection: NAD 1983 State Plane California II
Imagery: USDA NAIP 2021; Flood: FEMA

Flood Zone

100-year FEMA flood zone

InfraTerra

SONOMA COUNTY WATER AGENCY

Sonoma Valley County Sanitation District
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Figure SV-38. Flood Zone (Area 7)

Map Projection: NAD 1983 State Plane California II
Imagery: USDA NAIP 2021; Flood: FEMA

Flood Zone

100-year FEMA flood zone

InfraTerra

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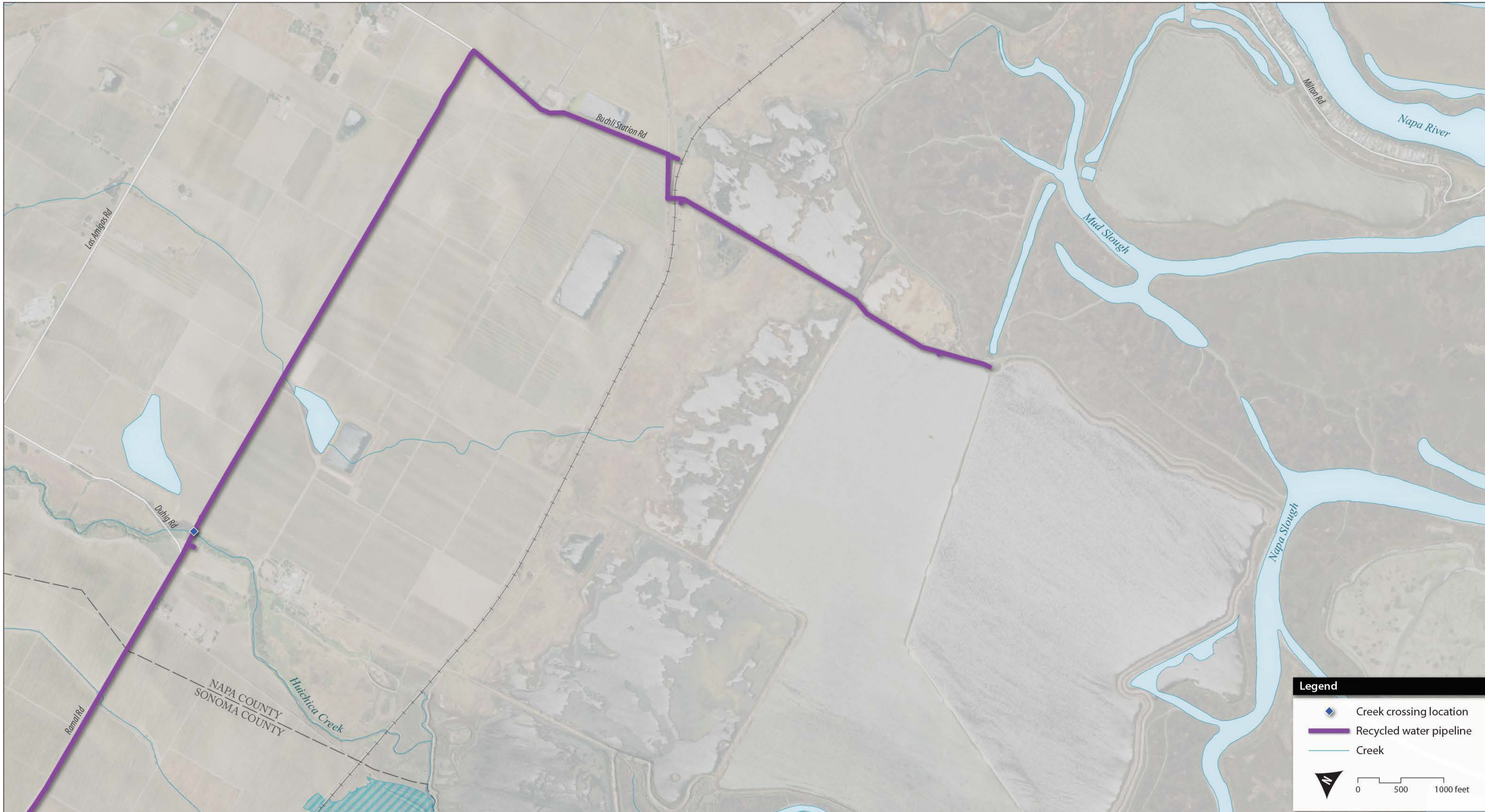
LOCAL HAZARD MITIGATION PLAN UPDATE 2021

SONOMA COUNTY WATER AGENCY

Figure SV-39. Flood Zone (Area 8)



Map Projection: NAD 1983 State Plane California II
Imagery: USDA NAIP 2021; Flood: FEMA

Flood Zone

100-year FEMA flood zone

InfraTerra

Sonoma Valley County Sanitation District
LOCAL HAZARD MITIGATION PLAN UPDATE 2021

Figure SV-40. Flood Zone (Area 9)

Map Projection: NAD 1983 State Plane California II
Imagery: USDA NAIP 2021; Flood: FEMA

Flood Zone

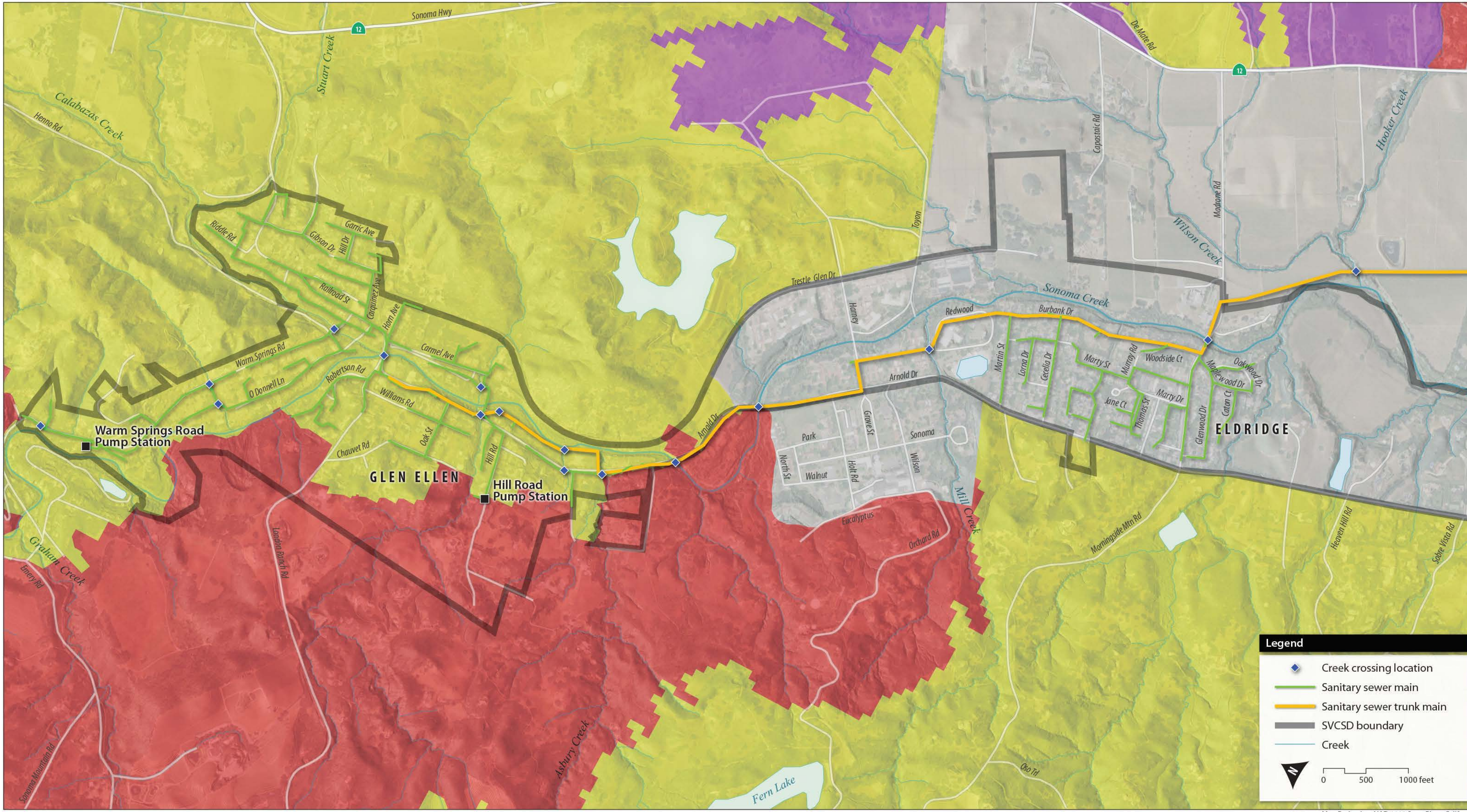
100-year FEMA flood zone

InfraTerra

Sonoma Valley County Sanitation District
LOCAL HAZARD MITIGATION PLAN UPDATE 2021

SONOMA COUNTY WATER AGENCY

Figure SV-41. Flood Zone (Area 10)



Map Projection: NAD 1983 State Plane California II
Imagery: USDA NAIP 2021; Fire Hazard: Cal Fire

InfraTerra

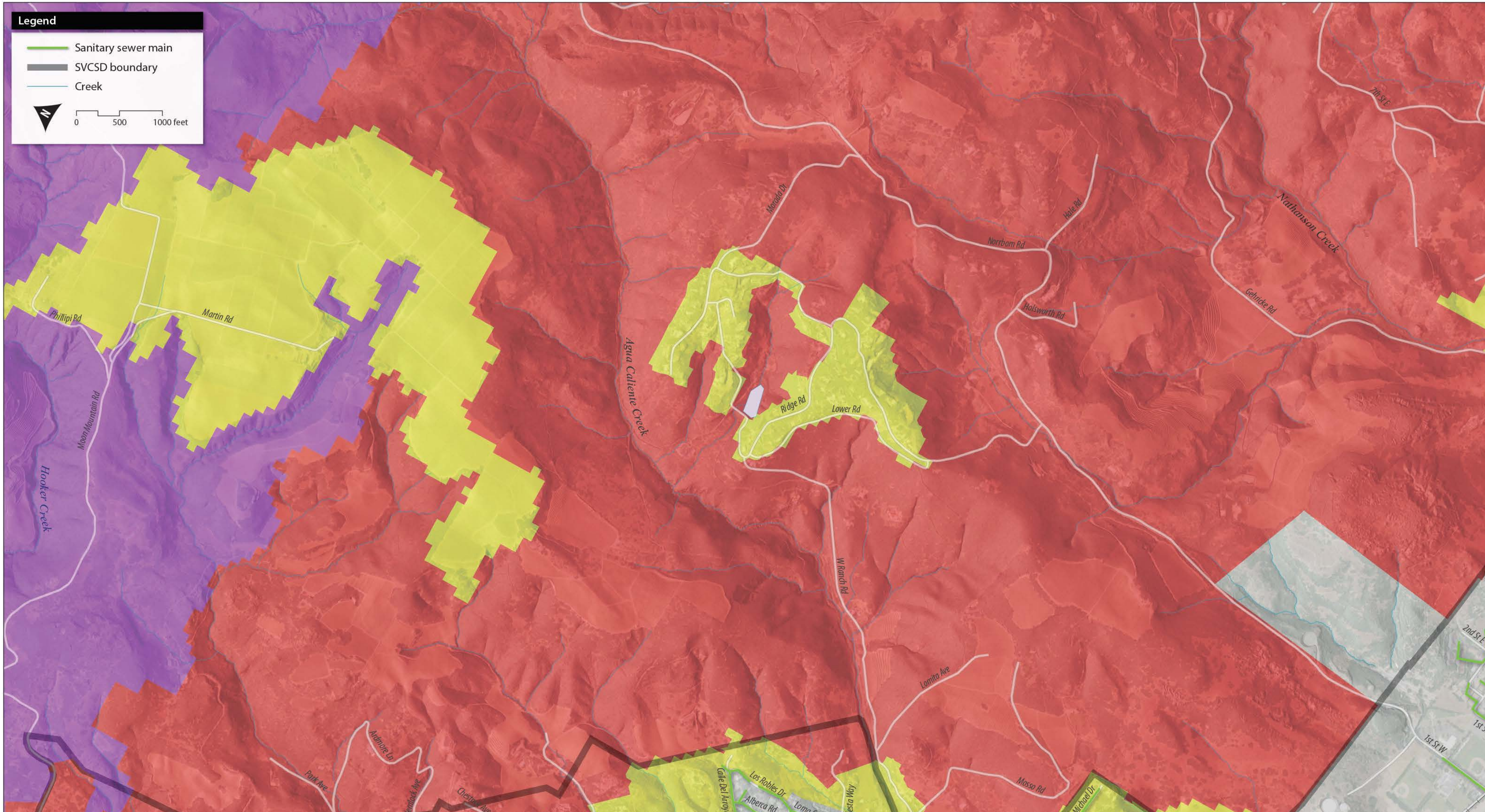
Fire Hazard Severity Zones

Very high | High | Moderate

SONOMA COUNTY WATER AGENCY

Sonoma Valley County Sanitation District
LOCAL HAZARD MITIGATION PLAN UPDATE 2021

Figure SV-42. Fire Hazard Zones (Area 1)



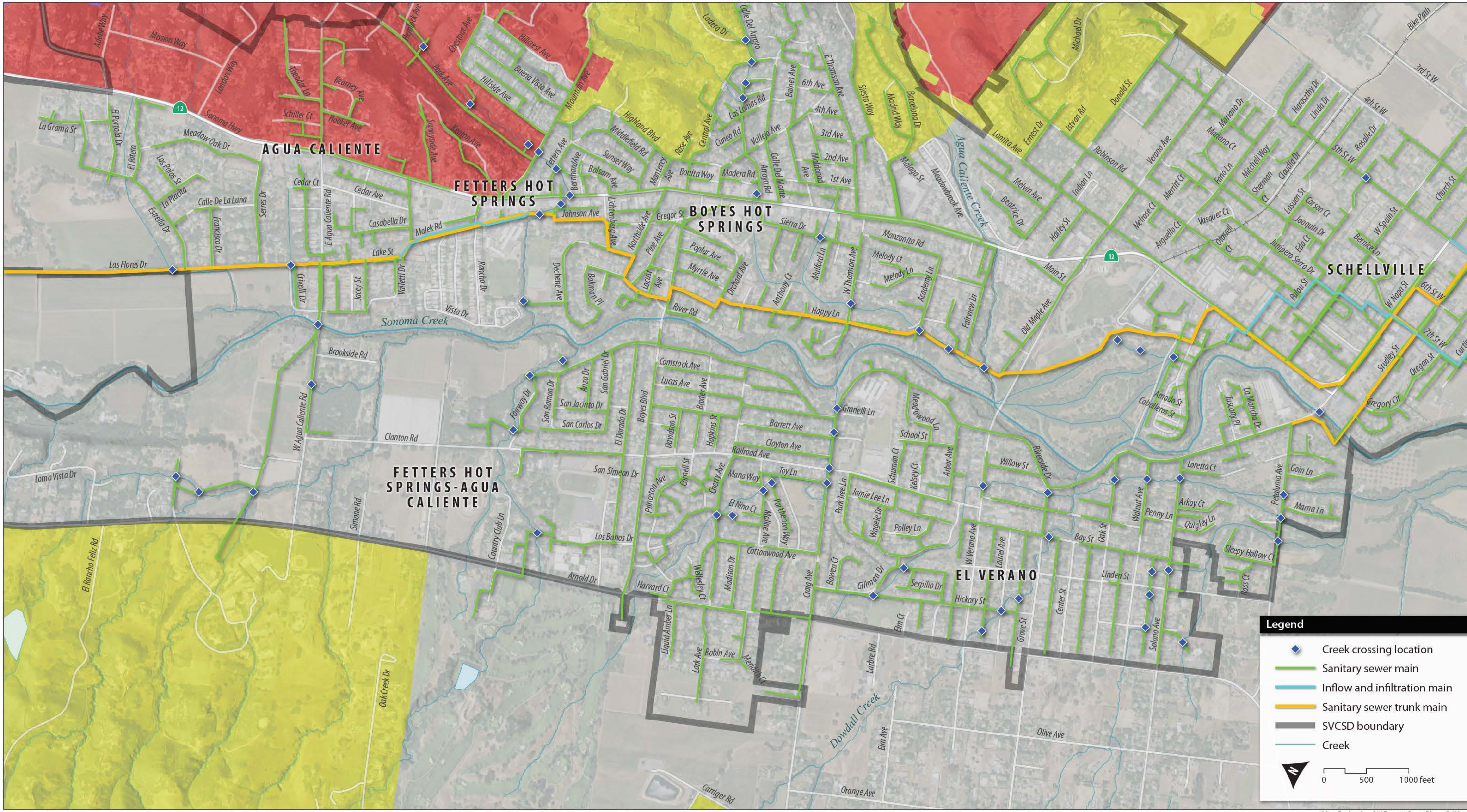
Map Projection: NAD 1983 State Plane California II
Imagery: USDA NAIP 2021; Fire Hazard: Cal Fire

Fire Hazard Severity Zones

Very high
High
Moderate

Sonoma Valley County Sanitation District
LOCAL HAZARD MITIGATION PLAN UPDATE 2021

Figure SV-43. Fire Hazard Zones (Area 2)



Map Projection: NAD 1983 State Plane California II
Imagery: USDA NAIP 2021; Fire Hazard: Cal Fire

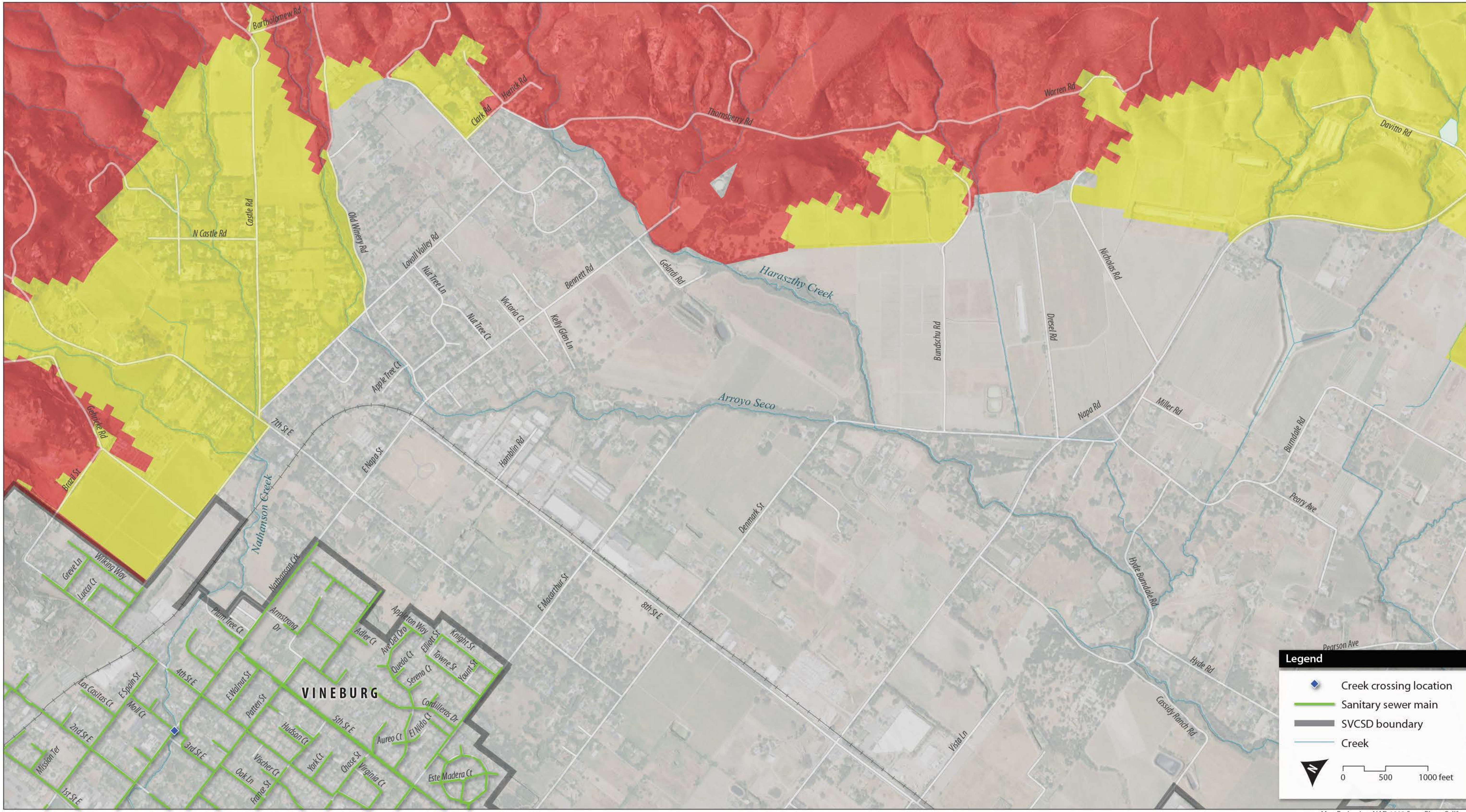
Fire Hazard Severity Zones

Very high | High | Moderate

InfraTerra

SONOMA COUNTY WATER AGENCY

Figure SV-44. Fire Hazard Zones (Area 3)



Map Projection: NAD 1983 State Plane California II
Imagery: USDA NAIP 2021; Fire Hazard: Cal Fire

Fire Hazard Severity Zones

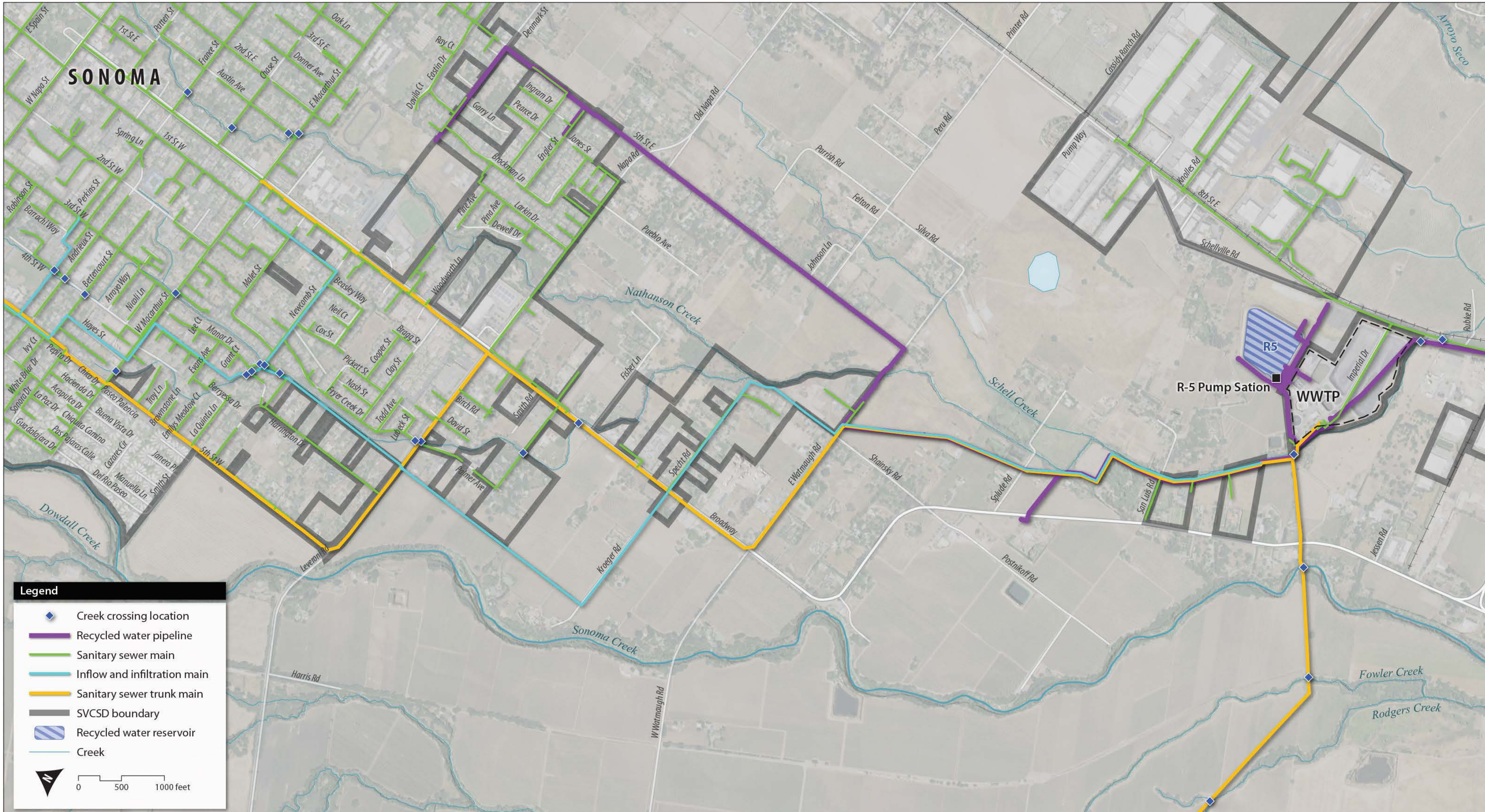
Very high | High | Moderate

InfraTerra

Sonoma Valley County Sanitation District
LOCAL HAZARD MITIGATION PLAN UPDATE 2021

SONOMA COUNTY WATER AGENCY

Figure SV-45. Fire Hazard Zones (Area 4)



Map Projection: NAD 1983 State Plane California II
Imagery: USDA NAIP 2021; Fire Hazard: Cal Fire

Fire Hazard Severity Zones

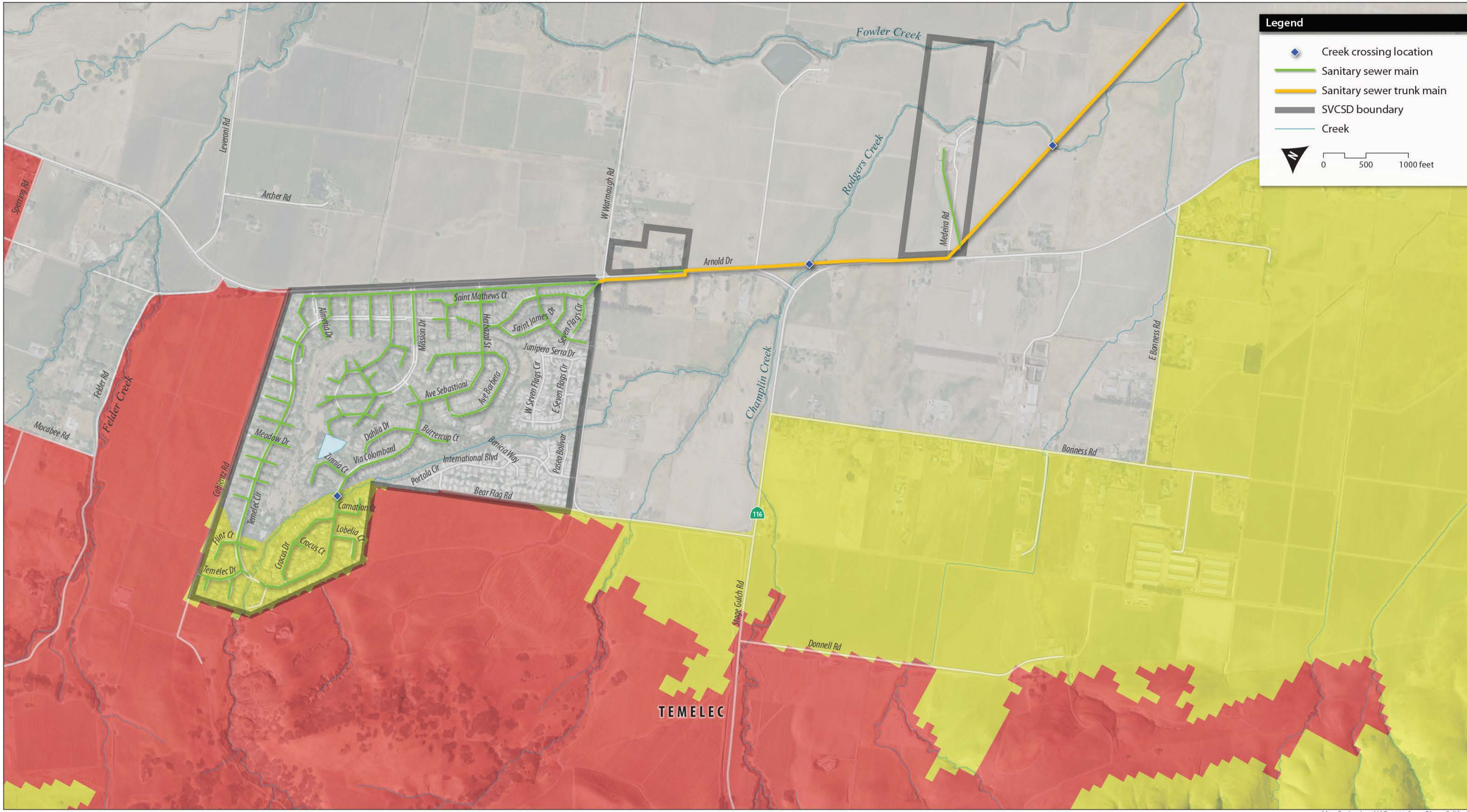
Very high | High | Moderate

InfraTerra

SONOMA COUNTY WATER AGENCY

Sonoma Valley County Sanitation District
LOCAL HAZARD MITIGATION PLAN UPDATE 2021

Figure SV-46. Fire Hazard Zones (Area 5)



Map Projection: NAD 1983 State Plane California II
Imagery: USDA NAIP 2021; Fire Hazard: Cal Fire

Fire Hazard Severity Zones

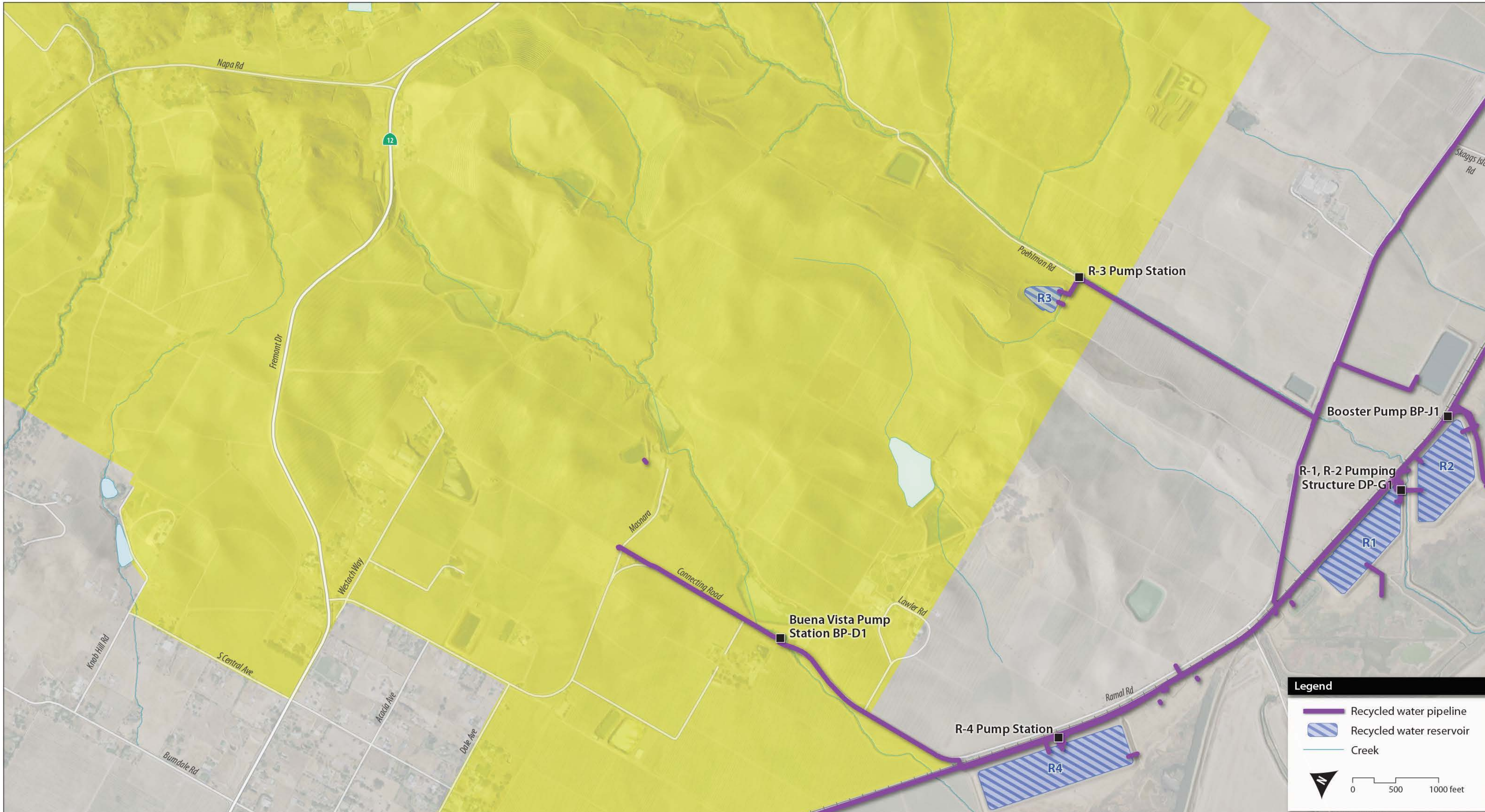
Very high | High | Moderate

InfraTerra

SONOMA COUNTY WATER AGENCY

Sonoma Valley County Sanitation District
LOCAL HAZARD MITIGATION PLAN UPDATE 2021

Figure SV-47. Fire Hazard Zones (Area 6)



Map Projection: NAD 1983 State Plane California II
Imagery: USDA NAIP 2021; Fire Hazard: Cal Fire

Fire Hazard Severity Zones

- Very high
- High
- Moderate

InfraTerra

SONOMA COUNTY WATER AGENCY

Sonoma Valley County Sanitation District
LOCAL HAZARD MITIGATION PLAN UPDATE 2021

Figure SV-48. Fire Hazard Zones (Area 7)

 AUG 2021

Map Projection: NAD 1983 State Plane California II
Imagery: USDA NAIP 2021; Fire Hazard: Cal Fire

Fire Hazard Severity Zones

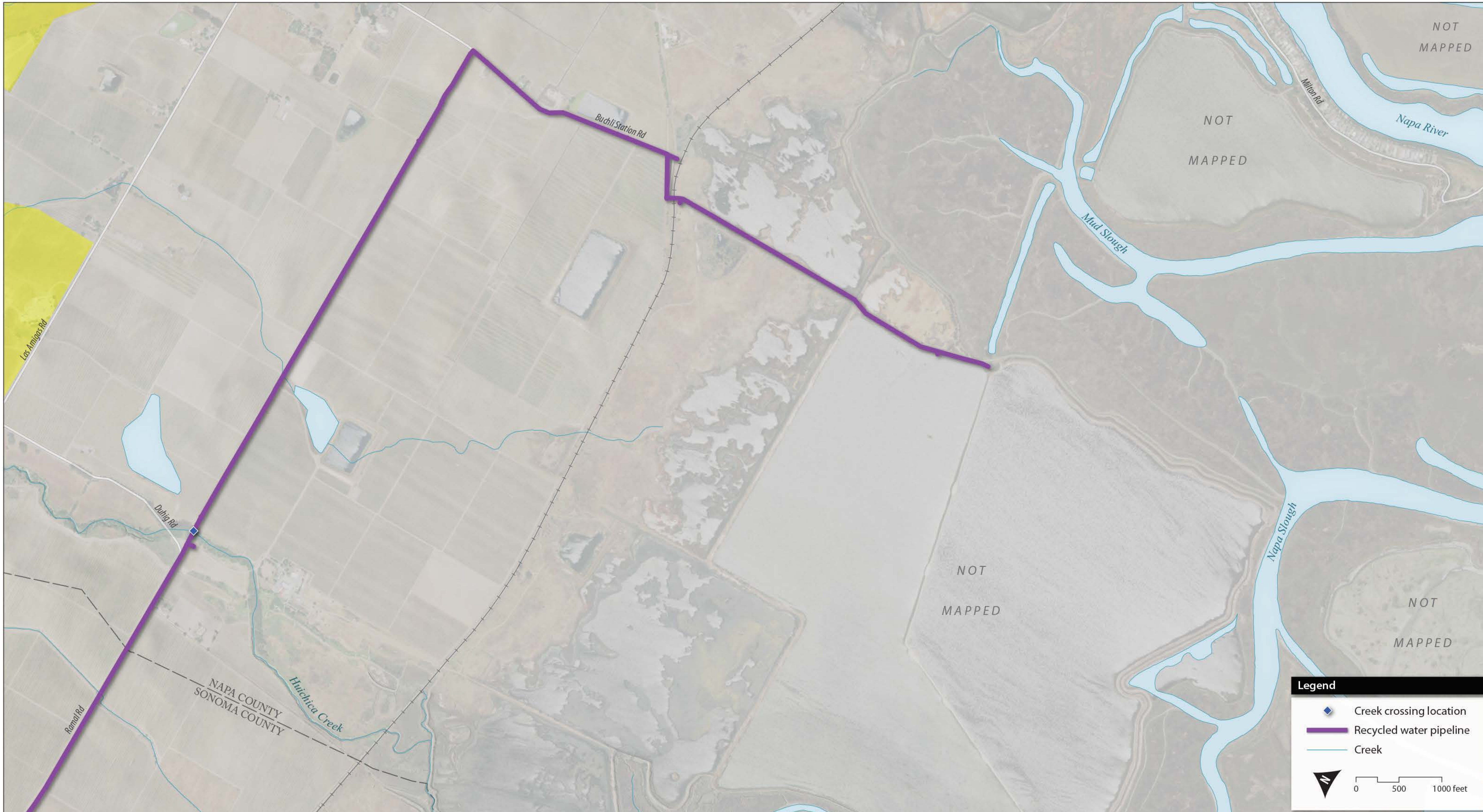
Very high
High
Moderate

InfraTerra

SONOMA COUNTY WATER AGENCY

Sonoma Valley County Sanitation District
LOCAL HAZARD MITIGATION PLAN UPDATE 2021

Figure SV-49. Fire Hazard Zones (Area 8)



Map Projection: NAD 1983 State Plane California II
Imagery: USDA NAIP 2021; Fire Hazard: Cal Fire

Fire Hazard Severity Zones

Very high | High | Moderate

InfraTerra

Sonoma Valley County Sanitation District
LOCAL HAZARD MITIGATION PLAN UPDATE 2021

Figure SV-50. Fire Hazard Zones (Area 9)

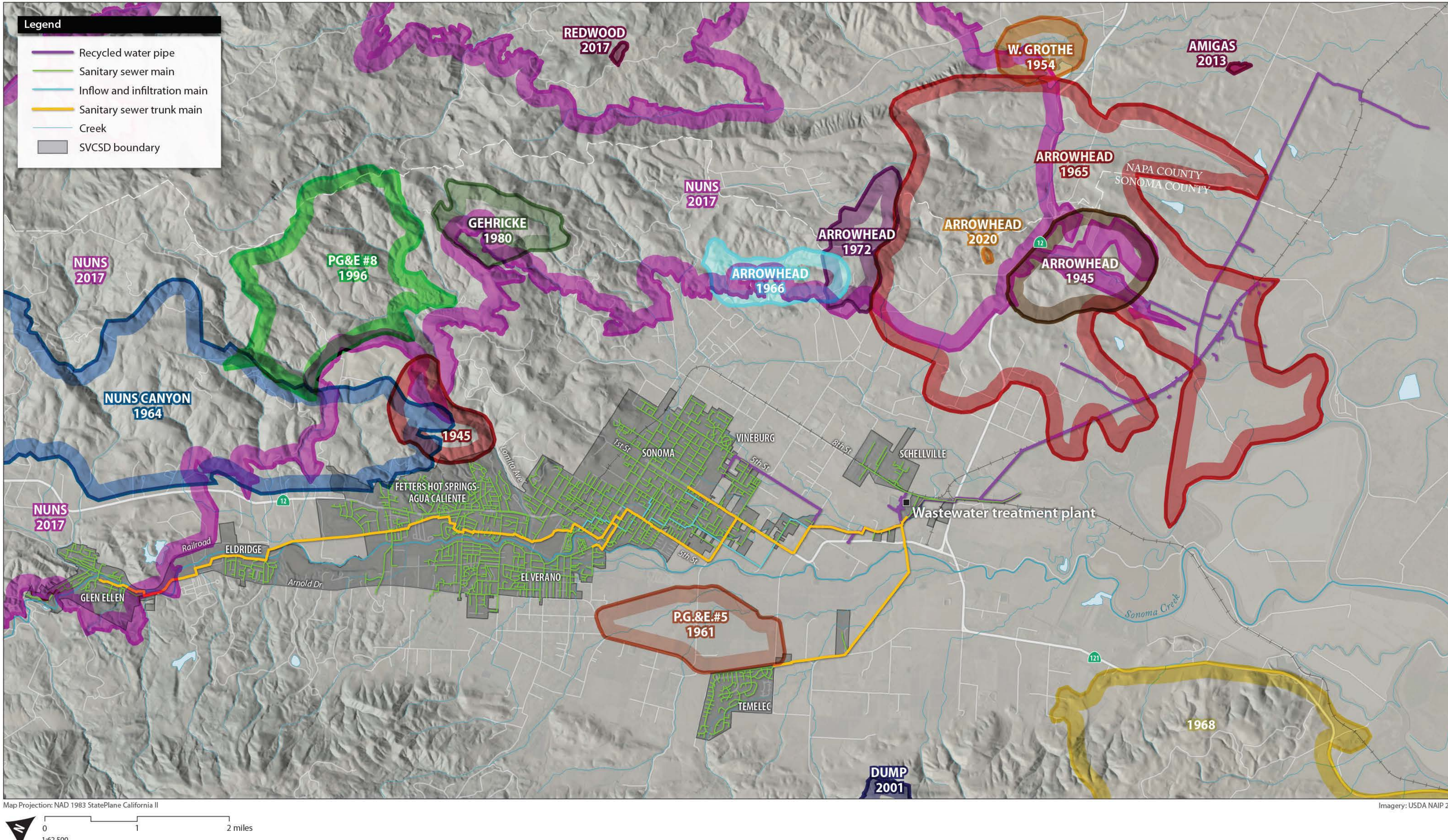
Map Projection: NAD 1983 State Plane California II
Imagery: USDA NAIP 2021; Fire Hazard: Cal Fire

Fire Hazard Severity Zones

Very high
High
Moderate

Sonoma Valley County Sanitation District
LOCAL HAZARD MITIGATION PLAN UPDATE 2021

Figure SV-51. Fire Hazard Zones (Area 10)



Sonoma Valley County Sanitation District
LOCAL HAZARD MITIGATION PLAN UPDATE 2021

Figure SV-52. Historic Wildfires

Appendix B

- Stakeholder List
- Schedule of Activities for Development of Update
- Presentations to Stakeholder and the Public
    1. Meeting with Director Susan Gorin
    2. Sonoma Valley Citizen Advisory Commission (SVCAC)
    3. North Sonoma Valley Municipal Advisory Council (NVMAC)
    4. Springs Municipal Advisory Council
- SVCSD LHMP Community Survey
    1. Text Accompanying Survey
    2. Survey Questions
    3. Survey Announcement with QR Code
    4. Survey Results
- E-News & Newsletters
    1. October 2020
    2. February 2021
    3. Spring 2021
    4. August 2021
- Press Releases
- Social Media Outreach
- Public Review Comments

SVCSD LHMP Stakeholder List

AGENCY CONTACT FIRST NAME	AGENCY CONTACT LAST NAME	ORGANIZATION	TITLE	MAILING ADDRESS	CITY	STATE	ZIP CODE	EMAIL	PHONE
		Water contractors							
Colleen	Ferguson	City of Sonoma - Public Works	Public Works Director/City Engineer	[redacted]					
Matt	Fullner	Valley of the Moon Water District	Interim General Manager	[redacted]					
		Cities/Counties/Local Govt		[redacted]					
Therese	McMillan	Association of Bay Area Governments	Executive Director	[redacted]					
Julie	Lucido	City of Napa	Public Works Director	[redacted]					
Cathy	Capriola	City of Sonoma	City Manager	[redacted]					
Logan	Harvey	City of Sonoma	Mayor	[redacted]					
Robert	Felder	City of Sonoma Planning Commission	Chair	[redacted]					
Chris	Pegg	City of Sonoma Public Works Department	Stormwater Compliance Specialist	[redacted]					
		City of Sonoma Sonoma Disaster Council		[redacted]					
Caryl	Hart	County of Sonoma Agricultural Preservation and Open Space District	Interim General Manager	[redacted]					
Barbie	Robinson	County of Sonoma Department of Health Services	Director	[redacted]					
Johannes	Hoevertsz	County of Sonoma Department of Transportation & Public Works	Director	[redacted]					
Christopher	Godley	County of Sonoma Department of Emergency Management	Emergency Services Manager	[redacted]					
		County of Sonoma Fish & Wildlife Advertising Commission	Department Head	[redacted]					
Tennis	Wick	County of Sonoma Permit and Resource Management Department	Director	[redacted]					
Eduardo	Hernandez	County of Sonoma Permit and Resource Management Department	Planner III	[redacted]					
Steve	Akre	Sonoma Valley Fire District	Fire Chief	[redacted]					
Daren	Bellach	Kenwood Fire Protection District	Fire Chief	[redacted]					
Leah	Greenbaum	Napa County Office of Emergency Services	Emergency Services Officer	[redacted]					
Mark	Egan	Napa Sanitation District	Plant Maintenance Supervisor	[redacted]					
Nick	Becker	Napa Sanitation District	Collection system Manager	[redacted]					
Eileen	Sobeck	Regional Water Authority	Executive Director	[redacted]					
Ray	Mulas	Shell-Vista Fire Protection District	Chief	[redacted]					
Steven	Herrington	Sonoma County Office of Education	Superintendent of Schools	[redacted]					
Charlotte	Jones	Sonoma Developmental Center / Eldridge FD	Facility Director	[redacted]					
Valerie	Minton Quinto	Sonoma Resource Conservation District	Executive Director	[redacted]					
Pat	Gilardi	Sonoma Valley Citizens Advisory Commission		[redacted]					
		State Agencies		[redacted]					
Gregg	Erickson	California Department of Fish & Wildlife	Bay Delta Regional Manager	[redacted]					
Sandra	Shewry	California Department of Public Health	Interim Director	[redacted]					
Melissa	Miller-Henson	California Fish and Game Commission	Executive Director	[redacted]					
Mark	Ghilarducci	California Governor’s Office of Emergency Services	Director	[redacted]					
Sarah	Finnigan	California Governor’s Office of Emergency Services	County, Sonoma County	[redacted]					
Trisha	Johnson		Region II Chair	[redacted]					
		Santa Rosa California Highway Patrol		[redacted]					
		Napa California Highway Patrol		[redacted]					
Wade	Crowfoot	California Natural Resources Agency	Secretary	[redacted]					
Danita	Rodriguez	California State Parks in the greater Bay Area	District Superintendent	[redacted]					
Karla	Nemeth	Department of Water Resources	Director	[redacted]					
Michael	Day	Management Program	Deputy Director	[redacted]					
Matt	St. John	North Coast Regional Water Quality Control Board	Executive Officer	[redacted]					
Michael	Montgomery	San Francisco Bay Regional Water Quality Control Board	Executive Officer	[redacted]					
Eric	Oppenheimer	State Water Resources Control Board	Office of Research, Planning and Performance	[redacted]					
Mark	Starr	Center for Environmental Health	Deputy Director	[redacted]					
		Federal Agencies		[redacted]					
Lisa	Van Atta	NOAA California Coastal Office	Assistant Regional Administrator	[redacted]					
Bob	Coey	NOAA West Coast Regional Office	Branch Chief	[redacted]					
Chris	Yates	NOAA Protected Species Division	Assistant Regional Administrator	[redacted]					
Mike	Dillabough	US Army Corps of Engineers	Chief, Operations and Readiness	[redacted]					
Kim	Turner	US Fish & Wildlife Services	Deputy Field Supervisor	[redacted]					
Shane	Hunt	US Fish & Wildlife Services - Bay Delta	Public Affairs Specialist	[redacted]					
Andrew	Watson	USGS Ukiah Field Office	Field Office Chief	[redacted]					
		Elected Representatives		[redacted]					
Marc	Levine	California State Assembly	State Assembly Member	[redacted]					
Bill	Dodd	California State Senate	State Senate	[redacted]					
Jim	Wood	California State Assembly	State Assembly Member	[redacted]					
Mike	McGuire	California State Senate	State Senator	[redacted]				senator.mcguire@senate.ca.gov	[redacted]
Cecilia	Aguiar-Curry	California State Assembly	State Assembly Member	[redacted]					

Jared	Huffman	US House of Representatives	US Representative - California	[redacted]
Mike	Thompson	US House of Representatives	US Representative - California	
Susan	Gorin	First District	Supervisor/Director	
David	Rabbitt	Second District	Supervisor/Director	
Shirlee	Zane	Third District	Supervisor/Director	
James	Gore	Fourth District	Supervisor/Director	
Lynda	Hopkins	Fifth District	Supervisor/Director	
		Non-governmental Organizations		
John	Ruiz	American Red Cross - Northern California Coastal Region	Regional Disaster Officer	
Laurel	Marcus	California Land Stewardship Institute	Executive Director	
Lynn	Hamilton	Community Clean Water Institute	President	
Susan	Keller	Sonoma County Conservation Council	President	
Kim	Rago	Environmental Forum of Marin	Executive Director	
David	Keller	Friends of the Eel River	Bay Area Director	
Noelle	Johnson	Gold Ridge Resource Conservation District	Conservation Planner	
Bill	DeBoer	Groundwater Resources Association of California	Branch President	
Anne	Morkill	Laguna de Santa Rosa Foundation	Executive Director	
Craig	Anderson	LandPaths	Executive Director	
Jeff	Trandahl	National Fish and Wildlife Foundation	Executive Director and Chief Executive Officer	
H. R.	Downs	O.W.L. Foundation	President	
Brock	Dolman	Occidental Arts and Ecology Center - Water Institute	Program Director	
Lisa	Micheli	Science	PRESIDENT & CEO	
Thomas	Gardali	Point Blue	Director	
Don	McEnhill	Russian River Keeper	Program Director	
Brenda	Adelman	Russian River Watershed Protection Committee	Chair	
Jane	Nielson	Sebastopol Water Information Group	President	
		Sierra Club: Redwood Chapter		
Erica	Buonassisi	Sonoma County Conservation Action	Operations Director	
Tawny	Tesconi	Sonoma County Farm Bureau	Executive Director	
Amie		Sonoma County Gazette		
Sarah	Heyne	Sonoma Coast Surfrider Foundation	Chairperson	
		Sonoma County Water Coalition		
Karissa	Kruse	Sonoma County Winegrape Commission	President	
Richard	Dale	Sonoma Ecology Center	Executive Director	
Eamon	O'Byrne	Sonoma Land Trust	Executive Director	
Maureen	Cottingham	Sonoma Valley Vintners & Growers Alliance	Executive Director	
Michele	Luna	Stewards of the Coast & Redwoods	Executive Director	
Gary	Bobker	The Bay Institute of San Francisco	Director	
Brian	Johnson	Trout Unlimited	California State Director and Senior Attorney	
Dan	Hubacker	United Anglers	Director/Teacher	
Bob	Anderson	United Winegrowers for Sonoma County	Executive Director	
Debbie	Colgrove	Wine Growers of Dry Creek Valley Alliance	Operations & Membership Manager	
		Associations/Groups		
Jake	Hawkes	Alexander Valley Winegrowers	President	
Melinda	Barnard	Alexander Valley Association	Director	
Adam	Link	California Association of Sanitation Agencies	Executive Director	
Sarah	Deslauriers	California Association of Sanitation Agencies	Climate Change Program Manager	
Richard	Kagel	Dry Creek Valley Association	President	
Tracy	Huotari	North Bay Association of Realtors	Chief Executive Officer	
Lisa	Badenfort	North Bay Association of Realtors	Government Affairs Director	
Andy	Rodgers	North Bay Watershed Association	Executive Director	
Thomas P	Conlon	Transition Sonoma Valley	Volunteer / Steering Committee	
		Business/Chambers of Commerce		
Brian	Ling	Sonoma County Alliance	Executive Director	
Mark	Bodenhammer	Sonoma Valley Chamber of Commerce	Executive Director	
		Service Organizations		
Jill	Barwick	Napa Rotary	Club Secretary	
Gail	Cardaropoli	Petaluma Rotary	Club Secretary	
John	Coulston	Sonoma Valley Rotary	Club Secretary	
Valerie	Hulsey	The Rotary Club of the Valley Of The Moon	Club Secretary	
Jennifer	Thompson-Grey	Rebuild Northbay Foundation		
		Academia		
Josh	Adams	Santa Rosa Junior College	Dean of Public Safety	
Missy	Brunetta	Sonoma State University	Continuity Planning	
Socorro	Shiels	Sonoma Valley Unified School District	Superintendent	
Stephanie	Larson	University of CA Cooperative Extension - Sonoma County	County Director	
		Business		
		Fairmont Sonoma Mission Inn		
		Glen Ellen Village Market		
		MacArthur Place Hotel		
		Pacific Gas & Electric Company		
Denise	Roach	Sebastiani Winery	Media	

		Sonoma Market		[redacted]
		Sonoma Raceway		
		Sonoma Valley Hospital		
Rick	Bonitati	St. Francis Winery	President & Chief Executive Officer	
		The Lodge at Sonoma		
		Sonoma Golf Club		
		Other		
Marian	Williams			

Schedule

Description	Start date	End Date	Duration	Responsible	Task Complete
Publish Announcement in E-News	10/12/20	10/30/20	18	Mollie, Barry	√
Update Chapters 1 -3, and parts of 4	12/01/20	02/28/21	89	Mollie, Devin, Parastou	
Finalize Survey Questions	12/09/20	12/30/20	21	Mollie, Devin, Parastou	√
Update #'s of social media followers and send to Mollie & Devin	12/15/20	12/30/20	15	Andrea	√
Modify Stakeholder List & Get City of Sonoma Email List	12/15/20	12/30/20	15	Barry/Andrea	√
Schedule Meeting with PE's and Coordinators to Review Current Actions	01/06/21	01/06/21	0	Devin	√
January Monthly E- News - announcing survey	01/15/21	01/15/21	0	Barry/Andrea/Cynthia	√
Engineering Consultant Agreement Board Approval	01/26/21	01/26/21	0	Parastou	√
Launch Survey	02/01/21	03/03/21	30	Barry/Andrea/Cynthia	√
February Monthly E-News, Nextdoor, Facebook, City of Sonoma Community FB page - will include link to survey	02/15/21	02/15/21	0	Barry/Andrea/Cynthia	√
Kickoff Meeting with Consultant	02/22/21	02/22/21	0	Parastou	√
Revise Mitigation Actions with PE's, Coordinators, Consultant	02/22/21	05/03/21	70	TRT	√
Engineering Consultant Signed Agreement	02/23/21	02/23/21	0	Christine	√
Review District Data and Provide Comments	02/23/21	04/09/21	45	InfraTerra	√
Site Visit with InfraTerra and staff	03/08/21	03/08/21	1	Parastou	√
Meeting with Director Gorin	03/11/21	03/11/21	1	Andrea/Kent	√
Present at North Valley MAC	05/19/21	05/19/21	1	Barry or Cynthia	√
Update Website	03/15/21	03/15/21	0	Cynthia	√
1st Draft to Consultant for Review	04/08/21	04/08/21	0	Devin/Mollie	√
Present at SV Citizens Advisory Committee Zoom Meeting	03/24/21	03/24/21	0	Andrea/Parastou	√
Prop 218 Mailer March - April- lhmp update info and public comment period time	03/25/21	03/29/21	4	Barry/Andrea	√
Receive InfraTerra's first draft of Chapter 4 and Mitigation Actions table.	06/18/20	06/20/20	2	Parastou	√
Meeting with TRT and InfraTerra to review findings and proposed mitigation actions.	07/06/21	07/06/21	1	Mollie/Devin/Parastou/InfraTerra	√
InfraTerra to send combined mitigation action list. Then route to TRT to review.	07/14/21	07/14/21	0	Jenny/Parastou	√
InfraTerra to incorporate any edits or actions from the 7/6 meeting	07/26/21	08/09/21	14	Jenny/Parastou	√
Present at Springs MAC	07/27/21	07/27/21	1	Parsastou, Andrea	√
Internal Review/Incorporate Comments	10/04/21	10/11/21	7	Senior Mgmt	√

Update Website with link to draft LHMP and public comment period info	10/29/21	10/29/21	1	Hailey/Cynthia	√
Press Release	11/01/21	11/01/21	1	Barry/Andrea	√
Publish public comment period announcement on social media, & send link to stakeholders	11/01/21	11/01/21	0	Cynthia/Hailey/Mollie/Barry/Andrea	√
Public Comment Period	12/01/21	12/22/21	21	Cynthia	√
Incorporate Public Comments	12/22/21	01/12/22	21	Mollie/Devin	√
CalOES Review	01/12/22	02/26/22	45	Cal OES	√
Incorporate CalOES Comments	03/01/22	04/15/22	45	Mollie/Parastou	√
CalOES Review	04/15/22	05/30/22	45	Cal OEs	
Estimated FEMA Review	05/30/22	07/14/22	45	FEMA	
Estimated Board Approval Date	07/19/22	07/19/22	0	Mollie/Parastou	
Estimated FEMA Approval Date	08/01/22	08/01/22	0	FEMA	

Presentations to Stakeholder and the Public

1. Meeting with Director Susan Gorin
    a. Presentation Introduction
    b. Presentation Agenda

2. Sonoma Valley Citizen Advisory Commission (SVCAC)
    a. Presentation
    b. Presentation Agenda
    c. Meeting Minutes

3. North Sonoma Valley Municipal Advisory Council (NVMAC)
    a. Meeting Agenda
    b. Presentation Introduction and Agenda Overview
    c. Meeting Minutes

4. Springs Municipal Advisory Council
    a. Meeting Agenda
    b. Presentation Introduction and Agenda Overview
    c. Meeting Minutes

SVCSD LHMP Update 2021

Briefing Director
Susan Gorin

March 11, 2021

Agenda

- Introduction and Background
- LHMP Purpose and Content
- Review 2016 SVCSD LHMP
  - Hazards Identification
  - Mitigation Goals, Objectives, and Actions
  - Plan Implementation
- 2021 LHMP Update
- Questions

SVCSD LHMP Update 2021

Sonoma Valley Citizen's Advisory Commission Meeting

March 24, 2021

Sonoma Water

Agenda

- Introduction and Background
- LHMP Purpose and Content
- Hazards Identification
- 2016 LHMP Goals
- 2016 Mitigation Actions
- 2016 Plan Implementation
- 2021 LHMP Update
- 2021 Public Awareness and Participation
- Questions

Sonoma Water

Introduction and Background

- **2008** SW LHMP adopted
- **2012** SW LHMP updated to include sanitation hazard
- **2016** FEMA approval of SVCSD LHMP
- **2020** SVCSD awarded $150,000 to update LHMP
- ***2021** Deadline for FEMA approval of next LHMP*

Sonoma Water

LHMP Purpose and Content

- Describes SVCSD Facilities
- Assesses Potential Hazards
- Assesses Infrastructure Vulnerabilities
- Provides Mitigation Goals
- Discusses Implementation Strategies
- Describes Plan Maintenance
- Qualify for FEMA grant funding – must update every 5 years

Sonoma Water

Hazards Identification

Geologic and Seismic Hazard

Flood Hazard

Fire Hazard

Other Hazards

Sonoma Water

2016 LHMP Goals

- Increase organizational efficiencies and effectiveness when responding to natural disasters
- Increase reliability of the treatment system capabilities during and after natural disasters
- Increase reliability of the wastewater collection system and reclamation facilities to maintain conveyance capabilities during and after natural disasters

Sonoma Water

2016 Mitigation Actions

- Significance of impact
- Likelihood of failure
- Cost to implement
- Two Tiers
- Two Categories

Sonoma Water

2016 Plan Implementation

- Develop Emergency Response Plan
- Replace Trunk Main in the vicinity of Maxwell Park
- Sonoma Creek and Kohler Creek Bank Repairs
- Seismic Retrofit of Secondary Treatment Clarifiers at SVCSD Wastewater Treatment Plant (FEMA funded)

Sonoma Water

2021 LHMP Update

- Hire Consultant
- Update hazards profile
- Incorporate Climate Adaptation Plan
- Schedule
- Public Outreach

Sonoma Water

Opportunities for Public Awareness and Participation

- E-Newsletter
- Survey information
- Social media
- Prop 218 Newsletter
- Stakeholders
- Website: https://www.sonomawater.org/svlhmp
- Email: LHMP@scwa.ca.gov
- Public Comment Period

Sonoma Water

Questions?

Sonoma Water

Parastou Hooshialsadat, PE
WATER ENGINEER

Phone: 707.547.1961
Fax: 707.544.6123
Email: Parastou.Hooshialsadat@scwa.ca.gov

404 Aviation Boulevard
Santa Rosa, CA 95403

sonomawater.org

SONOMA VALLEY CITIZENS ADVISORY COMMISSION
Minutes of the Virtual Meeting
March 24, 2021

1. **Call to Order 6:30**

Pledge of Allegiance

Chair Freeman
Roll Call: Secretary Spaulding
Present: Dickey, Pulvirenti, Curley, Kokkonen, Kiser
County Alternate: Mullen
Ex Officio: Cornwall
Absent: Vella, Carr, Brown, Harvey, Bramfitt

Present: First District Director for Supervisor Gorin: Pat Gilardi
First District Field Representative for Supervisor Gorin, Arielle Kubu-Jones

2. **Approval of Minutes of the Meeting of February 24, 2021**

Commissioner Curley moved to approve Minutes. Commissioner Mullen Seconded. Motion passed unanimously.

3. **Public Comment limited to 3 minutes per speaker per item**

(Items not on agenda)
None.
Public Comment closed.

4. **Presentation – Sonoma Valley County Sanitation District**

Local Hazard Mitigation Plan (LHMP) UPDATE 2021
Andrea Rodriguez and Parastou Hooshialsa Engineering & Resource Planning (Sonoma Water)
Power Point Presentation

20210324_SVCAC Meeting PPT.pdf

11,000 parcels served in Sonoma Valley
3 primary elements: collection systems, water treatment plant, reclamation
Background:
2008 LHMP adopted; 2012 LHMP updated; 2016 FEMA approval; 2020 awarded $150,000 to update; 2021 FEMA deadline for update
Sept 2021 Expiration of current LHMP, should be updated every 5 years for Grants
LHMP Purpose & Content
Describes facilities; assesses potential hazards; assesses infrastructure

vulnerabilities; provides mitigation goals; discusses implementation strategies; describes plan maintenance; qualify for FEMA grant funding
Hazards Identification: Natural Geologic & Seismic, Flood, Fire, Other
2016 Mitigation actions: Impact, likelihood of failure, cost to implement, two tiers (cost), two categories (actions)
2016 LHMP Goals: increase organizational efficiencies/effectiveness to natural disasters; increase reliability of treatment system capabilities during/after natural disasters; increase reliability of the wastewater collection system & reclamation facilities to maintain conveyance capabilities during & after natural disasters
2016 Mitigation Actions: significance of impact e.g. breaks; likelihood of failure e.g. areas of high liquefaction; cost to implement; two tiers based on priorities for 5 year plan; two categories
2016 Plan Implementation: develop emergency operation plan, final stages; replace trunk main in vicinity of Maxwell Park; Sonoma Creek & Kohler Creek Bank Repairs; Seismic retrofit of secondary treatment 2 clarifiers at SVCSD plant (FEMA funded)
2021 LHMP Update: Hire consultant for tech support; update hazards profile, focus on fire hazard/public safety/power shut off; incorporate climate adaptation plan; schedule; public outreach; documents to be ready by end of May for public review, for submission by Sept 12, 2021
2016 LHMP had no Public Survey. Added one to 2021 for more community engagement
Opportunities for Public Awareness & Participation: E Newsletter, bilingual; survey info; via social media; Prop 218 sanitation newsletter; stakeholders; website SonomaWater.org/SVLHMP; email LHMP@scwa.ca.gov; public comment period
Contact info: 707.547.1961; Parastou.Hooshialsadat@scwa.ca.gov
Sonomawater.org

Chair Freeman called for Commissioners' Questions

Vice Chair Dickey, is study for existing capacity? Parastou, yes. Vice Chair Dickey, if facility service needs are expanded would there be another study? Parastou, this is updated for 5 years, any capital improvements already incorporated in Master Plan for 2021-2025. Beyond that will be in next 5 year Plan. Vice Chair Dickey, noted that the Sonoma Developmental Center (SDC) is in process of being examined for use which would impact Sanitation District. Was this taken into account during LHMP development? Parastou, unsure.
Kent Gylfe, Water Agency, Principal Engineer, re SDC, understands planning efforts in works for 2 years. But their perspective is that SDC flow may actually decrease. Has been infiltration & inflow into system. If SDC site is significantly rehabilitated, hoping that will result in less flow overall. Will assess along w/ planning efforts, w/SDC on system. The next plan update/review of natural

hazards would be w/ next 5 year Plan, even if determined that SDC planning process shows increase flows. Have no increased capacity projects proposed in next 5 Year capital planning process now. Vice Chair Dickey, clarified that their projection is based on groundwater incursion at SDC; would flow be reduced even w/ additional buildings? Kent, yes, greatest challenge is w/ wet weather capacity, county encounters sewer overflows due to inadequate capacity caused by significant infiltration & inflow into 50/60 year old system. SDC site & others have been large contributor. Vice Chair Dickey, understands that is part of projected improvement to eliminate wastewater into sewer system.
Re potential hazards, is water incursion aspect of hazard mitigation planning? Seen recent groundwater studies in that part of valley showing impact by rising sea levels, sea water, coming into Valley aquifers. Is that projected in this hazard mitigation plan, or is that too far out? Ken, no, haven't given much consideration to impact of rising groundwater levels. Vice Chair Dickey, the issues are tied together – it's a holistic question. The hydrostatic pressure on ponds will be impacted if groundwaters force ponds out of ground. Kent, if climate change impacts groundwater such that it increases inflow or infiltration, that would be valid to consider as natural hazard liability assessment. Not highest priority risk; seismic risk is currently greatest vulnerability. Other hazards can contribute to vulnerabilities. Vice Chair Dickey, is it the liquefaction & seismic in age of facility that makes seismic biggest concern? Kent, 3 biggest hazards are seismic, flooding, fire. Major seismic event on Rogers Creek Fault like a 7 on fault, would cause significant damage. If treatment plant goes down, major disaster. Up a creek w/o a paddle. Likely to remain top priorities. Will give consideration to Vice Chair's concern and asses risk to system.
Chair Freeman, re sea level rise, over the 5 year increments for review this concern might increase on risk factor. Asked for description of area covering the Study. Kent, district boundary, Glen Ellen, unincorporated area south of GE down to Schellville, urbanized Valley area, not to Kenwood.

Ex-Officio Cornwall, read reports from Bay Area re sea level rise, pushing up shallow groundwater causing problems for low lying infrastructure. Seems like an increasing issue, worth assessing. During recent drought, people conserved too much water at home, caused problem at treatment plant. Is that a concern? Kent, required changes in operations at plant, but water kept flowing downhill, no major disruptions to process. Plant treatment processes get more concentrated w/ lower flows, creates challenges. Can see potential for challenges. Ex-Officio Cornwall, County overall doing multi-hazard mitigation plan. Since 2017 wildfires, county has beefed up its coordinating emergency notification methodologies. Is this Plan connected to those things, and how? Kent, unsure. Not a member agency of county hazard mitigation plan, as Water Agency has own mitigation plan, but coordinating w/ county effort, have rep on their steering committee. Re notification process, alert system has enhanced their ability to notify customers, unsure how it would be involved otherwise.

Can research & reply. Parastou, yes, will have emergency operation centers for Water Agency for transmission, Sanitation District, SWAN, for their emergency people & customers in sanitation district. There is no connection w/ them now, will be at some point. Kent, in true emergency, Water Agency has integral role w/ EOC/county depending on nature of disaster. Particulars of county's approach can be provided.

Vice Chair Dickey, there is an emergency back-up system for water in the Valley. Associated w/ SDC & storage facility thru Valley of Moon Water. Anything like that for Sanitation District? If ponds out at end of 8th Street became unusable, what would happen? Kent, not an equivalent back up. If significant treatment or storage facilities were lost at wrong time of year, would probably be discharge violations. Would violate their operational permits, would have to discharge anyway. There are many possible variations, in worst case, if plant goes down, e.g. clarifiers lost - would no longer be able to comply w/ operational permits. But water would probably still be coming, have to deal w/ it, probably not in compliance w/ discharge permits. That would present environmental & health risks. Planning to avoid that. Major rupture to trunk line, no water, would be other issues, how to set up emergency/temporary pumping.

Commissioner Kokkonen, re survey, social media for public input. What other sources of information from public that would be useful for Plan. Andrea, when Draft Plan is released in May, public comment period will be open for review/feedback. Come back strong then for feedback/comments. Parastou, confident there will be good feedback because Survey was very helpful. Statistics useful.

Secretary Spaulding, re funding - are their other sources besides FEMA, how are they distributed? Kent, planning effort helps to understand vulnerabilities & where they need funding. Primary focus w/ updating LHMP is to stay eligible for FEMA funds. Sonoma Water has secured millions of dollars in funding. Disasters provide funding for hazard mitigation, but not enough. Other funding sources welcome, but FEMA emphasis now. Federal Infrastructure Bill, State fund, Bond Measures are welcome to update infrastructure.

Chair Freeman called for Public Comment.
Fred Allebach, if treatment plant goes down, what creek would we be up [w/o a paddle]? Kent, probably more than one.

Chair Freeman thanked all for presentation.

3.a NVMAC Meeting Agenda

North Valley Municipal Advisory Council
Notice of Meeting and Agenda
May 19, 2021

PLEASE NOTE: This meeting will be conducted entirely by teleconference pursuant to the provisions of the Governor's Executive Orders N-29-20 and N-35-20, suspending certain requirements of the Ralph M. Brown Act. Members of the public will be recognized at the appropriate time via Zoom's Raise Hand tool.

Join Zoom Conference Meeting:
https://sonomacounty.zoom.us/j/92547618299?pwd=a3hOa1AwRUl2WkhQRjJvQU1xSUQ5UT09
Meeting ID: 925 4761 8299
Passcode: 830513
Join by Phone: 1-669-900-9128
5:30 p.m.
Contact: Arielle Kubu-Jones, District Director for Supervisor Susan Gorin – arielle.kubu-jones@sonoma-county.org

1. **Call to Order, Pledge of Allegiance, Roll Call**

2. **Approval of April 21, 2021 minutes** — Resolution

3. **Public Comment** — Receive
 (Limited to items not appearing on the agenda)

4. **Supervisor Gorin Update** — Receive

5. **Scattered Housing Rezoning Environmental Impact Report Overview** — Receive
 Nina Bellucci—Permit Sonoma
   - Scattered Rezoning Project Overview
   - Environmental Impact Report (EIR)
   - Next Steps and Opportunities for Public Input

6. **Sonoma Valley Sanitation Local Hazard Mitigation Plan (LHMP)** — Receive
 Parastou Hooshialsadat, Barry Dugan, Kent Gylfe—Sonoma Water
   - Overview of Sonoma Valley Sanitation LHMP

7. **Budget Request Forms for FY 20/21** — Resolution
   - Overview of MAC Budget, Request Forms, Intended Uses and Other Opportunities for Community Project Funding
   - Letters of Support for Community Organization Funding Requests
   - MAC Member/Ad Hoc Budget Request Discussion and Approval

8. **Reports and Announcements from Councilmembers and Ad Hocs** — Receive
 Due to time constraints, the Chair requests this be limited to crucial or time sensitive items

9. **Consideration of items for future agenda** — Receive
   - Permit Sonoma Overview, Project Update and System Tutorial—July 21

10. **Adjourn** — Resolution

Materials related to an item on this Agenda submitted to the North Valley Municipal Advisory Council after distribution of the agenda packet are available for public inspection in the Board of Supervisors' Office located at 575 Administration Drive, Room 100-A, Santa Rosa, CA, during normal business hours.

3.a NVMAC Meeting Agenda

Note: Consideration of agenda items will proceed as follows:

1. Presentation
2. Questions by Councilmembers
3. Questions and comments from the public
4. Response by presenter, if required
5. Comments by Councilmembers
6. Resolution, if indicated

Web Links: https://sonomacounty.ca.gov/North-Valley-Municipal-Advisory-Council/

SVCSD LHMP Update 2021

North Valley Municipal Advisory Council Meeting

May 19, 2021

Sonoma Water

Agenda

- Introduction and Background
- LHMP Purpose and Content
- Hazards Identification
- 2016 LHMP Goals
- 2016 Mitigation Actions
- 2016 Plan Implementation
- 2021 LHMP Update
- 2021 Public Awareness and Participation
- Questions

Sonoma Water

3.c NVMAC Meeting Minutes

North Valley Advisory Council represents people who work outside the city limits.

Susan Gorin is not in attendance.

Mellisa Dowling has resigned but is still available to work with us to get the word out through the Kenwood Press.

1. Call to Order, Pledge of Allegiance, Roll Call

    - Chair Dawson- Present
    - Vice Chair Doss-Present
    - Councilmember Eagles-Present
    - Councilmember Newhouser-Present
    - Councilmember Nardo-Morgan-Present
    - Alternate Councilmember Cooper-Present (excused at 7:40, quorum maintained)
    - Councilmember Dickey-Absent
    - Councilmember Handron- Absent
    - Alternate Councilmember Dowling-Resigned

- Mission statement and description of MAC. Permit Sonoma re-zoning environmental impact review which will impact two properties in Glen Ellen. While the Mac cannot vote on this, I encourage people to comment tonight and also to make public comments tomorrow at the planning commission meeting at 1 pm by zoom, or by email until June 18th.

- Item five should be renamed Rezoning Sites for Housing Environmental Impact Report Overview instead of the Scattered Housing Rezoning Environmental Impact Review.

- Name change to North Sonoma Valley MAC June 8th.
- Minutes: Alyssa Conder
- Hannah Whitman: Lead Staff for Susan Gorin's office, continue to loop Arielle in.

2. Approval of April, 2021 Mac Meeting minutes
- Motion to approve: Kate Eagles:
- Second: Angela Nardo-Morgan:
- Motion Approved: 6-0-2

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6. Presentation | Sonoma Valley Sanitation Local Hazard Mitigation Plan
Presenters: Parastou Hooshialsadat, Kent Gylfe, Barry Dugan Cynthia DeLyon and Carlos Diaz

Councilmember Comments:

Chair Dawson: Survey still active?
Barry Dougan: It is no longer active?

Councilmember Eagles: With this kind of hazard mitigation, what kind of input would you be looking for?

Barry Dugan: We would want an indication that the public understands it and what are members of the public interested in looking at?

Kent Gylfe: feedback from the public on our ability to provide reliable sanitation services to them. We identify our greatest risks. We have one treatment plant. If we experienced significant damage we could be unable to properly treat water.

Councilmember Newhouser: The trunk line has significant issues with water seeping into the pipe. Are there plans to reline or replace it? What happens if we enter a mega-draught?

3.c NVMAC Meeting Minutes

Carlos Diaz: The Water Agency has been actively replacing the trunk main for close to a decade now. We are currently in phase 4C of that effort. There remains 5A and 5B of that plan.

Barry Dugan: A sewer lateral inspection and replacement program is ongoing. Currently our reservations are at an all-time low. Things will keep getting worse until we get rain. The main problem might be the lack of inflow. We are currently asking everyone to reduce their water by 20%. July 1 there is likely to be a mandatory 20% cut in water deliveries.

Kent Gylfe: Right now the draught is not an urgent concern. The trunk main project we are doing will help, but our service includes private laterals. There are other projects we need to do to reduce flow.

Public Comment:

Larry: Do you have a responsibility in the relationship of getting involved with agricultural runoff? Are you monitoring the quality of water?

Carlos Diaz: Sonoma Creek Pathogens TDML identifies in their implementation measures to address to address failing septic within the valley. Agricultural runoff the nutrient TMDL study has been suspended because it is not being identified as a not being needed in Sonoma Creek as it is not impaired with respect to nutrients, but chemicals falls under purview of the Regional Water Quality Control Board.

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10. Adjourn
- **Motion to Approve:** Eagles
- **Second:** Nardo-Morgan
- **Motion Approved:** 7:59 pm

Springs Municipal Advisory Council
Notice of Virtual Meeting and Agenda
July 27, 2021
6:30pm

PLEASE NOTE:
This meeting will be conducted entirely by Zoom Webinar pursuant to the provisions of the Governor's Executive Orders N-29-20 and N-35-20, suspending certain requirements of the Ralph M. Brown Act..

Members of the public who wish to connect to the Springs MAC meeting may do so via the following platform:

Join Zoom Webinar Meeting
https://zoom.us/j/98545304964?pwd=QVlYUTcwNFlOZGtIM2JyWVdNZFZSZz09
Webinar ID: 985 4530 4964
Passcode: 404502

Dial in by phone:
(669) 900 9128

Public comment during the virtual meeting:
Members of the public will be recognized at the appropriate time for public comment. Those connected via Zoom must use the Raise Hand tool or dial *9 if called in. When indicated, members of the public will be allowed to speak, asked to unmute and make their comment. Depending on the number of commenters, the Chair may decide to set a time limit.

Interpreting available:
In zoom: to listen to the meeting in your preferred language go to the bottom right of your screen and click on the Interpretation logo. Select English or Spanish. You will automatically hear it the language selected.

Youtube videos:
https://www.youtube.com/playlist?list=PLOdzlO4_wWVEgcBB5907iZTimmpIqLGhJ

Weblinks:
https://sonomacounty.ca.gov/Springs-Municipal-Advisory-Council/

The Springs Municipal Advisory Council represents the people of the Springs in Sonoma Valley as the voice of the community to elected representatives. SMAC is committed to engage with all community members in meaningful and inclusive ways to promote the health and wellbeing of the Springs.

4.a SMAC Meeting Agenda

Springs Municipal Advisory Council
Notice of Virtual Meeting and Agenda
July 27, 2021
6:30pm

Contact: Karina Garcia, Field Rep to Supervisor Susan Gorin – Karina.Garcia@sonoma-county.org

INTERPRETER CONFIRMED 1/5/2021

1. Call to Order, & Roll Call	
2. Approval of Minutes of June 22, 2021 meeting	**Resolution**
3. Public Comment*	**Receive**
4. Community Event Announcements	**Receive**
5. Chair Iturri update:	**Receive**
a. **Welcome New MAC members**	**Receive**
i. Joanne Brown-SVCAC liaison	
ii. Hannah Perot-At Large	
iii. Jesus Alcaraz-Alternate-At Large	
6. County Update: Supervisor Susan Gorin	**Receive**
7. LGBTQ Connection	**Receive**
a. Isamar Alamilla, Youth Advocate	
8. Permit Sonoma:	**Receive**
a. Gary Helfrich: Vacation Rental Ordinance Presentation/public outreach timeline	
b. Lisa Hulette: Sonoma County Multi-Jurisdictional Hazard Mitigation Plan	
9. Sonoma County Water Agency:	**Receive**
a. Barry Dugan & Parastou Hooshialsadat**:** Sonoma Valley County Sanitation District (SVCSD)-Local Hazard Mitigation Plan (LHMP)	
10. Ad hoc Updates	**Resolution**
a. MYN	
b. Fire Safe Council	
c. Arts Projects	
d. Community Outreach-creation of adhoc	
11. Consideration of Future Agenda Items	**Receive**
12. Adjournment	**Resolution**

* Public Comment limited to items not appearing on the agenda.
Materials related to an item on this Agenda submitted to the Springs Municipal Advisory Council after distribution of the agenda packet are available for public inspection in the Board of Supervisors' Office located at 575 Administration Drive, Room 100-Al, Santa Rosa, CA, during normal business hours.

Note: Consideration of items will proceed as follows:

1. Presentation by proponent
2. Questions by Commissioners
3. Questions and comments from the public
4. Response by proponent, if required
5. Comments by Commissioners
6. Resolution, if indicated

Web Links: County of Sonoma: www.sonoma-county.org select Boards and Commissions

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SVCSD LHMP Update 2021

Springs Municipal Advisory Council Meeting

July 27, 2021

Sonoma Water

Agenda

- LHMP Purpose and Content
- Hazards Identification
- LHMP Goals
- LHMP Mitigation Actions
- LHMP Progress Update
- Opportunities for Public Awareness and Participation
- Questions

Sonoma Water

4.c SMAC Meeting Minutes

The Springs Municipal Advisory Council represents the people of the Springs in Sonoma Valley as the voice of the community to elected representatives. SMAC is committed to engage with all community members in meaningful and inclusive ways to promote the health and wellbeing of the Springs.

Springs Municipal Advisory Council
Minutes of the Virtual Meeting
July 27, 2021

1. Call to Order 6:31
Roll Call: Vice Chair Willett
Present: Iturri, Goldman, Lombard, Reyes, Brown, Perot, Alcaraz
Absent: None

Question & Answer & Chat turned off. Public Comment will be available. Meeting will close if hacked.
Chair Iturri announced availability of dual language English/Spanish interpretation.
Present: Jordi Vidales Interpreter

Per Agenda: Interpreting available
In zoom: to listen to the meeting in your preferred language go to the bottom right of your screen and click on the Interpretation logo. Select English or Spanish. You will automatically hear the language selected.

Karina announced KSVY/Sonoma TV will be broadcasting in Spanish on you tube.

2. Approval of Minutes of June 22, 2021
Councilmember Goldman moved to approve Minutes. Councilmember Willett Seconded. Motion passed unanimously.

3. Chair Iturri called for Public Comment limited to 2 minutes
(Limited to items not appearing on the agenda)

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Chair Iturri called for a Break 8:28 till 8:40

9. **Sonoma County Water Agency** (At 2:08:00 on you tube video) **Sonoma Valley County Sanitation District (SVCSD)-Local Hazard Mitigation Plan (LHMP)**

MJHMP_ SpringsMAC_ Pres_En **Multi Jurisdictional Hazard Mitigation Plan Update**

20210727_Springs MAC Meeting PPT_En **LHMP**

MJHMP_ SpringsMAC_ Pres_En **Multi Jurisdictional Hazard Mitigation Plan**

20210727_Springs MAC Meeting PPT_En **LHMP UPDATE**

a. **Barry Dugan & Parastou Hooshialsadat (Engineering/Planning): Sonoma Valley County Sanitation District (SVCSD)-Local Hazard Mitigation Plan (LHMP)**

   Andrea Rodriguez, Mollie Asay

UPDATE/Acutalizacion
SVCSD serves over 11,000 parcels in Sonoma Valley. Three primary elements for collection system. Presentation to discuss elimination of damage to facilities because of natural hazards, as part of application to FEMA grants for projects.
LHMP Purpose & Content: first plan 2008, updated 2012. Describes facilities; assess potential hazards & infrastructure vulnerabilities; provides mitigation goals & discuss implementation strategies, the main focus of the Plan; to qualify for FEMA grant funding must update every 5 years. Several projects in Sonoma Valley implemented in 2016 Plan e.g. replacements near Maxwell Park. Due to update plan to qualify for FEMA funding this year.

Hazards Identification: Natural hazards in Sonoma Valley - geologic & seismic hazard, flood, fire, landslides. Tornados lower risk here. Seismic has been most critical hazard in this region, recently wildfire hazards due to climate changes.

Goals: 1. increase organizational efficiencies & effectiveness when responding to natural disasters 2. Increase reliability of the treatment system capabilities 3. Increase reliability of the wastewater collection system capabilities 4. Increase reliability of the recyclable water system capabilities/reclamation ponds.

Actions: prioritize actions based on – significance of impact e.g. main line breakage; likelihood of failure e.g. near creeks; cost to implement a project e.g. anchorage at a treatment plant.

Two Tiers identified for projects
Tier one – provide highest cost benefit to overall reliability. Priority A – actions w/ potential to be initiated or completed in 5 year plan. Priority B – resources not available so unlikely to finish by 5 year plan.
Tier Two – desirable projects when Tier One goals are achieved. All remaining projects that the benefit cost assessments are below Tier One threshold.

Update: federally compliant RFP to hire outside consultant for more tech support. Received 3 proposals in Sept 2020. Selected InfraTerra *[http://www.infraterra.com Consulting services for the earth and the built environment ... InfraTerra is an industry leader in the characterization of geologic and seismic hazards for water]* based on tech expertise & experience w/ LHMP. Identified hazards also include PPS during fire weather conditions. Also assessing hazards related to climate change i.e. sea level rise, inflow into filtration systems & treatment plant & reclamation facilities. Update hazards profile. Incorporate climate adaptation plan. Schedule. Public Outreach.

- **Goal to have whole document ready for public review/comment in Sept 2021.**

2016 LHMP had no public survey; adding one to 2021 update. Provide more opportunities for public awareness & community participation.

Barry Dugan, Community & Government Affairs Sonoma Water, Andrea Rodriguez leading Effort. E Newsletter w/ several thousand on list; survey info, good response; social media; annual Prop 218 newsletter goes along w/ annual rate adjustment; stakeholders; website – https://www.sonomawater.org/svlhmp. Email: LHMP@scwa.ca.gov

Chair Iturri called for Council Questions.

Councilmember Lombard, what is concern for rest of Valley sewage district for flooding/hazards since sewage treatment facilities for Sonoma Valley are in Schellville? Parastou, main facility takes sewage treatment from whole Valley. **Kent Gylfe, Dept. Chief Engineer w/ Sonoma Water**. Yes, main treatment plant in southern end of Valley & is well protected from 100 year flood events, but flooding can affect system hydraulics; concerned about sea level rise which could affect plant discharge, as well as peak flows from major storms. Re climate projections - entire system vulnerable to extreme storm events, & resulting overflows. Councilmember Lombard, how imperiled is entire system compared to other county treatment plants? E.g. plant on west side, Santa Rosa/Guerneville near Laguna. Parastou, Sonoma Valley treatment plant in better location compared to other plants re risk.

Councilmember Brown, is "Climate Adaptation Plan" a departmental internal document or was it prepared & used by county in general? **Kent**, yes, Climate Adaptation Plan is in development by Sonoma Water for all facilities, re water supply, flood control & standpoint of sanitation. Also working on it to be a public document. Councilmember Brown, will it come out this year? Kent, hope to roll out by this fall. Barry, scheduled to go to BoS in Sept.

Chair Iturri, to Kent. Inquired as to context/process. **Kent**, LHMP being prepared to qualify for federal-sourced funding via FEMA & Cal OAS, administered through State. Without a LHMP would be unaware of risks & hazards & ineligible for substantial funding. Plan develops long list of mitigation actions & vulnerabilities, only a fraction can be prioritized high enough to acquire enough resources to address. Have implemented numerous projects on water supply & sanitation fronts utilizing FEMA funds, to enhance natural system resilience to most hazards e.g. seismic, flood control & sanitation. Chair Iturri, clarified that funding enhances day to day operations, but focus is on preventing tremendous natural disaster impacts. Kent, yes, specifically w/ this document. Sonoma Water manages 3 Plans - Sonoma Valley Sanitation District, Russian River Sanitation District, plus overarching water supply Plan for Santa Rosa.
Councilmember Perot, why is FEMA seeking public comment on a complex system that is challenging to understand? Is County getting good feedback from public about a HMP? **Barry**, past public comments been limited. FEMA wants to solicit public comment, re hazards to specific locations, e.g. active seismic area, mudslide, landslide that the county may not be aware of.
Councilmember Willett, looking at elevations on map, facility 13' above sea level, up to holding pond banks 24' above sea level. Is facility expected to last for another generation, considering climate change? **Kent**, Schellville Treatment Plant only part of facilities which operate as whole collection system. LMP covering all facilities up to Glen Ellen, piping, collection, sewage to plant, treatment plant. Recycled water system & discharge winter time discharge if not able to discharge for reuse. The plant had serious renovation 1978, unsure of design life, but hope for decades more. Are looking at climate projection & risks. No plans to replace facility in current long range plans.
Chair Iturri, since Valley shrinking in full time residents due to vacation rentals will need to take into consideration the impact of fluctuation in populations. Kent, yes.
Councilmember Lombard, considering recent weather events this summer - heat domes in northwest, rain in summer, so called 100 year floods, etc. there are more climate change concerns.

Chair Iturri called for Public Comment (at 2:37:30 on you tube)
Karina welcomed callers
Fred Allebach, re slide for "increase recycle system capacity" – understands existing ponds have max capacity of 17,000 acre feet if it rained all year. So increasing recycled water system capacity would not mean another pond. Would it mean bigger pipes? Parastou, slide referenced "reliability" not capacity. Plan is looking at existing assets. Kent, appreciated Fred's attention to detail w/ figures. Fred, just met w/ Sonoma Water re recycled water system for GSA. Correction, slide referenced "reliability" not capacity. Kent, yes, working to build resilience into overall infrastructure.
Public Comment closed.

Chair Iturri called for Council Comments. None.

[redacted]

Community Survey

1. Text Accompanying Survey
2. Survey Questions
3. Survey Announcement with QR Code
4. Survey Results

1. Text Accompanying Survey

Community Survey
The Sonoma Valley County Sanitation District (District) is seeking your opinion regarding natural hazards in the area (such as wildfires, floods, and earthquakes). The information you provide will help us identify and develop projects for the District's 2021 Sonoma Valley County Sanitation District Local Hazard Mitigation Plan (LHMP). The survey should take approximately 5 to 10 minutes to complete, and your personal information and responses will be kept confidential. The results of the survey will be included in the LHMP and will be posted on the project website https://www.sonomawater.org/svlhmp. The survey has been posted in both English and Spanish and is accessible via the following links and QR codes (which can be scanned on a phone or tablet). The survey will remain active through the end of February 2021.

LHMP Background

A FEMA-approved local hazard mitigation plan (LHMP) helps our communities identify important local hazard issues, prioritize next steps to address those issues, and provide access to funding through programs like the FEMA Hazard Mitigation Assistance Program. An LHMP is required in order to be eligible to apply for federal hazard mitigation funding, and must be updated every 5 years. The current SVCSD LHMP will expire September 13, 2021, and we are in the beginning stages of updating this plan. The adoption and maintenance of the current plan has been successful, and to date we have been awarded FEMA funding to design a seismic retrofit for the secondary clarifiers at the treatment plant.

2. Survey Questions

Sonoma Water

Copy of Local Hazard Mitigation Plan Sonoma Valley County Sanitation District, managed and operated by Sonoma Water

* 1. In which area of Sonoma Valley do you live?

- Boyes Hot Springs
- Eldridge
- El Verano
- Fetters Hot Springs
- Glen Ellen
- Kenwood
- Mission Heights
- Sonoma
- Vineburg
- Unincorporated County Area
- Other (please specify)

2. Do you think you are well informed about the dangers of natural hazards in the surrounding area?

- Yes
- No

3. Do you believe your Sonoma Valley residence is at risk from a natural hazard disaster?
Naturally occurring hazards include wildfires, flooding, earthquakes, and landslides etc.

- Yes
- No

2. Survey Questions

4. The hazards addressed in the Local Hazard Mitigation Plan update are listed below. Please indicate your level of concern in the Sonoma Valley County Sanitation District that you perceive for each hazard.

	Not concerned	Slightly concerned	Somewhat concerned	Moderately concerned	Extremely concerned
Climate Change	○	○	○	○	○
Drought and Water Shortage	○	○	○	○	○
Earthquake/ Geologic Hazard	○	○	○	○	○
Flooding	○	○	○	○	○
Debris Flows	○	○	○	○	○
Wildfires	○	○	○	○	○

Other (please specify)

5. Which of the following types of hazard events have you or your household experienced at your current Sonoma Valley residence?

- ☐ Earthquake
- ☐ Flooding (including from a creek, local drainage, or high groundwater levels)
- ☐ Geological hazard (landslide, erosion, mudslide, soil expansion / collapse)
- ☐ Other (please specify)
- ☐ Wildfire
- ☐ None

6. Which of the following resources have you taken advantage of to prepare for a hazard or emergency? Please check all that apply

- ☐ Experience with previous emergency events
- ☐ Local news, informational brochures and other media information
- ☐ City website or Facebook page
- ☐ Sonoma County website
- ☐ Community-based nonprofit groups (e.g., COPE, CERT)
- ☐ Social media postings/articles
- ☐ Training from public safety and emergency management sources
- ☐ Schooling, training, and other academic exposure to preparedness measures
- ☐ Emergency alert warning systems (e.g., SoCoAlert, Nixle, WEA, NWS)
- ☐ None of the above
- ☐ Other (please specify)

2. Survey Questions

7. If sewer service to your home were to be interrupted following a major natural hazard event (earthquake, wildfire, flood, etc.) what maximum period of time do you feel the District should have as a goal to restore service?

- 1 day
- 3 days
- 1 week
- 1 month
- 3 months
- 6 months
- Other (please specify)

8. Which of the following mitigation projects do you believe the Sonoma Valley County Sanitation District should focus on to reduce disruptions of sewer services and to increase the community resiliency? Please check all that apply

- Repair or replace inadequate or vulnerable infrastructure
- Retrofit or upgrade dated sewer system
- Work on improving the damage resistance of water / wastewater facilities
- Ensure that the District has adequate backup power generators to maintain services to essential buildings and structures
- Strengthen codes, ordinances, and plans to require higher hazard risk management standards
- Provide public awareness information about hazard risk and high-hazard areas that could affect sewer service
- Other (please specify)
- None of the above
- Inform property owners of ways they can mitigate against damage to the sewer pipes on their property(ies)
- Assist vulnerable property owners with securing funding to mitigate sewer-related vulnerabilities of their property(ies)
- Replant vegetation after wildfires to prevent additional inflow to the sewer system
- Provide public warning information/messages

2. Survey Questions

9. If you would like to be added to the contact list for the Local Hazard Mitigation Plan, please provide your name and email address.

Providing us with your name and email is optional and the information will be used only to notify you of Local Hazard Mitigation Plan activities.

Name

Address

City

State

Zip code

Email Address

3. Survey Announcement with QR Code

Sonoma Valley County Sanitation District

Local Hazard Mitigation Plan

Survey

The Sonoma Valley County Sanitation District is asking for customers input about awareness of natural disasters and the reliability of sanitation facilities through an online survey.

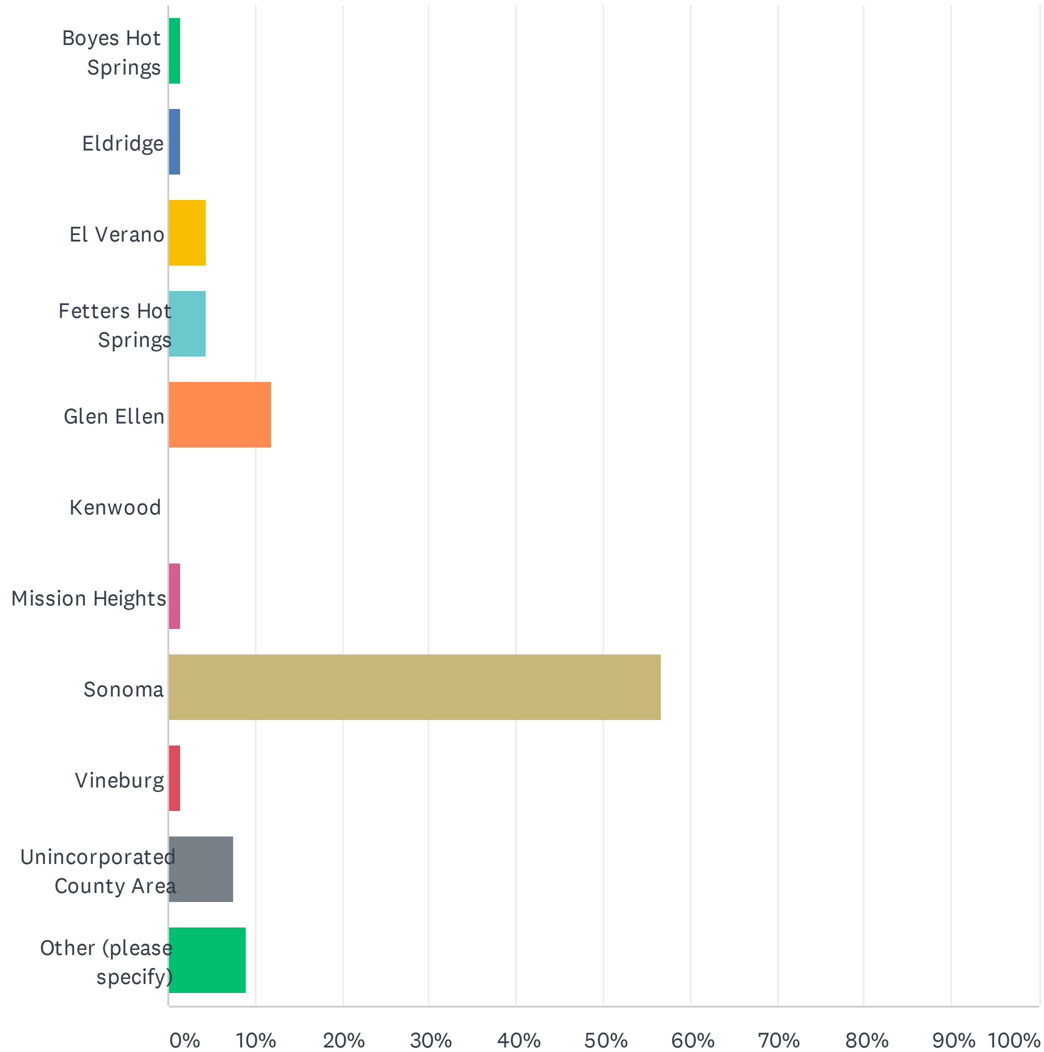
Scan me to directly link to English survey

Scan me to directly link to Spanish survey

To learn more or link to the survey, please visit SonomaWater.org/SVCSD

Q1 In which area of Sonoma Valley do you live?

Answered: 67 Skipped: 0



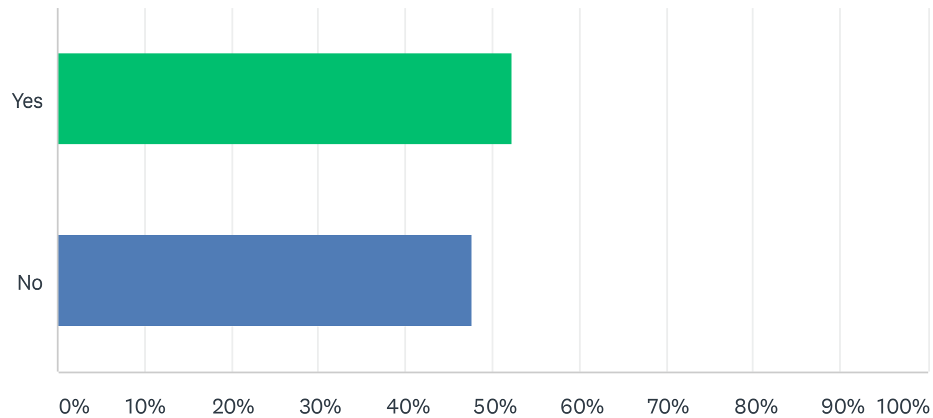
4. Survey Results

ANSWER CHOICES	RESPONSES	
Boyes Hot Springs	1.49%	
Eldridge	1.49%	
El Verano	4.48%	
Fetters Hot Springs	4.48%	
Glen Ellen	11.94%	
Kenwood	0.00%	
Mission Heights	1.49%	
Sonoma	56.72%	38
Vineburg	1.49%	1
Unincorporated County Area	7.46%	5
Other (please specify)	8.96%	6
TOTAL		67

4. Survey Results

Q2 Do you think you are well informed about the dangers of natural hazards in the surrounding area?

Answered: 67 Skipped: 0

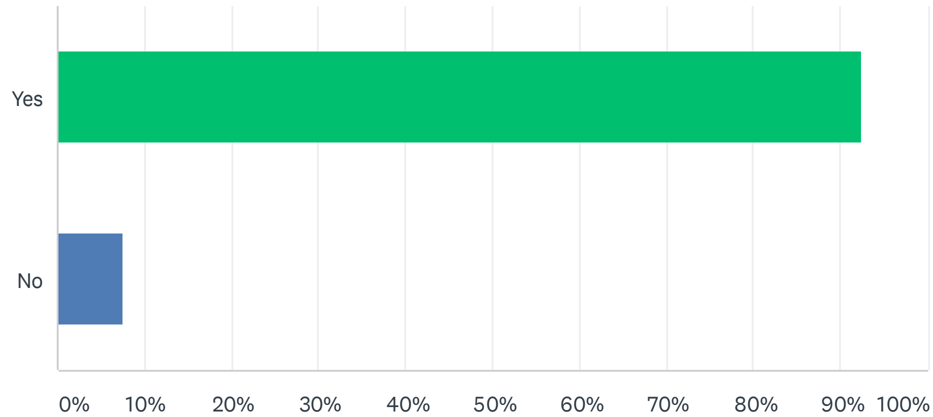


ANSWER CHOICES	RESPONSES	
Yes	52.24%	35
No	47.76%	32
TOTAL		67

4. Survey Results

Q3 Do you believe your Sonoma Valley residence is at risk from a natural hazard disaster? Naturally occurring hazards include wildfires, flooding, earthquakes, and landslides etc.

Answered: 67 Skipped: 0

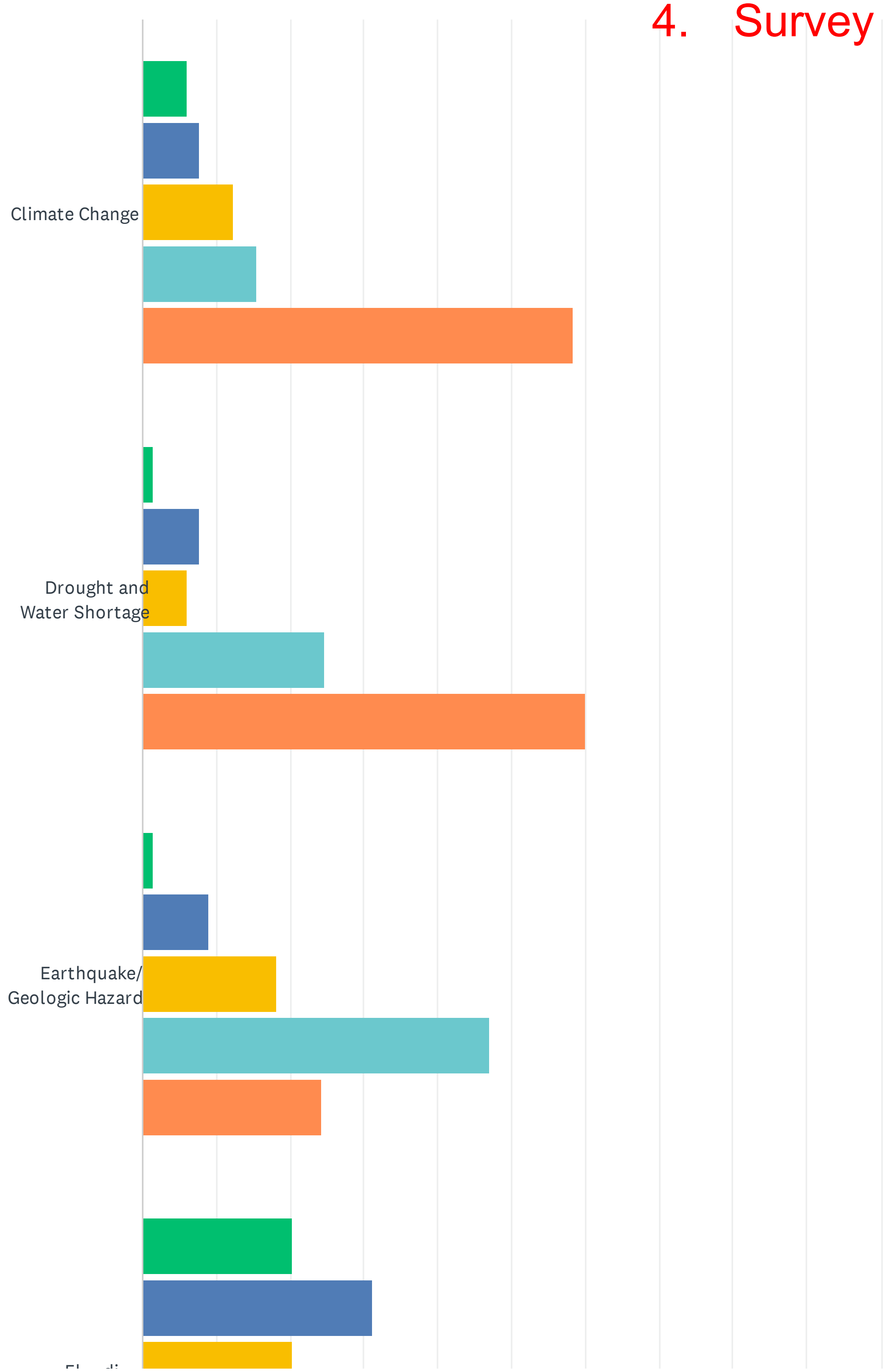


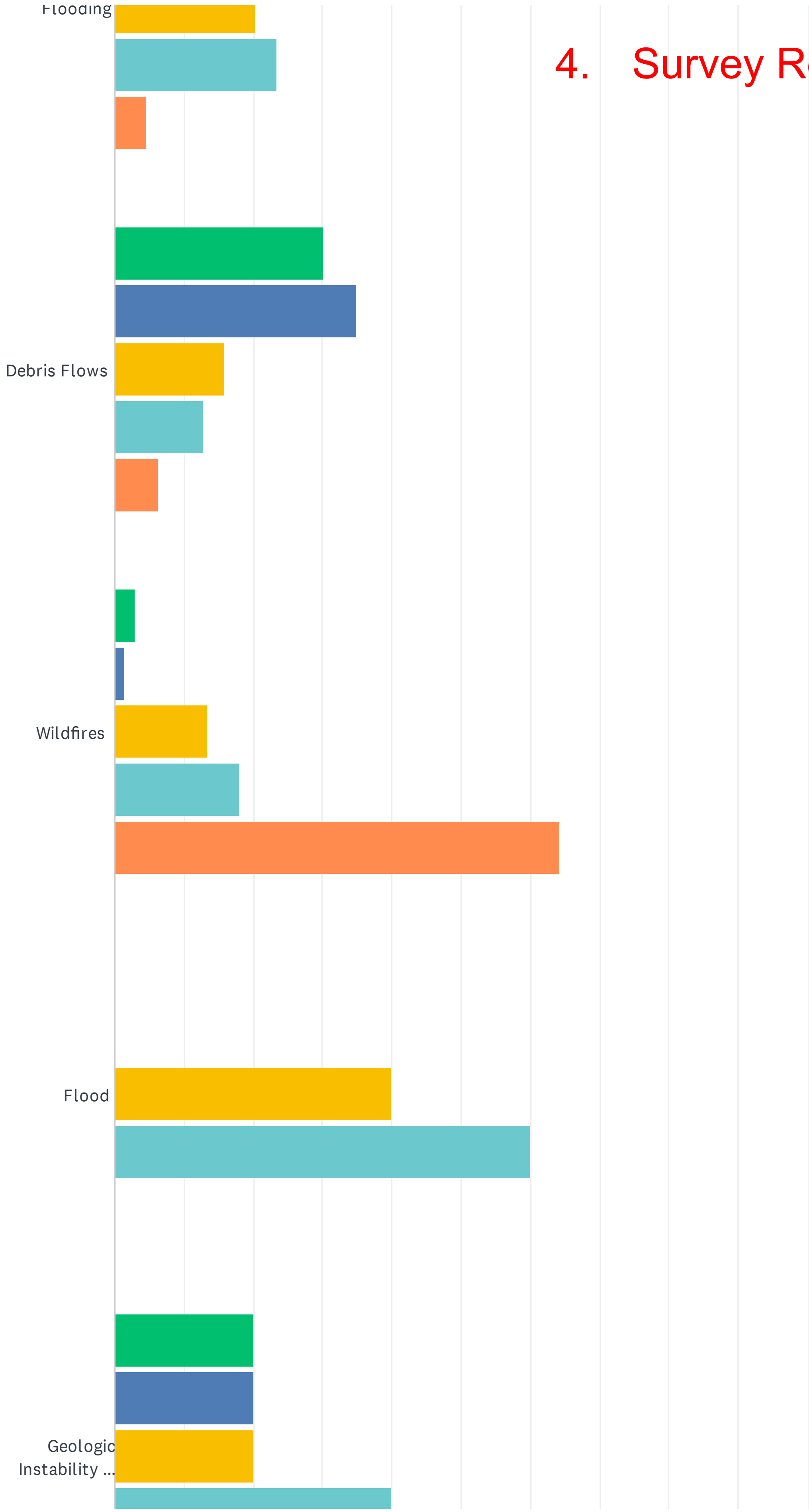
ANSWER CHOICES	RESPONSES	
Yes	92.54%	62
No	7.46%	5
TOTAL		67

Q4 The hazards addressed in the Local Hazard Mitigation Plan update are listed below. Please indicate your level of concern in the Sonoma Valley County Sanitation District that you perceive for each hazard.

Answered: 67 Skipped: 0

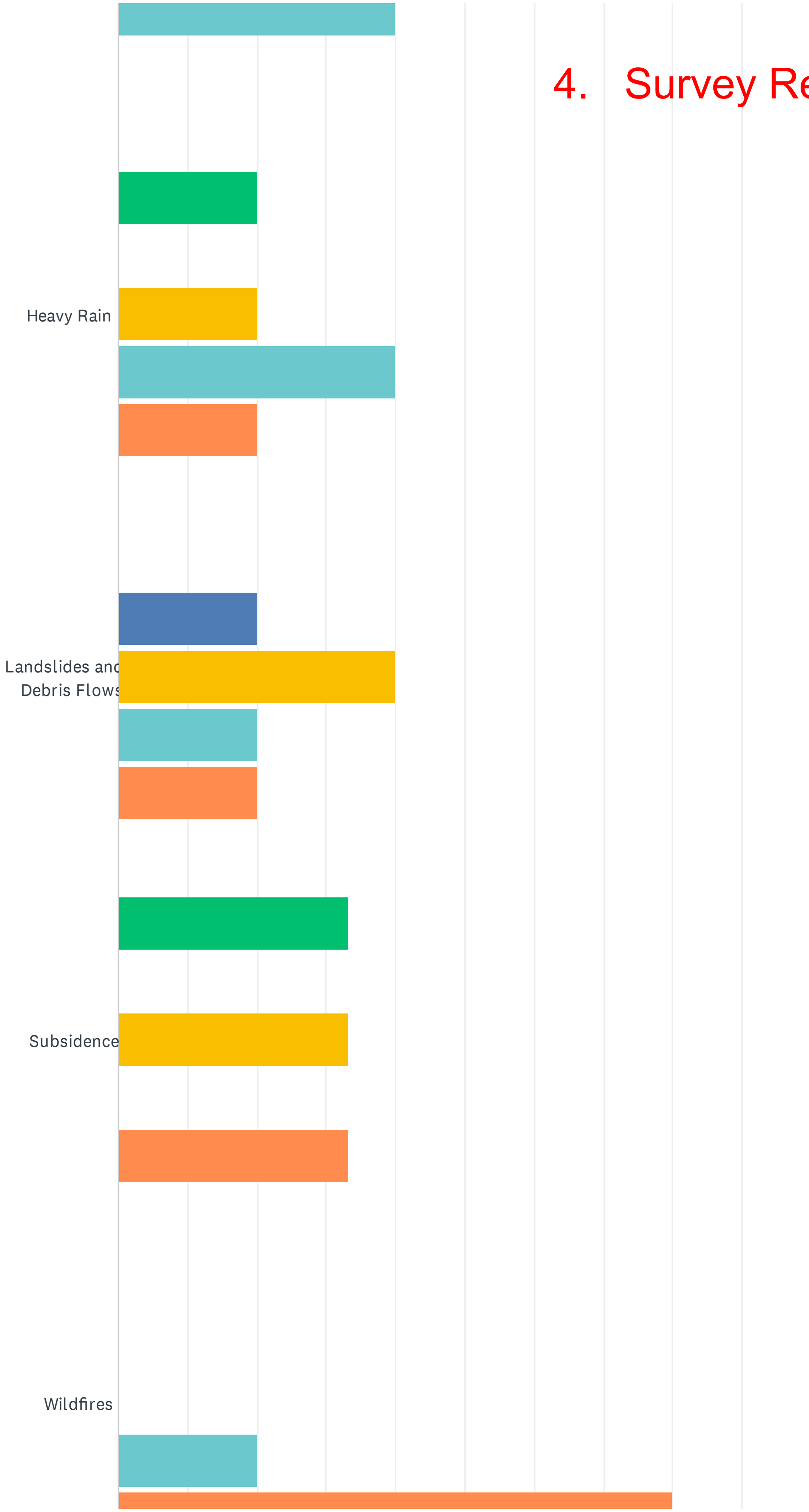
4. Survey Results



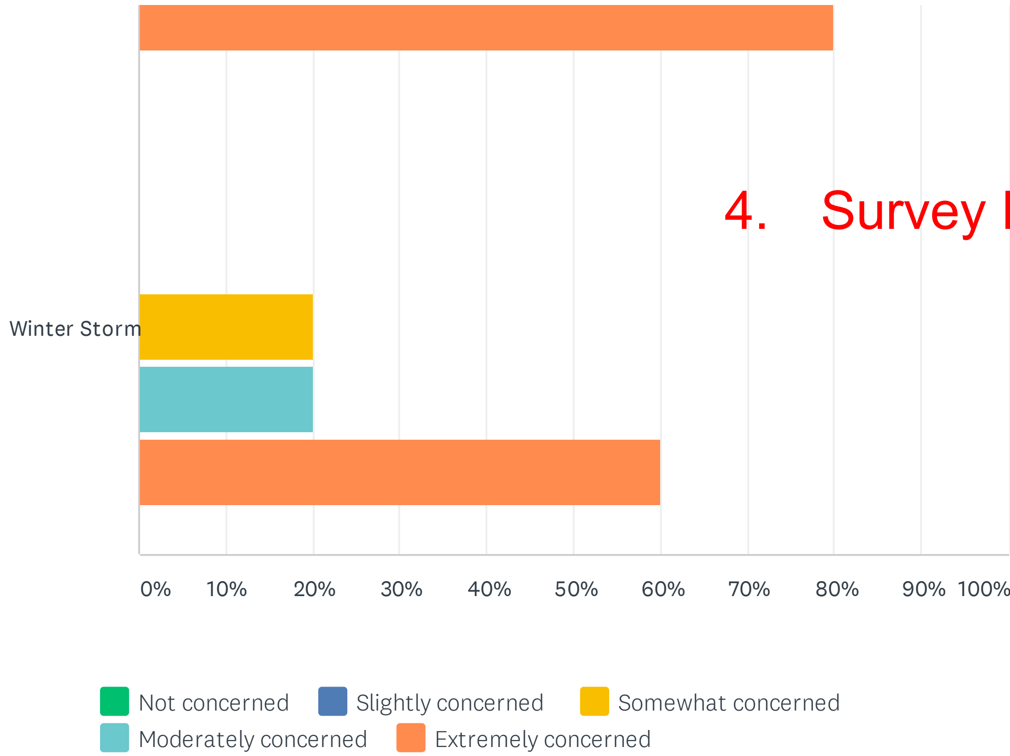


4. Survey Results

4. Survey Results



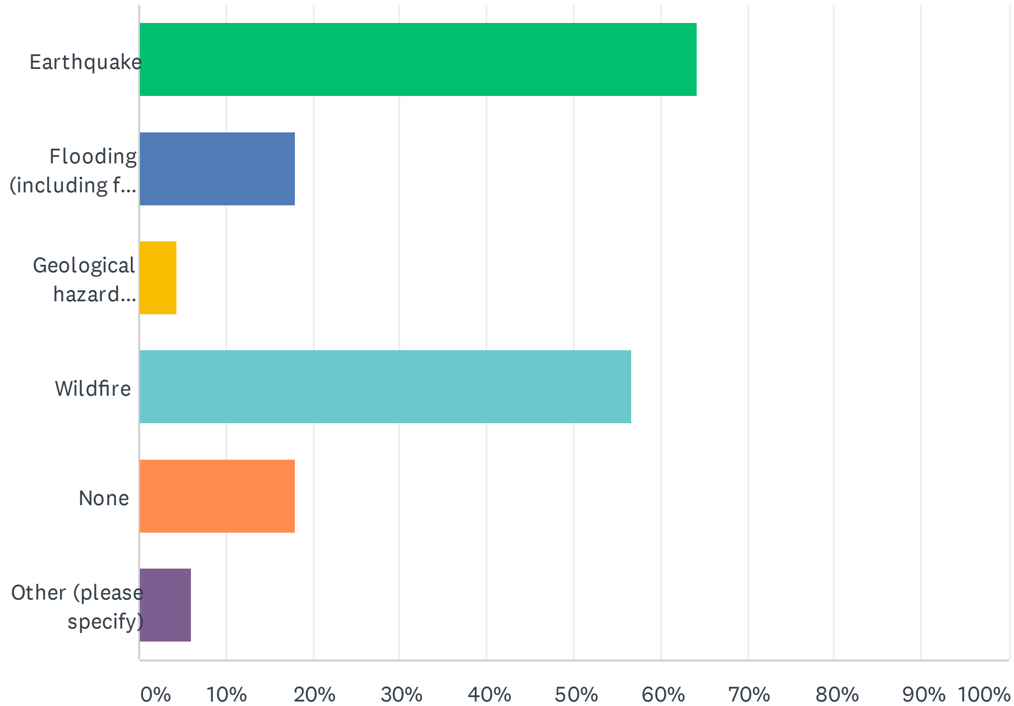
4. Survey Results



	NOT CONCERNED	SLIGHTLY CONCERNED	SOMEWHAT CONCERNED	MODERATELY CONCERNED	EXTREMELY CONCERNED	TOTAL
Climate Change	6.15% 4	7.69% 5	12.31% 8	15.38% 10	58.46% 38	
Drought and Water Shortage	1.54% 1	7.69% 5	6.15% 4	24.62% 16	60.00% 39	65
Earthquake/ Geologic Hazard	1.52% 1	9.09% 6	18.18% 12	46.97% 31	24.24% 16	66
Flooding	20.31% 13	31.25% 20	20.31% 13	23.44% 15	4.69% 3	64
Debris Flows	30.16% 19	34.92% 22	15.87% 10	12.70% 8	6.35% 4	63
Wildfires	2.99% 2	1.49% 1	13.43% 9	17.91% 12	64.18% 43	67
Flood	0.00% 0	0.00% 0	40.00% 2	60.00% 3	0.00% 0	5
Geologic Instability or Activity	20.00% 1	20.00% 1	20.00% 1	40.00% 2	0.00% 0	5
Heavy Rain	20.00% 1	0.00% 0	20.00% 1	40.00% 2	20.00% 1	5
Landslides and Debris Flows	0.00% 0	20.00% 1	40.00% 2	20.00% 1	20.00% 1	5
Subsidence	33.33% 1	0.00% 0	33.33% 1	0.00% 0	33.33% 1	3
Wildfires	0.00% 0	0.00% 0	0.00% 0	20.00% 1	80.00% 4	5
Winter Storm	0.00% 0	0.00% 0	20.00% 1	20.00% 1	60.00% 3	5

Q5 Which of the following types of hazard events have you or your household experienced at your current Sonoma Valley residence?

Answered: 67 Skipped: 0

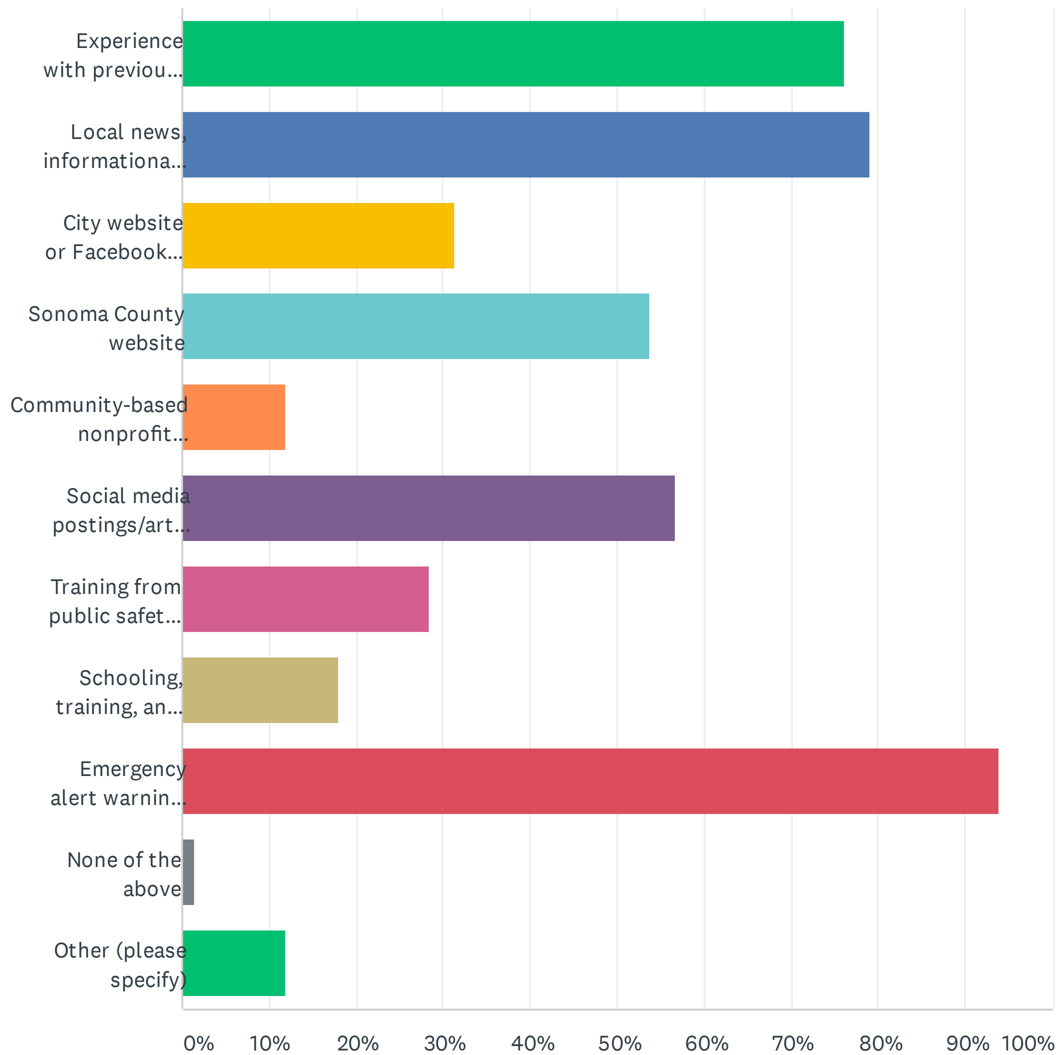


Earthquake	64.18%	43
Flooding (including from a creek, local drainage, or high groundwater levels)	17.91%	12
Geological hazard (landslide, erosion, mudslide, soil expansion / collapse)	4.48%	3
Wildfire	56.72%	38
None	17.91%	12
Other (please specify)	5.97%	4
Total Respondents: 67		

4. Survey Results

Q6 Which of the following resources have you taken advantage of to prepare for a hazard or emergency?Please check all that apply

Answered: 67 Skipped: 0



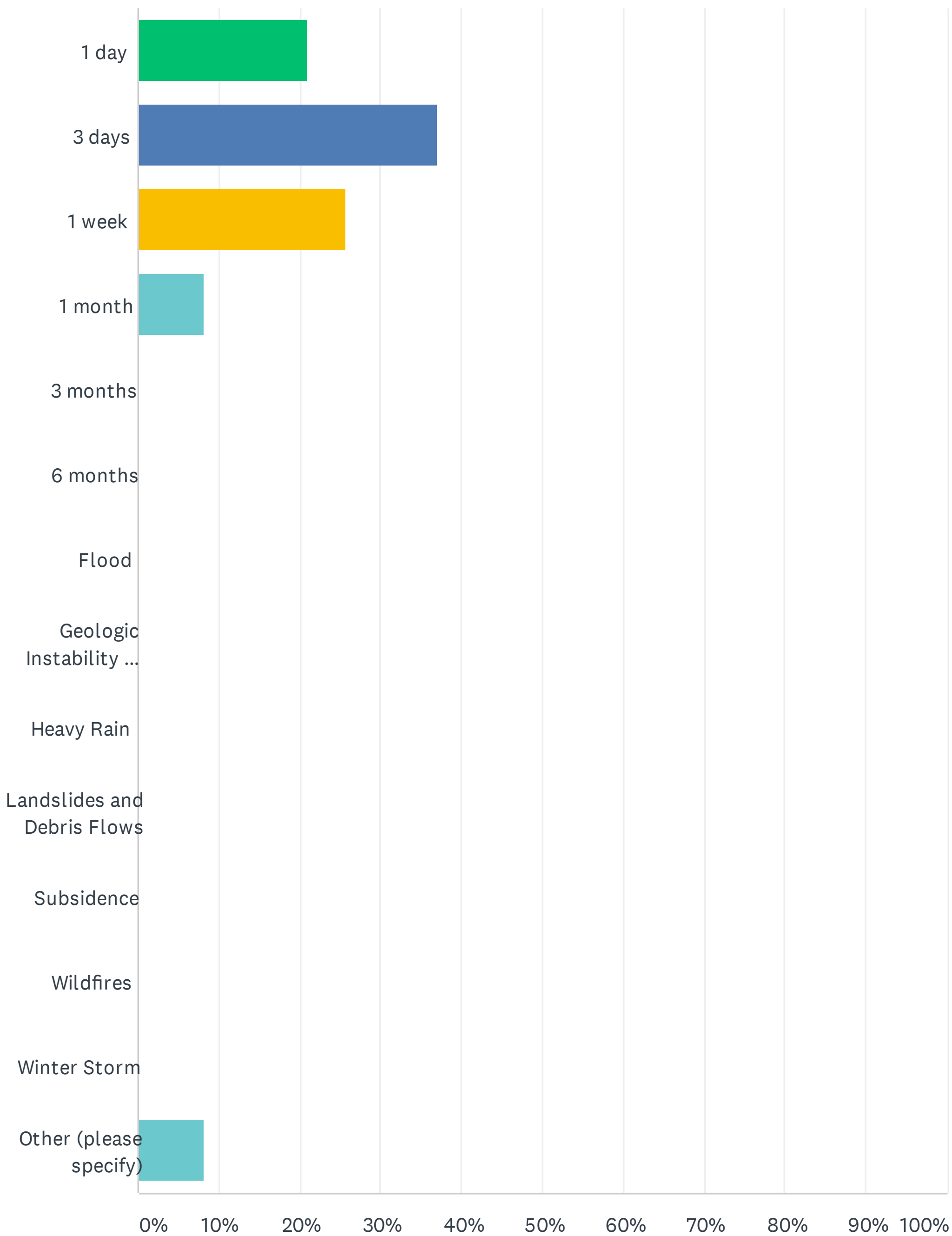
4. Survey Results

Experience with previous emergency events	76.12%	51
Local news, informational brochures and other media information	79.10%	53
City website or Facebook page	31.34%	21
Sonoma County website	53.73%	36
Community-based nonprofit groups (e.g., COPE, CERT)	11.94%	8
Social media postings/articles	56.72%	38
Training from public safety and emergency management sources	28.36%	19
Schooling, training, and other academic exposure to preparedness measures	17.91%	12
Emergency alert warning systems (e.g., SoCoAlert, Nixle, WEA, NWS)	94.03%	63
None of the above	1.49%	1
Other (please specify)	11.94%	8
Total Respondents: 67		

4. Survey Results

Q7 If sewer service to your home were to be interrupted following a major natural hazard event (earthquake, wildfire, flood, etc.) what maximum period of time do you feel the District should have as a goal to restore service?

Answered: 62 Skipped: 5



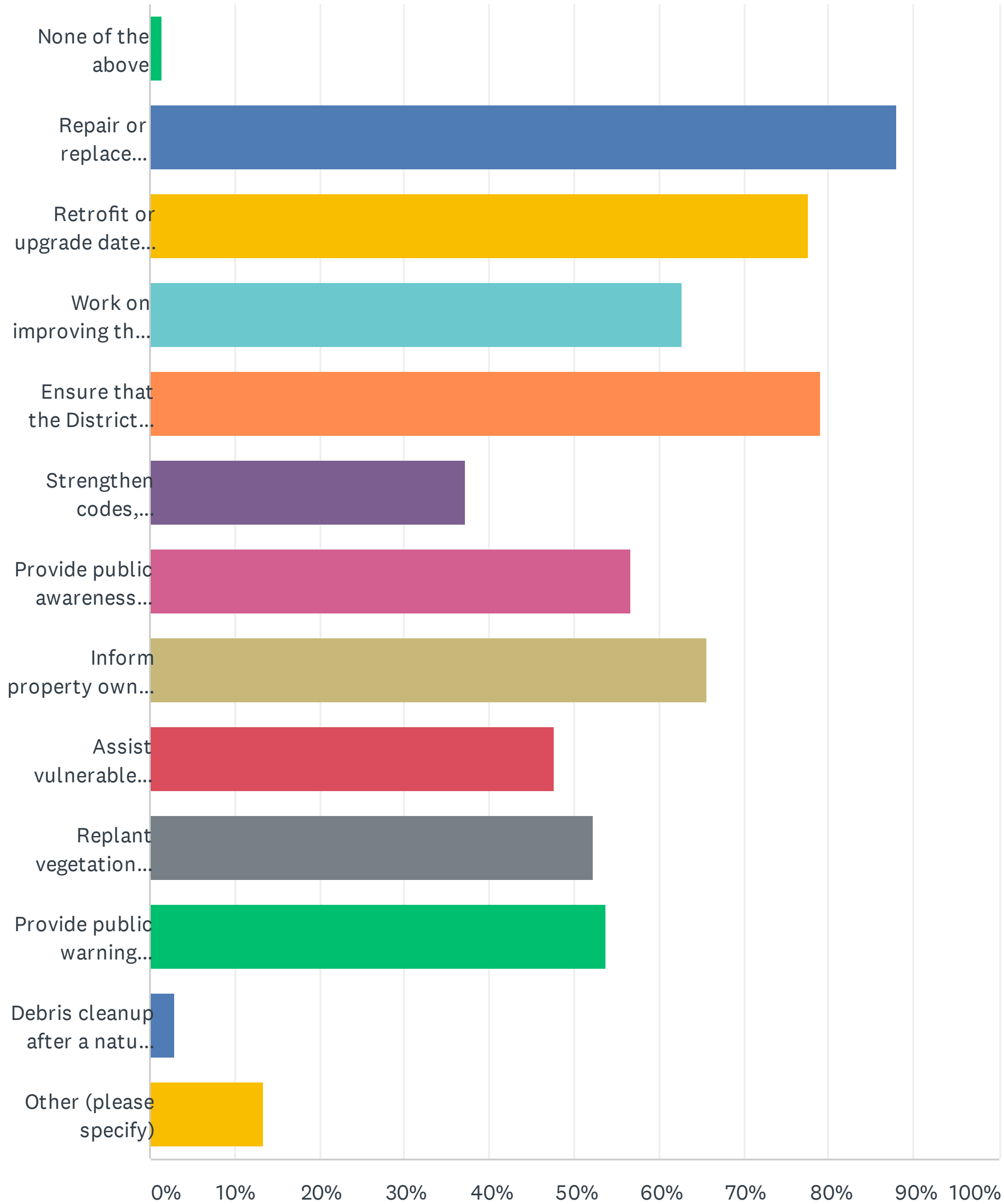
4. Survey Results

ANSWER CHOICES	RESPONSES	
1 day	20.97%	13
3 days	37.10%	23
1 week	25.81%	16
1 month	8.06%	5
3 months	0.00%	0
6 months	0.00%	0
Flood	0.00%	0
Geologic Instability or Activity	0.00%	0
Heavy Rain	0.00%	0
Landslides and Debris Flows	0.00%	0
Subsidence	0.00%	0
Wildfires	0.00%	0
Winter Storm	0.00%	0
Other (please specify)	8.06%	5
TOTAL		62

4. Survey Results

Q8 Which of the following mitigation projects do you believe the Sonoma Valley County Sanitation District should focus on to reduce disruptions of sewer services and to increase the community resiliency?Please check all that apply

Answered: 67 Skipped: 0



4. Survey Results

None of the above	1.49%	1
Repair or replace inadequate or vulnerable infrastructure	88.06%	59
Retrofit or upgrade dated sewer system	77.61%	52
Work on improving the damage resistance of water / wastewater facilities	62.69%	42
Ensure that the District has adequate backup power generators to maintain services to essential buildings and structures	79.10%	53
Strengthen codes, ordinances, and plans to require higher hazard risk management standards	37.31%	25
Provide public awareness information about hazard risk and high-hazard areas that could affect sewer service	56.72%	38
Inform property owners of ways they can mitigate against damage to the sewer pipes on their property(ies)	65.67%	44
Assist vulnerable property owners with securing funding to mitigate sewer-related vulnerabilities of their property(ies)	47.76%	32
Replant vegetation after wildfires to prevent additional inflow to the sewer system	52.24%	35
Provide public warning information/messages	53.73%	36
Debris cleanup after a natural hazard occurs	2.99%	2
Other (please specify)	13.43%	9
Total Respondents: 67		

Q9 If you would like to be added to the contact list for the Local Hazard Mitigation Plan, please provide your name and email address.Providing us with your name and email is optional and the information will be used only to notify you of Local Hazard Mitigation Plan activities.

Answered: 30 Skipped: 37

ANSWER CHOICES	RESPONSES	
Name	96.67%	29
Company	0.00%	0
Address	96.67%	29
Address 2	0.00%	0
City	96.67%	29
State	96.67%	29
Zip code	96.67%	29
Country	0.00%	0
Email Address	100.00%	30
Phone Number	0.00%	0

E-News & Newsletters

1. October 2020
2. February 2021
3. Spring 2021
4. August 2021

Sonoma Water

Sonoma Water E-News | October 2020

New Water Year Starts on Cautious Note

With a drier than normal previous Water Year and continuing water conservation efforts in place, Sonoma Water begins the new Water Year cautiously.

October 1 marks the start of the 2020-21 Water Year, which runs from October 1-September 30 each year. California's 2019-2020 Water Year ended with below average rainfall and further demonstrated the impact of climate change on the state's water supply. The Ukiah region had its third driest water year on record, which prompted Sonoma Water to file a Temporary Urgency Change Petition. This allowed the agency to reduce flows in Russian River if water storage in Lake Mendocino dropped more than one percent below the critical target water supply storage levels. To date water flows have been stable and usage during peak times has been offset with conservation efforts.

Water managers across the state, including Sonoma Water, will be monitoring weather forecasts regionally as 2020 closes knowing that Northern California received below average precipitation last year and some weather models indicate the 2020-21 rain year could also be dry. Storage in Lake Mendocino and Lake Sonoma are below target storage and average storage levels.

"We're entering the new Water Year cautiously, and we will continue to encourage our customers to practice water conservation," said Sonoma Water General Manager Grant Davis. "The Sonoma-Marin Saving Water Partnership is working every day to remind our communities about the importance of conserving water resources and promoting long-term efficient water use."

Click here for additional information on water storage

Click here for information about water conservation

Water Smart Plant Inspiration!

Fall is the ideal time to plant in California because of its shorter days, cooler nights, and the prospect of fall and winter rainfall, all of which help to give new plantings a good start in life. Here are a few Water Smart Plant ideas to help you decide what to plant this fall.

Small Flowering Tree or Large Shrub
Western Redbud (*Cercis occidentalis*) is a deciduous California native that offers year-round interest. The show starts with rosy pink blossoms in late winter to early fall,

which are then followed by apple-green, heart-shaped leaves that remain into the winter months.

Small to Medium Flowing Shrub
Winnifred Gilman Sage (*Salvia clevelandii 'Winifred Gilman'*) will thrive in hot sunny locations with good drainage, and reward you with fragrant foliage and deep blue whorls of flowers that will attract bees and other pollinators.

Rain Garden Perennial
California gray rush (*Juncus patens*) is a go-to species for the summer-dry rain garden! It will thrive in moist conditions and its roots will help to stabilize soil and filter stormwater runoff. It is also tolerant of extended periods of drought. The stiff upright foliage provide an interesting contrast amongst other plants.

For these and other Water Smart Plants, visit local plant nurseries that feature the Water Smart Plant Label. Easily identify plants that thrive in our area with less water by looking for this label.

Find additional information on Water Smart Plants and gardening here

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Sonoma Valley County Sanitation District Local Hazard Mitigation Plan

The Sonoma Valley County Sanitation District (District) is working with its stakeholders on an update of its 2016 Local Hazard Mitigation Plan (LHMP). An LHMP forms the foundation for a community's long-term strategy to reduce disaster losses and break the cycle of disaster damage, reconstruction, and repeated damage. The planning process must include public and stakeholder involvement.

The District must update its LHMP every five years to ensure it remains relevant to current events and system conditions and to meet regulations set forth by the Federal Emergency Management Agency (FEMA). In particular, staff will review the District's vulnerabilities and risks, as well as the prioritized listing of hazard mitigation projects.

LHMPs are public documents that create a framework for risk-based decision making to reduce damage to lives, property, and the economy from future disasters, such as earthquakes, fires, and floods. Hazard mitigation is sustained action taken to reduce or eliminate long-term risk to people and their property from hazards. FEMA utilizes

LHMPs to issue grant funding for pre-disaster and hazard mitigation projects.

If you are interested in following the LHMP preparation, approval, and adoption process or providing input, visit www.sonomawater.org/svlhmp. LHMP drafts, staff reports, public hearing notices, hazard maps, etc., will be posted there for public review.

Find more information here

You can submit questions or comments by sending an email here

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Chinook Count in the Russian River

Sonoma Water Fisheries biologists have observed a total of 12 Chinook salmon at the Russian River Fish Ladder at the Mirabel Inflatable Dam. The first Chinook of the year was spotted on September 29.

Chinook salmon currently returning to the River are offspring of wild parents that spawned naturally in the upper 75 miles of the mainstem or in Dry Creek.

Unlike many steelhead and coho salmon in the Russian River, there is no hatchery production of Chinook salmon. Fish returning to spawn are two to four years old.

Spawning typically commences in November and continues through January. Eggs incubate in the gravel for roughly two months before fry emerge and begin their downstream migration to the estuary.

Sonoma Water trapping and marking studies have shown that most juvenile Chinook salmon enter the Pacific Ocean by July of their first year of life.

Learn more about the Chinook count here

Water Education Program & Resources for Teachers

Sonoma Water will be offering a distance learning program for 5th grade students this fall!

We are offering four engaging lessons where our staff will live Zoom into your virtual classroom and lead your students on virtual tours of our water system and the Russian River ecosystem.

Our four areas of study will include:

- Exploring our Local Ecosystem- The Russian River watershed
- Water quality testing and the natural history of salmon and steelhead in the Russian River watershed
- Sonoma Water's water supply and transmission system
- Making a difference - Conserving water and caring for the Russian River watershed

Interested teachers can sign up here

Sign up here to stay up to date on the water education program with our e- newsletter

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Rainfall and Water Storage Update

Current water supply conditions as of 10/7/2020:

Lake Mendocino Target Water Supply Curve: 62,508 acre-feet
Current Storage: 39,100 acre-feet (62.55% of Target Water Supply Curve)

Lake Sonoma
Target Storage Curve: 245,000 acre-feet
Current Storage: 178,996 acre-feet (73.06% of Water Supply Pool)

Current rainfall conditions (10/1/20 – 10/6/20)

Ukiah:
Average (1894-2020 water years): 0.24”

Current Water Year: 0.00” which is 0.00% of average

Santa Rosa:
Average (1950-2020 water years): 0.13"
Current Water Year: 0.00” which is 0.00% of average

Learn more about water storage here

Upcoming Events

The Board normally holds its regular meetings on Tuesdays, beginning at 8:30 a.m. and will be facilitated virtually through Zoom.

Upcoming Board meetings:
- October 20 at 8:30 am
- November 10 at 8:30 am
- November 17 at 8:30 am

Board Agendas:
View upcoming Agenda items

Please visit SoCoEmergency.org for additional information on Coronavirus and fire recovery from Sonoma County.

Groundwater Sustainability Agency Board Meetings
- October 22, 2020, 4:00 pm - Petaluma Valley
- October 26, 2020, 4:00 pm - Sonoma Valley
- October 29, 2020, 1:00 pm - Santa Rosa Plain

sonomagroundwater.org

Sonoma Water Events Calendar

Fact of the Month

Why do hydrologists need their own way to classify a year when the January-December calendar has been functional for hundreds of years?

The simple answer has to do with the way the water cycle works. The setup for next year's hydrologic "action" takes place starting in the prior fall, not January, and precipitation that occurs toward the end of the calendar year often does not impact flow in streams and rivers until the following spring.

Employment Opportunities

Public Comment

We invite you to explore the career opportunities available with the Sonoma County Water Agency.

- Water Agency Engineer III (Closes October 28, 2020)
- Water Agency Maintenance Worker I - Extra Help

Employment Opportunities

Opportunities

Please click the button below to see opportunities to provide your input and comments.

Public Comment Opportunities

Sonoma Water | 404 Aviation Blvd, Santa Rosa, CA 95403 | sonomacountywater.org

STAY CONNECTED

Sonoma Water

Sonoma Water E-News | February 2021

FIRO Helps Store More Water and Maintain Flood Protection

The Russian River basin experiences some of the most variable climate in the U.S., with atmospheric rivers and their extreme precipitation driving this variability. These storms provide 25-50 percent of annual precipitation in key parts of the West, which can replenish water supply, but can also lead to hazardous and costly flooding, with atmospheric rivers causing 84 percent of Western U.S. flood damages, and 99 percent of damages in Sonoma County. The science of forecasting atmospheric rivers has continued to advance, particularly in understanding the origin and evolution of these storms, through enhanced observations before they make landfall, and through better modeling and prediction. "The skill of forecasting atmospheric rivers and their associated extreme precipitation and runoff, based on scientific advances and modern technology, have been shown by this program to enable Lake Mendocino to be operated more flexibly than in the past," said Scripps research meteorologist F. Martin Ralph, director of CW3E. "Even in the third driest year on record, this program demonstrated the ability to apply science to save water, which is essential for

California given how common droughts are in the region."

To address these challenges, FIRO leverages current and improved forecasts of atmospheric rivers and their associated heavy precipitation and streamflow, through tools developed as part of the project. These data and tools inform reservoir operations, allowing more proactive and adaptive adjustments to variable weather conditions in decisions to retain or release water. FIRO does not require reservoir operators to employ information provided by FIRO; it merely provides additional information to inform operational decisions. The program represents an innovative use of science, technology, and observations for operators to adapt to variable conditions without costly reservoir infrastructure improvements. "The Lake Mendocino FIRO project is an example of how multiple agencies can collaborate to collectively explore the potential of emerging technologies in observations and forecasts and create an adaptive strategy with multiple benefits for water management in a changing climate," said Michael Anderson, state climatologist with the California Department of Water Resources.

"Sonoma Water's interest in innovation, and our partnership with federal and state agencies including the U.S. Army Corps of Engineers and the Center for Western Weather and Water Extremes, generated a breakthrough in water management for Sonoma Water," said Lynda Hopkins, chair of the Sonoma Water Board of Directors and Sonoma County Board of Supervisors. "This comprehensive report demonstrates significant regional benefits for people, the environment, and the economy."

Learn more about FIRO

Sonoma County Biomass Business Competition

In response to catastrophic wildfires and the need to reduce wildfire risk to manage for healthy watersheds and critical drinking water supply, Sonoma Water is collaborating with business leaders, forest experts, and public agencies to sponsor the Biomass Business competition, SoCoBioBiz.

Sonoma Water supports innovative strategies that support the use of biomass for in managing healthy watersheds, clean water supply, and to reduce risk of catastrophic wildfire. Finding responsible and sustainable uses for biomass and rebuilding the wood products industry is good for the economy good for the environment and our communities.

The BioBiz Competition will award $35,000 in startup funds to two local entrepreneurs to fund technical support services to implement their winning biomass business concepts. The competition seeks to turn wildfire risk in Sonoma County into an economic development opportunity. The Northern Sonoma County Air Pollution Control District in partnership with Napa-Sonoma Small Business Development Center, Sonoma County Economic Development Board, CAL FIRE, Sonoma Clean Power, the Bay Area Air Quality Management District, Sonoma Water, and a coalition of support partners are investing in local entrepreneurs and existing small businesses to launch wood products businesses to incentivize forest health in Sonoma County.

The goal is for the winning projects to work with state, regional, and local entities to support and provide a high-value end-use from excess forest biomass materials. The removal and utilization of the biomass will help reduce the risk of catastrophic wildfires and the unhealthy air pollution impacts caused by wildfire smoke.

Interested parties should go to the BioBiz website for additional information and to sign-up for e-mail updates at: www.Biomass.Biz. Biomass business plan submissions may be submitted Feb 1st through March 26, 2021. The competition has two phases of review and presentations with awards presented in mid-July, 2021.

Learn more about BioBiz

Sonoma Valley County Sanitation District (SVCSD) Local Hazard Mitigation Plan

Hazard mitigation planning reduces loss of life and property by minimizing the

impact of disasters. A Local Hazard Mitigation Plan (LHMP) forms the foundation for a community's long-term strategy to reduce disaster losses and break the cycle of disaster damage, reconstruction, and repeated damage. It begins with local public agencies identifying natural disaster risks and vulnerabilities that are common in their area. After identifying these risks, they develop long-term strategies to protect people and property from similar events. Mitigation plans are key to breaking the cycle of disaster damage and reconstruction.

The District must update its LHMP every five years to ensure it remains relevant to current events and system conditions and to meet regulations set forth by the Federal Emergency Management Agency (FEMA). The Sonoma Valley County Sanitation District (District) is working with its stakeholders on an update of the 2016 LHMP. The District is required to review and revise its plan to reflect changes in development, progress in local mitigation efforts, and changes in priorities, and resubmit it for approval in order to continue to be eligible for mitigation project grant funding.

We invite you to participate in a community survey and provide us with your opinion regarding natural hazards in the Sonoma Valley area. The information you provide will help us identify and develop projects for the District's 2021 Local Hazard Mitigation Plan. The results of the survey will be included in the LHMP.

Learn more about the LHMP

EPA WaterSense Fix-A-Leak Week

Fix a Leak Week is March 15-21, 2021. Join Flo the Water Drop, the official mascot of Fix a Leak Week, in finding and fixing leaks in and around your home.

The U.S. Environmental Protection Agency's WaterSense Program sponsors this national campaign to serves as a reminder to check household plumbing fixtures and irrigation systems for leaks. Nationwide, more than 1 trillion gallons of water leak from homes each year.

Here in California, it is estimated that 14 percent of homes have or have recently had a leak, representing up to 18 percent of household water use. Sonoma Water and the Sonoma-Marin Saving Water Partnership invite you to “Save Water With Us” and follow Flo during Fix a Leak Week to find and fix leaks.

Flo’s favorite places to check your home for leaks:
• Review your water bill for unexpected changes in water use
• Check your water meter - it has a leak indicator
• Test your toilets for leaks - perform a toilet dye test

Learn how and get more tips

Rubber Dam is Lowered as Russian River Rises

Sonoma Water routinely deflates the rubber dam near Forestville when Russian River flow forecasts show the river reaching 2,000 cubic feet per second (cfs) in order to prevent damage to the rubber dam from the high flows. When completely deflated, the rubber dam rests flat on the bottom of the Russian River.

The rubber dam is located just downstream of the Wohler Bridge on the Russian River and is normally raised in the spring or early summer when water demands increase. The rubber dam creates a pool of water that enhances Sonoma Water’s well levels in the area. Permanent fish ladders provide fish passage when the rubber dam is raised and also allow Sonoma Water to count the migration of adult salmon and steelhead with its underwater video system located in the fish ladders.

Even with the wet weather, Sonoma Water encourages people to continue to use water efficiently. Now is the time to adjust or deactivate irrigation systems and to repair leaky faucets and toilets. Additional water conservation tips are available at the Sonoma Marin Water Saving Partnership website, www.savingwaterpartnership.org

Rainfall and Water Storage Update

Current water supply conditions as of 2/8/2021:
Lake Mendocino Target Water Supply Curve: 68,400 acre-feet
Current Storage: 29,696 acre-feet (43.42% of Target Water Supply Curve)
Lake Sonoma
Target Storage Curve: 245,000 acre-feet
Current Storage: 157,673 acre-feet (64.36% of Water Supply Pool)
Current rainfall conditions (10/1/20 – 2/7/21)
Ukiah:
Average (1894-2020 water years): 23.01”
Current Water Year: 8.95” which is 38.9% of average
Santa Rosa:
Average (1950-2020 water years): 19.10"
Current Water Year: 8.94” which is 46.8% of average

Learn more about Water Supply Levels

Upcoming Events

The Board normally holds its regular meetings on Tuesdays, beginning at 8:30 a.m. and will be facilitated virtually through Zoom

Board of Directors Meetings
•February 23, 2021
•March 2, 2021
•March 16, 2021

Board Agendas:
View upcoming Agenda items

Please visit SoCoEmergency.org for additional information on Coronavirus and fire recovery from Sonoma County.

Fact of the Month

For every $1 invested in safe water and sanitation, a yield of $5 to $28 USD is returned in increased economic activity and reduced health care costs. Access to safe water stimulates the economy for the long-term.

Employment Opportunities

We invite you to explore the career opportunities available with Sonoma Water.

- Fish and Wildlife Technician I - Extra-Help
- Licensed Land Surveyor

Groundwater Sustainability Agency Board Meetings

Petaluma Valley - March 25, 2021, 4:00 pm
Sonoma Valley - March 22, 2021, 4:00 pm
Santa Rosa Plain - March 11 , 2021 1:00 pm *tentative*

sonomagroundwater.org

Sonoma Water Events Calendar

Water Agency Supervising Right of Way Agent

Employment Opportunities

Sonoma Water | 404 Aviation Blvd, Santa Rosa, CA 95403 | sonomacountywater.org

STAY CONNECTED

Sonoma Water

Boletín de Sonoma Water| febrero 2021

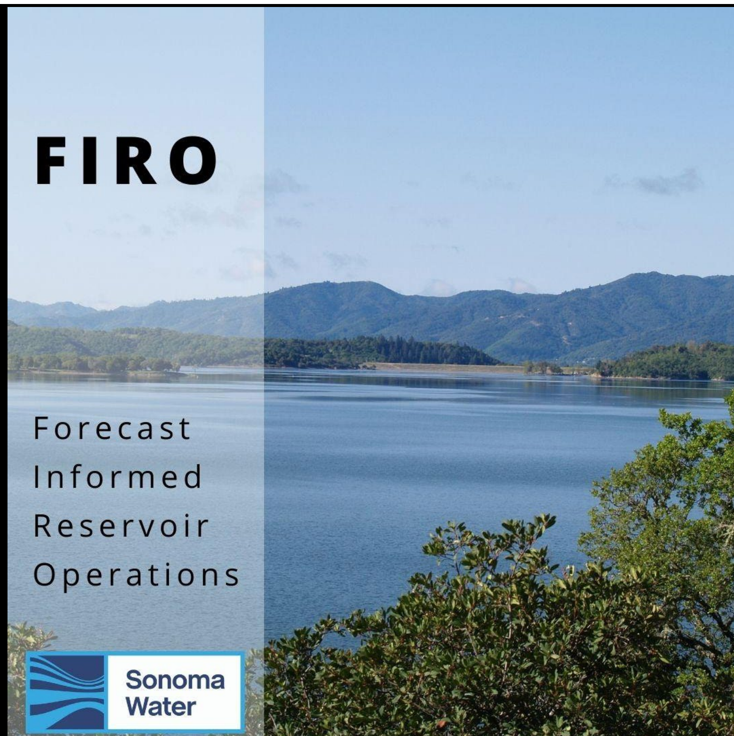
FIRO ayuda a almacenar más agua y a mantener la protección contra inundaciones

La cuenca del Russian River experimenta algunos de los climas más variables del país. Con ríos atmosféricos y sus precipitaciones extremas impulsando esta variabilidad. Estas tormentas proporcionan entre el 25 y el 50 por ciento de la precipitación anual en partes clave del oeste, lo que puede reponer el suministro de agua, pero también puede provocar inundaciones peligrosas y costosas, y los ríos atmosféricos causan el 84 por ciento de los daños por inundaciones en el oeste del país, y el 99 por ciento de los daños en el condado de Sonoma. La ciencia de pronosticar ríos atmosféricos ha seguido avanzando, particularmente en la comprensión del origen y la evolución de estas tormentas, a través de observaciones mejoradas antes de que toquen tierra, y a través de mejores modelos y predicciones. "Este programa ha demostrado que la habilidad de pronosticar ríos atmosféricos y sus precipitaciones y escorrentías extremas asociadas, con base en los avances científicos y la tecnología moderna, permite que el lago Mendocino sea operado de manera más flexible que en el pasado”, dijo el meteorólogo investigador de Scripps F. Martin Ralph, director de CW3E. “Incluso en el tercer año más seco registrado, este programa demostró la capacidad de aplicar la ciencia para ahorrar agua, lo cual es esencial para California dado lo comunes que son las sequías en la región”.

Para abordar estos desafíos, FIRO aprovecha los pronósticos actuales y mejorados de los ríos atmosféricos y sus fuertes precipitaciones y corrientes asociadas, a través de herramientas desarrolladas como parte del proyecto. Estos datos y herramientas informan las operaciones del reservorio, lo que permite ajustes más proactivos y adaptativos a las condiciones climáticas variables en las decisiones de retener o liberar agua. FIRO no requiere que los operadores de reservorios utilicen la información proporcionada por FIRO; simplemente proporciona información adicional para fundamentar las decisiones operativas. El programa representa un uso innovador de la ciencia, la tecnología y las observaciones para que los operadores se adapten a las condiciones variables sin costosas mejoras en la infraestructura del reservorio. “El proyecto FIRO del lago Mendocino es un ejemplo de cómo múltiples agencias pueden colaborar para explorar colectivamente el potencial de las tecnologías emergentes en observaciones y pronósticos y crear una estrategia adaptativa con múltiples beneficios para la gestión del agua en un clima cambiante”, dijo Michael Anderson, climatólogo estatal con el Departamento de Recursos de Agua de California.

"El interés de Sonoma Water en la innovación y nuestra asociación con agencias federales y estatales, incluido el U.S. Army Corps of Engineers y Center for Western Weather and Water Extremes, generó un gran avance en la gestión del agua para Sonoma Water", dijo Lynda Hopkins, presidenta de la Junta Directiva de Sonoma Water y Junta de Supervisores del Condado de Sonoma. "Este informe completo demuestra importantes beneficios regionales para las personas, el medio ambiente y la economía".

Obtenga más información sobre FIRO



Competencia comercial de biomasa del condado de Sonoma

SoCo BioBiz

En respuesta a los incendios forestales catastróficos y la necesidad de reducir el riesgo de incendios forestales para gestionar cuencas hidrográficas saludables y un suministro crítico de agua potable, Sonoma Water está colaborando con líderes en negocios, expertos forestales y agencias públicas para patrocinar la competencia de Negocios de Biomasa, SoCoBioBiz.

Sonoma Water apoya estrategias innovadoras que apoyan el uso de biomasa para el manejo de cuencas hidrográficas saludables, suministro de agua limpia y para reducir el riesgo de incendios forestales catastróficos. Encontrar usos responsables y sostenibles de la biomasa y reconstruir la industria de productos de madera es bueno para la economía, bueno para el medio ambiente y nuestras comunidades.

La Competencia BioBiz otorgará $ 35,000 en fondos de inicio a dos empresarios locales para financiar servicios de soporte técnico para implementar sus conceptos comerciales de biomasa ganadores. La competencia busca convertir el riesgo de incendios forestales en el condado de Sonoma en una oportunidad de desarrollo económico. El Distrito de Control de la Contaminación del Aire del Norte del Condado de Sonoma en asociación con el Centro de Desarrollo de Pequeñas Empresas de Napa-Sonoma, la Junta de Desarrollo Económico del Condado de Sonoma, CAL FIRE, Sonoma Clean Power, el Distrito de Gestión de la Calidad del Aire del Área de la Bahía, Sonoma Water y una coalición de socios de apoyo son invertir en negocios locales y pequeñas empresas existentes para iniciar negocios de productos de madera para incentivar la salud forestal en el condado de Sonoma.

El objetivo es que los proyectos ganadores trabajen con entidades estatales, regionales y locales para apoyar y proporcionar un uso final de alto valor del exceso de materiales de biomasa forestal. La remoción y utilización de la biomasa ayudará a reducir el riesgo de incendios forestales catastróficos y los impactos de contaminación del aire dañinos para la salud causados por el humo de los incendios forestales.

Las partes interesadas deben visitar el sitio web de BioBiz para obtener información adicional y registrarse para recibir actualizaciones por correo electrónico en: www.Biomass.Biz. Las presentaciones de planes de negocios de biomasa pueden enviarse del 1 de febrero al 26 de marzo de 2021. El concurso tiene dos fases de revisión y presentaciones con premios presentados a mediados de julio de 2021.

Obtenga más información sobre BioBiz

Plan de mitigación de Desastres locales del distrito de saneamiento del condado de Sonoma Valley

La planificación de la mitigación de desastres reduce la pérdida de vidas y propiedades al minimizar el impacto de los desastres. Un Plan de Mitigación de Desastres Locales (Local Hazard Mitigation Plan, LHMP) constituye la base de la estrategia a largo plazo de una comunidad para reducir las pérdidas por desastres y romper el ciclo de daños por desastres, reconstrucción y daños repetidos. Comienza con las agencias públicas locales que identifican los riesgos de desastres naturales y las vulnerabilidades que son comunes en su área. Después de identificar estos riesgos, desarrollan estrategias a largo plazo para proteger a las personas y la propiedad de eventos similares. Los planes de mitigación son clave para romper el ciclo de daños por desastres y reconstrucción.

El Distrito debe actualizar su LHMP cada cinco años para garantizar que siga siendo relevante para los eventos actuales y las condiciones del sistema y para cumplir con las regulaciones establecidas por la Agencia Federal para el Manejo de Emergencias (FEMA). El Distrito de Saneamiento del Condado de Sonoma Valley (Sonoma Valley County Sanitation District) está trabajando con sus partes interesadas en una actualización del LHMP 2016. Se requiere que el Distrito revise y modifique su plan para reflejar los cambios en el desarrollo, el progreso en los esfuerzos de mitigación local y los cambios en las prioridades, y que lo vuelva a enviar para su aprobación a fin de seguir siendo elegible para la ayuda de proyectos de mitigación.

Lo invitamos a participar en una encuesta comunitaria y brindarnos su opinión sobre los desastres naturales en el área del Valle de Sonoma. La información que proporcione nos ayudará a identificar y desarrollar proyectos para el Plan de Mitigación de Desastres Locales 2021 del Distrito. Los resultados de la encuesta se incluirán en el LHMP.

Obtenga más información sobre LHMP

Semana EPA WaterSense Fix-A-Leak

La semana de Fix a Leak Week es del 15 al 21 de marzo de 2021. Únase a Flo the Water Drop, la mascota oficial de Fix a Leak Week, para encontrar y reparar fugas en su hogar y sus alrededores.

El programa WaterSense de la Agencia de Protección Ambiental (Environmental Protection Agency, EPA) patrocina esta campaña nacional que sirve como recordatorio para verificar que no haya fugas en los accesorios de plomería y sistemas de riego del hogar. A nivel nacional, más de 1 billón de galones de agua se escapan de los hogares cada año.

Aquí en California, se estima que el 14 por ciento de los hogares tienen o han tenido recientemente una fuga, lo que representa hasta el 18 por ciento del uso doméstico de agua. Sonoma Water y la Asociación para el ahorro de agua de Sonoma Marin (Sonoma-Marin Saving Water Partnership) lo invitan a “Ahorrar agua con nosotros” y siga a Flo durante la semana de Fix a Leak para encontrar y reparar fugas.

Los lugares favoritos de Flo para revisar su casa en busca de fugas:
• Revise su factura de agua para detectar cambios inesperados en el uso del agua.
• Revise su medidor de agua - tiene un indicador de fugas
• Pruebe sus inodoros en busca de fugas: realice una prueba de tinte para inodoros

Aprenda cómo y obtenga más consejos

La presa de plástico se baja a medida que sube el río Russian

Sonoma Water desinfla rutinariamente la presa de plástico cerca de Forestville cuando los pronósticos de corrientes del Russian River muestran que el río alcanza los 2000 pies cúbicos por segundo (cubic feet per second, cfs) para evitar daños a la presa de plástico por el alto volumen de agua. Cuando está completamente desinflado, la presa de plástico permanece plana en el fondo del Russian River.

La presa de plástico está ubicada en las aguas bajo del puente Wohler en el Russian River y normalmente se levanta en la primavera o principios del verano cuando aumenta la demanda de agua. La presa de plástico crea un charco de agua que mejora los niveles de pozo de Sonoma Water en el área. Las escaleras permanentes para peces proporcionan paso a los peces cuando se infla la presa de plástico y también permiten que Sonoma Water cuente la migración de salmones adultos y truchas con su sistema de video submarino ubicado en las escaleras para peces.

A partir de las lluvias recientes, Sonoma Water anima a las personas a seguir usando el agua de manera eficiente. Ahora es el momento de ajustar o desactivar los sistemas de riego y reparar llaves de agua e inodoros con fugas. Se encuentran consejos adicionales para la conservación del agua en el sitio web de la Asociación para el ahorro de agua de Sonoma Marin, www.savingwaterpartnership.org

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Actualización de lluvia y almacenamiento de agua

Condiciones actuales de suministro de agua desde febrero 8 del 2021:

Objetivo de la Curva de suministro de agua del lago Lake Mendocino: 68,400 acres-pies
Almacenamiento actual: 29,696 acres-pies (43.42% del objetivo de la curva de suministro de agua)

Lago Lake Sonoma
objetivo de la curva de almacenamiento: 245,000 acres-pies
Almacenamiento actual: 157,673 acres-pies

(64.36% de la alberca de suministro de agua)

Condiciones actuales de lluvia (10/1/20 – 2/7/21)

Ukiah:
Promedio (1894-2020 años de agua): 23.01”
Año actual del agua: 8.95" que es el 38.9% del promedio

Santa Rosa:
Promedio (1950-2020 años de agua): 19.10"
Año actual del agua: 8.94” que es el 46.8% del promedio.

Obtenga más información sobre el almacenamiento de agua

Próximos Eventos

La Junta Directiva normalmente tiene reuniones los martes, comienzan a las 8:30 a.m. y se facilitarán virtualmente a través de Zoom.

Próximas reuniones de la Junta
- 23 de febrero de 2021
- 2 de marzo de 2021
- 16 de marzo de 2021

Ver los próximos temas de la agenda

Visite SoCoEmergency.org para obtener información adicional sobre el coronavirus y la recuperación de incendios del condado de Sonoma.

Reuniones de la Junta de la Agencia de Sostenibilidad de Aguas Subterránea

- Petaluma Valley - 25 de marzo de

Hechos Mensuales

Por cada $ 1 invertido en agua potable y saneamiento, se obtiene un rendimiento de $ 5 a $ 28 USD en mayor actividad económica y reducción de costos de atención médica. El acceso al agua potable estimula la economía a largo plazo.

Oportunidades de Empleo

Lo invitamos a explorar las oportunidades de empleo disponibles en Sonoma Water.

Oportunidades de Empleo

2021, 4:00 pm
•Sonoma Valley - 22 de marzo de 2021, 4:00 pm
•Santa Rosa Plain- 11 de marzo, 1:00 pm tentativo

sonomagroundwater.org

Sonoma Water Events Calendar

Sonoma Water | 404 Aviation Blvd, Santa Rosa, CA 95403 | sonomacountywater.org

MANTÉNGASE CONECTADO

Sonoma Water

NOTICIAS DE PRIMAVERA 2021

Vol. 9, número 1

ADENTRO

DISTRITO DE SANEAMIENTO DEL CONDADO EN SONOMA VALLEY

ACTUALIZACIONES DEL SISTEMA ELÉCTRICO

La Planta de Tratamiento del Valle de Sonoma (Planta) tiene un historial de cortes de energía intermitentes dentro de la Planta. Gran parte del equipo es original desde la construcción en 1978 y se está deteriorando hasta el punto de fallar.

Las actualizaciones del sistema eléctrico que se han completado son necesarias para prevenir peligros potenciales, reducir el potencial a cortes debido a Cortes de Energía para la Seguridad Pública (Public Safety Power Shutoffs) en el futuro y aumentar la eficiencia del sistema. Una especialidad del proyecto fue la instalación de interruptores de transferencia automática para simplificar el proceso y permitir la conexión de un generador portátil.

Una actualización particularmente importante fue el reemplazo del cuadro de distribución eléctrica principal. El cuadro de distribución original se instaló en 1979, había excedido su vida útil y necesitaba ser reemplazado. Se había instalado en la entrada de servicio y era necesario reposicionarlo. La nueva distribución de la centralita y la sala proporciona un entorno más seguro y mayores espacios libres para el equipo para un mantenimiento y una operación continua y confiable.

Estas actualizaciones eléctricas ayudarán a que la planta funcione de manera eficiente y segura durante muchos años más.

PLAN LOCAL DE MITIGACIÓN DE DESASTRES

El Distrito de Saneamiento del Condado en Sonoma Valley (Distrito) ha comenzado el proceso para actualizar su Plan Local de Mitigación de Desastres (Local Hazard Mitigation Plan LHMP), que fue aprobado por la Agencia Federal para el Manejo de Emergencias (Federal Emergency Management Agency, FEMA) en 2016 por un período de cinco años. La aprobación de este plan asegura la elegibilidad continua del Distrito para subvenciones de proyectos bajo los programas de Asistencia para la Mitigación de Riesgos de FEMA.

Este año, el Distrito debe revisar y modificar su plan para reflejar el progreso en los esfuerzos de mitigación local y los cambios en prioridades, y volver a presentar el plan para su aprobación con fin de seguir siendo elegible para el financiamiento de auxilios para proyectos de mitigación.

Se prepara un LHMP integral en reconocimiento de la responsabilidad del Distrito con la comunidad y su papel en la preservación de la vitalidad económica de la región. El público confía en los operadores de los sistemas de aguas residuales para administrar de manera segura las operaciones que protegen la salud y la seguridad del público y el medio ambiente, incluso después de un desastre.

Lo invitamos a conocer más sobre el LHMP y proporcione comentarios sobre el plan esta primavera en línea en SonomaWater.org/svlhmp

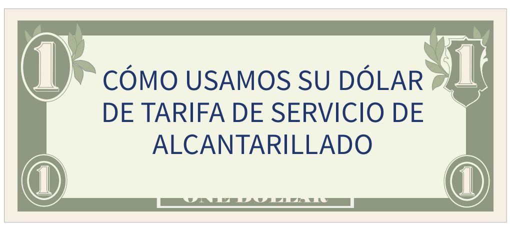
www.sonomawater.org/SVCSD

CÓMO USAMOS SU TARIFA DE SERVICIO DE ALCANTARILLADO

Las tarifas de servicio cobradas a los propietarios se utilizan para operar y mantener las instalaciones de saneamiento administradas por Sonoma Water. Esta gráfica proporciona una representación de los tipos de actividades requeridos para operar nuestras estructuras de una manera responsable con el medio ambiente y fiscalmente prudente, para reemplazar el equipo desgastado antes de que falle.

SISTEMA DE RECOLECCIÓN
11¢

OPERACIONES
44¢



ADMINISTRACIÓN
21¢

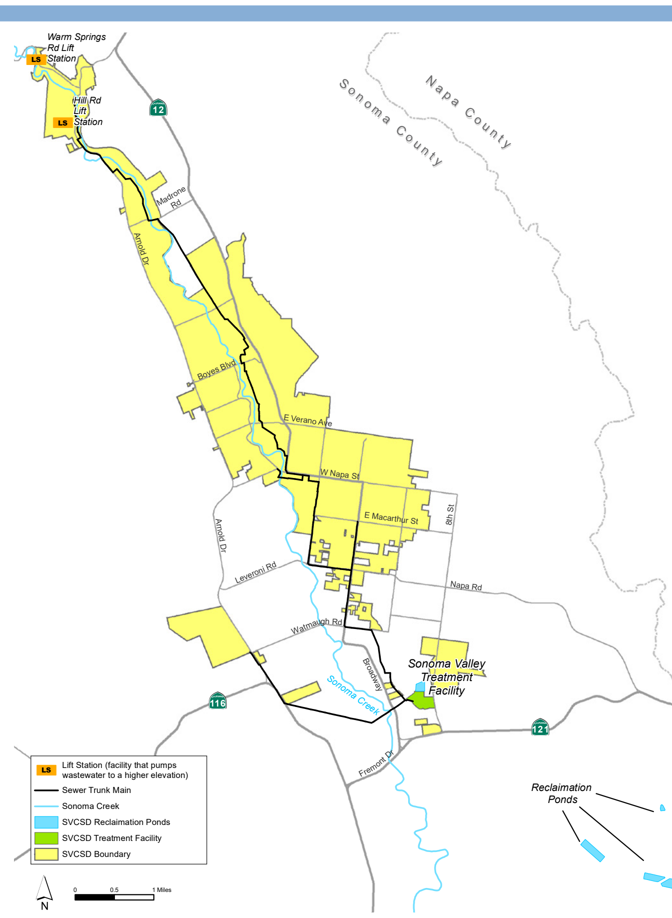
MANTENIMIENTO ELÉCTRICO Y MECÁNICO
24¢

APROBACIÓN DEL PRESUPUESTO

Después de que se desarrollen los presupuestos y las tarifas propuestos, los presupuestos están disponibles para revisión pública en las bibliotecas de todo el condado y en la oficina de Sonoma Water ubicada en 404 Aviation Boulevard, Santa Rosa. También están disponibles en línea. Normalmente, esto sucede a finales de marzo. Además, los avisos de las tarifas propuestas se envían por correo a los propietarios de las propiedades en los distritos y zonas en ese momento. El público puede protestar por los aumentos de tarifas hasta la fecha de las audiencias de tarifas, que generalmente se llevan a cabo a mediados de mayo en las cámaras de la Junta de Supervisores. (Un formulario de protesta e información sobre la audiencia de tarifas están disponibles en las páginas 6-7 de este aviso).

ACERCA DE SU DISTRITO

En 1995 Sonoma Water asumió la responsabilidad de la gestión de distritos y zonas de sanidad por parte del Condado de Sonoma, incluyendo su Distrito. El Distrito comenzó a operar en 1953. Actualmente, provee servicios al Equivalente de 17,548 Viviendas Unifamiliares dentro de una área de servicio de 4,500 acres. La planta de tratamiento está diseñada para una capacidad de 3 millones de galones por dia (flujo promedio de clima seco) y trata aguas residuales a un nivel de tratamiento terciario (también referido como tratamiento de agua avanzado). Agua reciclada a nivel terciario de alta calidad es un recurso importante y su uso ayuda a compensar la demanda de agua potable y a mejorar el medioambiente. Entre mayo 1 y octubre 31, el agua reciclada es usada para irrigacion y el mejoramiento de humedales/marismas de agua salada. Entre noviembre 1 y abril 30, agua reciclada es descargada in el Schell Slough o hudeman Slough.



EL IMPACTO DE COVID-19 EN LOS PRESUPUESTOS Y LOS CARGOS POR SERVICIO DE SANEAMIENTO ALCANTARILLADO

A nuestros contribuyentes,

Sabemos que la pandemia de COVID-19 ha tenido un efecto devastador en muchos residentes y negocios en todo nuestro condado y más allá. Como administradores de ocho pequeños distritos y zonas de saneamiento, somos muy conscientes de la carga financiera del aumento de las tarifas de saneamiento durante estos tiempos difíciles y estamos haciendo todo lo posible para suavizar los impactos tanto como sea posible.

Las ocho zonas y distritos de saneamiento administrados por Sonoma Water están experimentando restricciones financieras. Los ingresos están disminuyendo ya que algunos propietarios no pueden pagar los cargos por el servicio de alcantarillado y anticipamos que habrá más decoraciones a medida que continúe el impacto económico de la pandemia. Los distritos y las zonas enfrentan presupuestos ajustados, pero trabajaremos arduamente para mantener nuestras estructuras y continuar operando los sistemas de manera segura y confiable. Si bien seguimos comprometidos con operar y mantener los sistemas de manera responsable, proteger la salud pública y el medio ambiente y cumplir con los requisitos reglamentarios, los costos para cumplir con esos requisitos continúan aumentando.

Este año hemos realizado varios ajustes para mantener los aumentos de tarifas al mínimo, incluyendo la reducción de los costos generales, el aplazamiento del mantenimiento donde sea posible y el retraso de los estudios y proyectos de mejora de capital.

Uno de los desafíos inherentes a los distritos y zonas pequeñas es que hay un número limitado de residentes y negocios para compartir los costos de operación, mantenimiento e implementación del proyecto. Con una base de tarifas más pequeña, los costos son asumidos por menos clientes. Como gerente de estos distritos y zonas, Sonoma Water continúa respaldando a los distritos especiales y los condados rurales que reciban el apoyo de COVID y estamos buscando activamente el apoyo de fuentes estatales y federales.

Nuestros corazones están con las muchas personas, familias, empresas y comunidades que están sufriendo durante esta pandemia. Continuaremos brindándole servicios de saneamiento críticos y encontraremos formas de limitar el costo de estos servicios. Como siempre, continuaremos manteniendo la seguridad pública y la confiabilidad del sistema como nuestras principales prioridades.

Atentamente,

Grant Davis

Gerente General, Sonoma Water

PROGRAMAS DE REEMBOLSO DE AGUA EN SU ZONA

PROGRAMAS DE REEMBOLSO DISPONIBLES PARA AHORRAR AGUA DE LA ZONA DE SANEAMIENTO

Si usted es un cliente de la Ciudad de Sonoma o del Distrito de Agua del Valle de la Luna, ¡tiene algunas herramientas para ahorrar agua a su alcance! Aproveche los siguientes programas de ahorro de agua que se ofrecen por orden de llegada mientras dure la financiación:

> Lavadoras de ropa: Reciba hasta $50 de reembolso en la compra e instalación de una nueva lavadora de ropa de alta eficiencia (high-efficiency washer, HEW) que califique. Los reembolsos están disponibles para todas las lavadoras de ropa incluidas en Energy Star Most Efficient, excepto las que contienen tecnología de iones de plata.

Para obtener más información, visite www.savingwaterpartnership.org/washer-rebate/

PROPOSITION 218

DISTRITO DE SANEAMIENTO DEL CONDADO EN SONOMA VALLEY
NOTIFICACIÓN DE AUDIENCIA PÚBLICA ACERCA DE UNA PROPUESTA DE INCREMENTO DE LA TARIFA POR EL SERVICIO DE ALCANTARILLADO

Fecha, Tiempo, y Lugar de la Audiencia Pública

En **Mayo 18, 2021 a las 1:30 p.m.** o tan pronto como se pueda escuchar el asunto, en la Cámara de la Junta Directiva, Sala 102A, 575 Administration Drive, Santa Rosa, California, la Junta Directiva (Junta) del Distrito de Saneamiento del Condado en Sonoma Valley (Distrito) llevará a cabo una audiencia pública para considerar incrementar la tarifa anual del servicio de alcantarillado (tarifa de alcantarillado) y hacer cambios a la estructura de las tarifas. Si es aprobada, el incremento de la tarifa del Servicio de Alcantarillado y la estructura de la tarifa tomarán efecto en julio 1, 2021.

> **Tenga en cuenta:** la reunión de la Junta de Supervisores se facilitará virtualmente a través de Zoom y debido a la pandemia, y de acuerdo con las Órdenes Ejecutivas N-25-20 y N-29-20, la reunión de la Junta de Directores del 18 de mayo de 2021 se llevará a cabo virtualmente. LOS MIEMBROS DEL PÚBLICO NO PUEDEN ASISTIR A ESTA REUNIÓN EN PERSONA. La información sobre la participación pública en línea estará disponible en la agenda de la Junta 72 horas antes de la reunión en https://sonoma-county.legistar.com/Calendar.aspx

La tarifa de alcantarillado será impuesta a cada parcela con una o más estructuras conectadas al sistema y la tarifa de alcantarillado será recaudada en la cuenta de impuestos de la propiedad administrada por el Condado de Sonoma. El pago de esta tarifa será la responsabilidad del dueño de la parcela.

Razones por el Cargo de Alcantarillado y Uso de los Fondos Recaudados

Esta tarifa es impuesta para financiar el costo seguro y confiable del tratamiento de aguas residuales en el Distrito incluyendo: (a) para financiar los costos de la continua operación y mantenimiento del sistema y, (b) pagar los costos de proyectos de renovación del sistema. El propósito del programa de renovación es financiar a largo plazo el reemplazo de instalaciones en el sistema que continuamente se desgastan, (c) para mantener reservas suficientes. La Tarifa de Alcantarillado de la Zona es revisada anualmente para determinar si se han recaudado fondos suficientes para este propósito. El Distrito reconoce el gran impacto financiero causado por COVID-19 y ha hecho todo lo posible para reducir los costos de operación y mantenimiento, diferir el mantenimiento cuando sea posible, retrasar estudios y proyectos de mejoras y reducir el aumento de tarifas. Al mismo tiempo, mantenemos nuestro compromiso con nuestras prioridades que son la seguridad pública y la seguridad de nuestro sistema.

La propuesta de presupuesto para el año fiscal 2021-22 describe en detalle los gastos anuales totales del Distrito y está disponible para su revisión en el Distrito de Saneamiento del Condado de Sonoma Valley, c / o la Agencia de Agua del Condado de Sonoma, 404 Aviation Boulevard, Santa Rosa, California 95403, y en el sitio web de Sonoma Water en www.sonomawater.org/current-budget

Cálculo del Incremento de Tarifa de Alcantarillado

El Distrito tiene dos categorías de usuarios:

> **A) Usuarios No Residenciales y Usuarios Residenciales Sin Conexión de Agua Pública.** Esta categoría de usuarios tiene un cargo de alcantarillado que es fijo. NOTA: Los usuarios residenciales que tienen una conexión pública de agua pero que no usan el agua en los meses de invierno y los complejos multifamiliares, incluidos los condominios con solo una conexión pública de agua para todas las unidades, también se incluyen en esta categoría.
>
> **B) Usuarios Residenciales con Conexión de Agua Pública.** Esta categoría de usuarios tiene una Tarifa de Alcantarillado que tiene un componente de cargo fijo y un componente basado en el volumen.

El método para calcular el cargo de alcantarillado para cada categoría de usuario se describe con más detalle a continuación.

A) Monto del Incremento Propuesto de la Tarifa de Alcantarillado para Usuarios No Residenciales y Usuarios Residenciales Sin Coneccion de Agua Pública.

A partir del 1 de julio de 2021, el Distrito propone aumentar el cargo del Equivalente de una Vivienda Unifamiliar (ESD) de $1,094 por ESD por año a $1,132 por ESD por año para los usuarios de esta categoría. Esto representa un aumento de $38 o 3.5% en comparación con el año actual. Este aumento en el cargo de ESD se ha calculado al dividir los costos anuales de la prestación de servicios de recolección y tratamiento de aguas residuales por el número total estimado de ESD en el Distrito.

Una vivienda unifamiliar estándar constituye una ESD. Las propiedades que no son viviendas unifamiliares se convierten a ESDs según los métodos estándar de la industria y hay más información sobre esta conversión disponible en el Distrito. A las parcelas que tienen otros usos (por ejemplo, apartamentos y edificios comerciales) se les asignará un número de ESDs utilizando factores de equivalencia estándar que estiman la cantidad y calidad probable del efluente de aguas residuales que normalmente son generadas por tales usos en comparación con una vivienda unifamiliar.

El cargo de alcantarillado para usuarios No Residenciales y Usuarios Residenciales Sin Conexión de Agua Pública se calcula de la siguiente manera:

$1,132 por ESD x Número Asignado de ESDs = Tarifa Anual de Alcantarillado

B) Incremento Propuesto a la Tarifa de Alcantarillado para usuarios Residenciales con una Coneccion de Agua Pública.

Todos los clientes de alcantarillado residencial con una conexión de agua pública deben pagar un cargo de alcantarillado con dos componentes: un cargo fijo y un cargo por volumen. Los usuarios residenciales con una categoría de conexión de agua pública incluyen viviendas unifamiliares, unidades multifamiliares, apartamentos y parques de casas móviles. Un complejo multifamiliar o complejo de condominios también se incluirá en esta categoría si cada unidad del complejo tiene su propia conexión de agua pública.

1. **Componente de Cargo Fijo:** El componente de cargo fijo de la Tarifa de Alcantarillado financia el 70% de los costos del Distrito para proporcionar servicios de alcantarillado, incluidos los costos en los que incurre el sistema de recolección y tratamiento de aguas residuales, independientemente del aumento o la disminución del flujo de aguas residuales al sistema.

A partir del 1 de julio de 2021, el Distrito propone aumentar el cargo fijo a $792.8 por ESD por año para usuarios residenciales con una conexión de agua pública. Esto representa un aumento de $26.8 (3.5% por encima del año en curso).

El componente de cargo fijo de la Tarifa de Alcantarillado se calculará de la siguiente manera:

$ 792.8 por ESD x Número de ESD = Cargo Fijo Componente de la carga de alcantarillado

2. **Componente Basado en Volumen:** El componente basado en volumen financia aproximadamente el 30% de los costos del Distrito para proporcionar el servicio de alcantarillado, incluidos los costos para el sistema de tratamiento y recolección de aguas residuales que varían con la cantidad de aguas residuales transportadas y tratadas. El componente basado en el volumen del Distrito utiliza el uso más bajo de agua en invierno de un cliente (noviembre - marzo) como base para el cálculo. El uso de agua en invierno se usa porque generalmente proporciona la mejor estimación disponible del uso de agua en interiores y su impacto en las instalaciones de tratamiento del Distrito, ya que el riego al aire libre suele ser mínimo durante los meses de invierno.

El Componente Basado en Volumen de la Tarifa de Alcantarillado tiene tres partes, que se multiplican juntas:

Uso de Agua en el invierno x Número de Periodos de Facturación Anual Provenientes de su Distrito de Agua x cada mil galones = Componente Basado en Volumen de la Tarifa de Alcantarillado

A partir del 1 de julio de 2021, el Distrito propone aumentar el cargo por componente basado en el volumen de $6.20 por mil galones a $6.42 por mil galones para usuarios residenciales con una conexión de agua pública. Esto representa un aumento de $0.22 por mil galones (3.5% comparado con el año actual). Se cobrará a cada usuario residencial con una conexión de alcantarillado y una conexión de agua pública con un uso de agua en invierno mayor que cero como sigue:

Tarifa Total de Alcantarillado (cargo fijo+cargo volumétrico) para Clientes Residenciales con una Coneccion de Agua Pública

Para Clientes con una factura del Valley of the Moon Water District:
$ 792.8 por ESD x Número de ESDs (Componente de Cargo Fijo) +
$6.42 por mil galones x Uso de Agua en Invierno Más Bajo en mil galones
x 6 periodos de facturación anuales (Componente de Cargo Volumétrico)

Para Clientes con una factura de agua del City of Sonoma Water District:
$ 792.8 por ESD x Número de ESDs (Componente de Cargo Fijo) +
$ 6.42 por mil galones x Uso de Agua en Invierno Más Bajo en mil galones
x 12 periodos de facturación anuales (Componente de Cargo Volumétrico)

Más Información Disponible Antes de la Audiencia

En la audiencia, la Junta considerará la adopción de una ordenanza para establecer el aumento de la tarifa. Una copia de la ordenanza está archivada y disponible para su revisión en la Sonoma County Water Agency, 404 Aviation Boulevard, Santa Rosa, CA 95403. Además, las siguientes personas pueden ser contactadas en la Agencia al (707) 526-5370 para más información y/o obtener copias del borrador de la propuesta de presupuesto para el año fiscal 2020-21: Kathy Badger, Administrative Aide.

Procedimiento Para Protestar

Esta notificación ha sido enviada a usted porque en los archivos de la Sonoma County Assessor usted aparece como el propietario de una o más parcelas dentro de la Zona que está sujeta a un incremento de la tarifa mientras esté conectada con el sistema. Si usted ha vendido una propiedad que haya tenido en su poder dentro de esta Zona, por favor mande esta notificación al nuevo propietario. Este documento se puede encontrar en el boletín de primavera en línea en: https://www.sonomawater.org/svcsd

Antes de la audiencia pública, los propietarios, o inquilinos que son directamente responsables por el pago de la tarifa, pueden enviar una protesta por escrito respecto a la tarifa. En la Audiencia Pública la Junta considerará todas las protestas por escrito que han sido recibidas durante las fechas límites prescritas. Para ser considerado, una protesta escrita debe ser enviada usando la forma incluida en este documento. Solo una protesta será contada por cada parcela. Solo protestas firmadas por el propietario actual , o el inquilino que paga la tarifa serán admitidas y deben ser recibidas antes de las fechas límites establecidas.

Si se envía por correo, deben ser recibidas (NO prefechadas) no más tarde de las 5:00 p.m. el lunes, mayo 17, 2021, en la dirección que aparece en la forma.

Si la entrega a mano, deben ser entregadas no más tarde que al cierre de la audiencia pública el lunes, mayo 17, 2021 en la dirección en la forma.

Sonoma Water

404 Aviation Blvd.

Santa Rosa, CA 95403

Fecha de esta Notificación: Marzo 29, 2021

FORMA DE PROTESTA DE TARIFA

NOTA: PARA QUE SEA CONSIDERADO, CUALQUIER PROTESTA TIENE QUE HACERSE POR ESCRITO.

PROTESTA ESCRITA

Yo soy el dueño de la parcela en la propiedad localizada en la dirección que se encuentra al otro lado de esta forma o un inquilino que es directamente responsable por pagar la tarifa de servicio de alcantarillado. Estoy entregando esta forma para protestar el incremento de la tarifa al servicio de alcantarillado.

Comentarios Adicionales ____

____

____

Use el lado opuesto o agregue otras hojas si es necesario

____
Firma del Dueño de la Propiedad es requerida

____
Nombre Escrito

Fold Here First

Place Postage Here

Sonoma Valley County Sanitation District
c/o Sonoma Water
404 Aviation Blvd
Santa Rosa, CA 95403

Fold Here Second

Sonoma Valley County Sanitation District
c/o Sonoma Water
404 Aviation Blvd.
Santa Rosa, CA 95403

IMPORTANT
Sewer service fee NOTICE
(Prop 218) enclosed for
Sonoma Valley County
Sanitation District

HEARING DATE
May 18, 2021 at 1:30 p.m.

HEARING DETAILS
The Hearing will be held virtually through Zoom.
Hearing details can be found at
https://sonoma-county.legistar.com/Calendar.aspx

ATTENTION
IMPORTANT SEWER RATE INFORMATION INSIDE

INCLUDED IN THIS ISSUE

Proposition 218 Notice for proposed Fiscal Year 2021-2022 sewer rates.

The Notice with information about the proposed rates is included on pages 5-6 of this newsletter.
The return protest form is located on page 7.

Sonoma Water

Clean. Reliable. Essential. Every day.

www.sonomawater.org/SVCSD

Sonoma Water

SPRING 2021 NEWS

Vol. 9, Issue #1

INSIDE

SONOMA VALLEY COUNTY SANITATION DISTRICT

ELECTRICAL SYSTEM UPGRADES

The Sonoma Valley Treatment Plant (Plant) has a history of intermittent power outages inside the Plant. Much of the equipment was original to the 1978 construction and is deteriorating to the point of failures.

The electrical system upgrades that have been completed were needed to prevent potential hazards, reduce potential exposure to outages due to future Public Safety Power Shutoffs, and build in efficiencies to the system. One feature of the project was the installation of automatic transfer switches to simplify the process and allow for the connection of a portable generator.

A significant feature of the electrical upgrades was the main switchboard replacement. The original switchboard was installed in 1979, had exceeded its serviceable life, and needed to be replaced. It had also been installed at the service entrance and needed to be repositioned. The new switchboard and room layout provides a safer environment, and increased equipment clearances for reliable ongoing maintenance and operation.

These electrical upgrades will help the Plant run efficiently and safely for many more years.

LOCAL HAZARD MITIGATION PLAN

The Sonoma Valley County Sanitation District (District) has begun the process to update its Local Hazard Mitigation Plan (LHMP), which was approved by the Federal Emergency Management Agency (FEMA) in 2016 for a period of five years. The approval of this plan ensures the District's continued eligibility for project grants under FEMA's Hazard Mitigation Assistance programs.

This year the District is required to review and revise its plan to reflect changes in development, progress in local mitigation efforts, and changes in priorities, and resubmit the plan for approval in order to continue to be eligible for mitigation project grant funding.

A comprehensive LHMP is prepared in recognition of the District's responsibility to the community and its role in preserving the economic vitality of the region. The public places trust in the operators of wastewater systems to safely manage their operations in a manner that protects the health and safety of the public and the environment, even after a disaster.

We invite you to learn more about the LHMP online at www.SonomaWater.org/svlhmp and provide feedback on the draft plan this spring.

HOW YOUR SEWER SERVICE FEES ARE SPENT

Service fees collected from property owners are used to operate and maintain the sanitation facilities that are managed by Sonoma Water. This graphic depiction provides a snapshot of types of activities that are required to operate our facilities in an environmentally responsible and fiscally prudent manner, to replace worn out equipment before it fails.

COLLECTION SYSTEM
11¢

OPERATIONS
44¢

ENGINEERING, ADMINISTRATION, REGULATORY COMPLIANCE
21¢

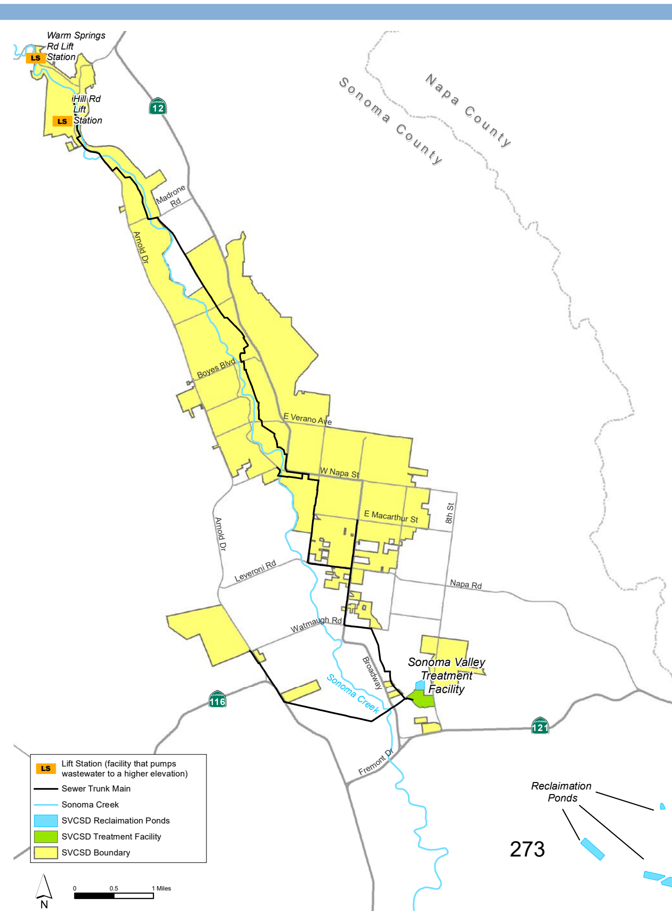
MECHANICAL & ELECTRICAL MAINTENANCE
24¢

BUDGET APPROVAL

After the proposed budgets and rates are developed, the budgets are available for public review at libraries throughout the county and at Sonoma Water's office located at 404 Aviation Boulevard, Santa Rosa. They are also available online. Typically, this happens at the end of March. In addition, notices of the proposed rates are mailed to the owners of the properties in the districts and zones at that time. The public can protest rate increases up to the date of the rate hearings, which are typically held in mid May at the Board of Supervisors chambers. (A protest form and rate hearing information are available on pages 6 7 of this notice).

ABOUT YOUR DISTRICT

In 1995 Sonoma Water assumed responsibility from the County of Sonoma for managing the county sanitation zones and districts, including your District. The District began operation in 1953. Currently, it serves 17,715 Equivalent Single-Family Dwellings within a 4,500-acre service area. The treatment plant has a design capacity of 3 million gallons per day (average daily dry weather flow) and treats wastewater to tertiary treatment levels (also referred to as advanced water treatment). High-quality recycled water is an important resource and its use offsets potable water demands and enhances the environment. Between May 1 and October 31, the recycled water is used for irrigation and wetland/salt marsh enhancement. Between November 1 and April 30, recycled water is discharged into Schell Slough or Hudeman Slough.



COVID-19'S IMPACT ON BUDGETS AND SEWER SERVICE CHARGES

To Our Ratepayers,

We know that the COVID-19 pandemic has had a devastating effect on many residents and businesses throughout our county and beyond. As managers of eight small sanitation districts and zones, we are well aware of the financial burden of rising sanitation charges during these difficult times and we are making every effort to soften the impacts as much as possible.

The eight sanitation zones and districts managed by Sonoma Water are all experiencing financial constraints. Revenues are decreasing as some property owners are unable to pay their sewer service charges, and we anticipate that there will be more delinquencies as the economic impact of the pandemic continues. The districts and zones are faced with tight budgets, but we will work hard to maintain our facilities and continue to operate the systems in a safe and reliable manner. While we remain committed to operate and maintain the systems in a responsible manner, protect public health and the environment, and comply with regulatory requirements, the costs to meet those requirements continue to increase.

This year we have made several adjustments to keep rate increases at a minimum, including cutting overhead costs, deferring maintenance where it is possible, and delaying studies and capital improvement projects.

One of the challenges inherent with small districts and zones is that there are a limited number of residents and businesses to share the costs of operations, maintenance, and project implementation. With a smaller rate base, costs are borne by fewer customers. As the manager of these districts and zones, Sonoma Water continues to advocate for special districts and rural counties to receive COVID support and we are actively seeking support from state and federal sources.

Our hearts go out to the many individuals, families, businesses and communities who are suffering during this pandemic. We will continue to provide critical sanitation services to you and find ways to limit the cost of these services. As always, we will continue to keep public safety and system reliability our top priorities.

Sincerely,

Grant Davis
General Manager, Sonoma Water

WATER REBATES IN YOUR DISTRICT

SANITATION DISTRICT WATER SAVING REBATE PROGRAMS AVAILABLE

If you are a City of Sonoma or Valley of the Moon Water District customer, you have some water saving tools at your fingertips! Please take advantage of the following water saving programs which are offered on a first-come, first-served basis while funding lasts:

> Clothes Washers: Receive up to $50 back on the purchase and installation of a new, qualifying high-efficiency clothes washer (HEW). Rebates are available for all Energy Star Most Efficient listed clothes washers except those containing silver ion technology.

For more information, go to www.savingwaterpartnership.org/washer-rebate/.

PROPOSITION 218

Sonoma Valley County Sanitation District

NOTICE OF PUBLIC HEARING REGARDING PROPOSED SEWER SERVICE RATE INCREASE

Date, Time, and Place of Public Hearing

On **May 18, 2021 at 1:30 p.m.** or as soon thereafter as the matter may be heard, the Board of Directors (Board) of the Sonoma Valley County Sanitation District (District) will conduct a public hearing to consider increasing the annual sewer service charge (Sewer Charge) and make rate structure modifications. If approved, the increased Sewer Charge will become effective on July 1, 2021.

> **Please note:** the Board of Supervisors Meeting will be facilitated virtually through Zoom and due to the pandemic, and in accordance with Executive Orders N-25-20 and N-29-20, the May 18, 2021 Board of Directors meeting will be held virtually. MEMBERS OF THE PUBLIC MAY NOT ATTEND THIS MEETING IN PERSON. Information regarding public online participation will be available on the Board's agenda 72 hours prior to the meeting at https://sonoma-county.legistar.com/Calendar.aspx

The Sewer Charge will be imposed on each parcel upon which is located one or more structures that are connected to the system and the Sewer Charge will be collected on the general property tax bill administered by Sonoma County. Payment of the Sewer Charge will be the responsibility of the owner of the parcel.

Reasons for the Sewer Service Charge and Use of the Funds Collected

The Sewer Charge is imposed to pay for the cost of providing safe and reliable sewer service to your property in conformance with legal requirements, and is necessary: (a) to finance the ongoing operation and maintenance costs of the system; (b) to pay the capital replacement program costs of the system, which provides for the long-term replacement of system facilities as they wear out; and (c) to maintain sufficient reserves. The District's Sewer Charge is reviewed annually to determine if adequate revenues are being collected for these purposes. The District recognizes the far reaching financial impacts of COVID-19 on its customers, and has gone to great lengths to cut operations and maintenance costs, defer maintenance where practicable, delay studies and capital improvement projects, and reduce the rate increase while continuing to keep public safety and system reliability our top priorities.

The draft proposed budget for fiscal year 2021-22 describes the District's total annual expenses in detail and is available for review at the Sonoma Valley County Sanitation District, c/o the Sonoma County Water Agency, 404 Aviation Boulevard, Santa Rosa, California 95403, and on Sonoma Water's website at www.sonomawater.org/current-budget

Calculation of the Sewer Rate Increase

The District has two categories of users:

> A) **Non-Residential Users and Residential Users with No Public Water Connection.** This category of users has a Sewer Charge that is fixed. NOTE: Residential Users that have a Public Water Connection but have no water usage in winter months and multi-family complexes including condominiums with only one Public Water Connection for all of the units are also included in this category.
>
> B) **Residential Users with a Public Water Connection.** This category of users has a Sewer Charge that has both a fixed charge component and a volume-based component.

The method for calculating the Sewer Charge for each category of user is described in more detail below.

A) Amount of Proposed Sewer Rate Increase for Non-Residential Users and Residential Users with No Public Water Connection.

Effective July 1, 2021, the District proposes to increase the charge per Equivalent Single-Family Dwelling (ESD) from $1,094 per ESD per year to $1,132 per ESD per year for users in this category. This represents an increase of $38 or 3.5% compared to the current year. This increase to the ESD charge has been calculated by dividing the annual costs of providing wastewater treatment and collection service by the total estimated number of ESDs in the District.

A standard single-family home constitutes one ESD. Properties that are not single family homes are converted to ESDs based on industry standard methods and more information about this conversion is available from the District. Parcels which have other uses (for example, apartments and commercial buildings) will be assigned a number of ESDs using standard equivalency factors which estimate the probable quantity and quality of sewage effluent normally generated by such uses in comparison to a single-family home.

The Sewer Charge for Non-Residential Users and Residential Users with No Public Water Connection is calculated as follows:

$1,132 per ESD x Assigned Number of ESD's = Annual Sewer Charge

B) Sewer Rate Increase Proposed For Residential Users With a Public Water Connection

All residential sewer customers with a public water connection must pay a Sewer Charge with two components: a fixed charge and a volume-based charge. The Residential Users with a Public Water Connection category includes single-family dwellings, multiple-family units, apartments, and mobile home parks. A multi-family complex or condominium complex will also fall within this category if each unit in the complex has its own public water connection.

1. Fixed Charge Component: The fixed charge component of the Sewer Charge funds 70% of the District's costs to provide sewer services, including costs that the sewage treatment and collection system incurs regardless of increased or decreased sewage flow into the system.

Effective July 1, 2021 the District proposes to increase the fixed charge to $792.80 per ESD per year for residential users with a public water connection. This represents an increase of $26.80 (3.5% above the current year).

The fixed charge component of the Sewer Charge will be calculated as follows:

$792.80 per ESD x Number of ESD's = Fixed Charge Component of the Sewer Charge

2. Volume-Based Component: The volume-based component funds approximately 30% of the District's costs to provide sewer service, including costs to the sewage treatment and collection system that vary with the amount of sewage conveyed and treated. The District's volume-based component uses a customer's lowest winter water use (November – March) as the basis for the calculation. Winter water use is used because it generally provides the best available estimate of indoor water use and its impact to the District's treatment facilities because outdoor irrigation is usually minimal during the winter months.

The Volume-Based Component of the Sewer Charge has three parts, which are multiplied together:

Winter Water Usage x Number of Billing Periods Annually from your Water District x per thousand gallon = Volume-Based Component of Sewer Charge

Effective July 1, 2021, the District proposes to increase the volume-based component charge from $5.99 per thousand gallons to $6.42 per thousand gallons for residential users with a public water connection. This represents an increase of $0.22 per thousand gallons (3.5% compared to current year). Each residential user with a sewer connection and a public water connection with winter water use greater than zero will be charged as follows:

Total Sewer Charge (fixed charge + volumetric charge) for Residential Customers with a Public Water Connection

For Customers with a Valley of the Moon Water District bill:

$792.80 per ESD x Number of ESD's (Fixed Charge Component)
+ $6.42 per thousand gallons
X Lowest Winter Water Usage in thousand gallons
X 6 billing periods annually (Volumetric Charge Component)

For Customers with a City of Sonoma Water District water bill:

792.80 per ESD x Number of ESD's (Fixed Charge Component)
+ $6.42 per thousand gallons
X Lowest Winter Water Usage in thousand gallons
X 12 billing periods annually (Volumetric Charge Component)

Further Information Available Prior to the Hearing

At the hearing, the Board will consider adoption of an ordinance which will establish the increased Sewer Charge. A copy of the ordinance is on file and available for review at the Sonoma County Water Agency, 404 Aviation Boulevard, Santa Rosa, CA 95403. In addition, the following person may be contacted at the Agency at (707) 526-5370 for further information and/or obtaining copies of the draft proposed budget for fiscal year 2021-22: Kathy Badger, Administrative Aide.

Protest Procedure

This notice has been mailed to you because records of the Sonoma County Assessor list you as an owner of one or more parcels within the District that will be subject to the Sewer Charge while connected to the system. In the event you have sold property you may have owned within the District, please send this notice to the new owner. This document can be found in the spring newsletter online at: www.sonomawater.org/svcsd

Prior to the public hearing, property owners, or tenants who are directly liable for the payment of the Sewer Charges, may submit written protests respecting the Sewer Charge. At the public hearing, the Board will consider all written protests that have been received by the prescribed deadline. In order to be considered, a written protest must be made on the attached form. Only one protest will be counted per parcel. Only protests signed by the current owner(s), or tenant(s) directly liable for paying the Sewer Charge, will be allowed and protests must be received no later than the following deadlines:

> *If submitted by mail, they must be received (NOT postmarked) no later than 5:00 p.m. on Monday, May 17, 2021 at the mailing address on the form.*
>
> *If hand delivered, they must be delivered no later than 5:00 p.m. on Monday, May 17, 2021 at the mailing address on the form.*

Sonoma Water

404 Aviation Blvd.

Santa Rosa, CA 95403

Date of this Notice: March 29, 2021

RATE PROTEST FORM

NOTE: IN ORDER TO BE CONSIDERED, ANY PROTEST MUST BE ON THIS FORM

WRITTEN PROTEST

I am the parcel owner of the property located at the address on the back of this form, or a tenant that is directly liable for paying the Sewer Charge for the property. I am submitting this form to protest the proposed Sewer Charge increase.

Additional Comments: ____

____

____

Use opposite side or attach additional sheets if needed.

____

Signature of Property Owner Required

____

Print Name

Fold Here First

Place Postage Here

Sonoma Valley County Sanitation District
c/o Sonoma Water
404 Aviation Blvd
Santa Rosa, CA 95403

Fold Here Second

Sonoma Valley County Sanitation District
c/o Sonoma Water
404 Aviation Blvd.
Santa Rosa, CA 95403

IMPORTANT
Sewer service fee NOTICE
(Prop 218) enclosed for
Sonoma Valley County
Sanitation District

HEARING DATE
May 18, 2021 at 1:30 p.m.

HEARING DETAILS
The Hearing will be held virtually through Zoom.
Hearing details can be found at
https://sonoma-county.legistar.com/Calendar.aspx

ATTENTION
IMPORTANT SEWER RATE INFORMATION INSIDE

INCLUDED IN THIS ISSUE

Proposition 218 Notice for proposed Fiscal Year 2021-2022 sewer rates.

The Notice with information about the proposed rates is included on pages 5-6 of this newsletter.
The return protest form is located on page 7.

Sonoma Water

Clean. Reliable. Essential. Every day.

www.sonomawater.org/SVCSD

Sonoma Water

Sonoma Water E-News | August 2021

Save the Date! Free Water-Saving Kits at Drought Drop By Event August 21st, 2021, 8am-12pm at various locations

Sonoma Water and its partners in the Sonoma-Marin Saving Water Partnership encourage all of our 600,000 water customers to continue to save water during this historic drought. The Sonoma-Marin Saving Water Partnership will give away thousands of water-saving kits during a Drought Drop By event on August 21 throughout a three-county region.

Free drought toolkits— including water reuse buckets with high-efficiency showerheads, faucet aerators, digital shower timers, leak detection tools, and informational handouts — will be distributed to participants who drop by on a first-come, first serve basis.

All locations are outdoors with drive-through curbside and walk-up pickup available. At this outdoor event, local COVID-19 safety protocols will be in effect. Please wear a mask and follow social distancing protocols. A complete list of locations and details are avialable about the Sonoma-Maring Saving Water Partnership https://www.savingwaterpartnership.org/dropby

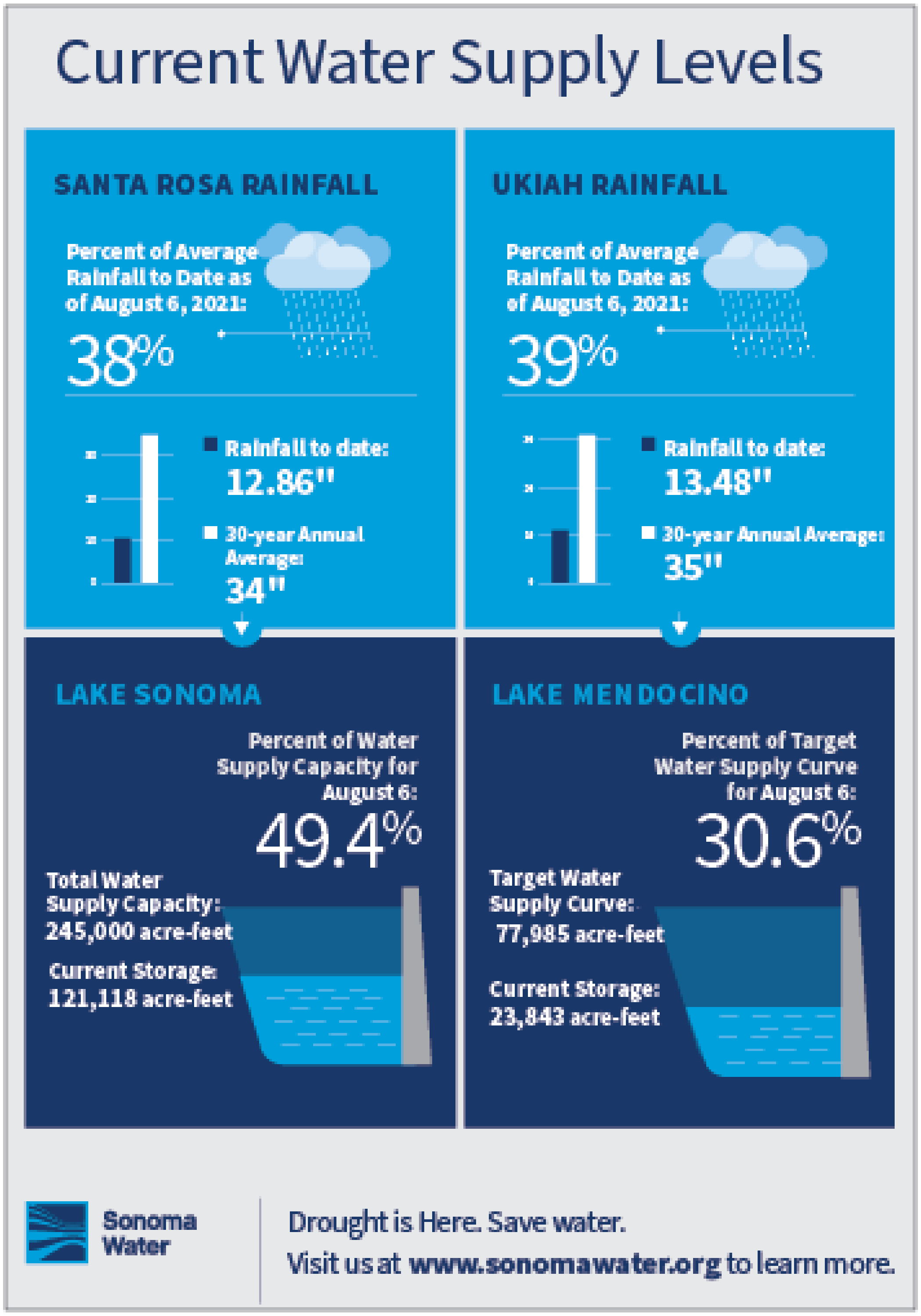
Learn more about the Drought Drop By event

Water Supply Update: Drought is Here. Save Water

View a Drought update from Sonoma Water General Manager Grant Davis and Supervisor James Gore.

We tackle our challenges head-on and will overcome this drought together by using water wisely & efficiently. It is critical that aggressive water saving by our communities occurs right now. Two years of low rainfall have left Lake Sonoma and Lake Mendocino at historically low levels. Every drop of water saved helps maintain flows in the Russian River and maintains storage in reservoirs.

Sonoma Water is publishing a water supply graphic (below) weekly, to provide a snapshot of the rainfall and water storage for our two main reservoirs, Lake Sonoma, and Lake Mendocino. Stay informed about Current Water Supply Conditions, 2021 Drought Updates, Actions, and Information. For more drought information, visit sonomawater.org/drought



Learn more about the current Drought

Tune in to “Water Saving Voices From Our Community” video series

The Sonoma Marin Saving Water Partnership is launching a new series of videos of local community members sharing water saving tips and best water-use efficiency practices.

On behalf of the Partnership, Sonoma Water will feature one video per week beginning next week on Sonoma Water’s social media (below.) Tune in each week to get some ideas for water conservation indoors and outdoors.

Water is a resource that our community shares, and it is critical that we all protect and conserve this valuable resource. Drought is here, make changes to everyday habits by eliminating water waste and reducing water use for big water savings.

Sonoma Water’s Social Media

- Facebook
- Instagram
- YouTube
- Twitter
- Nextdoor

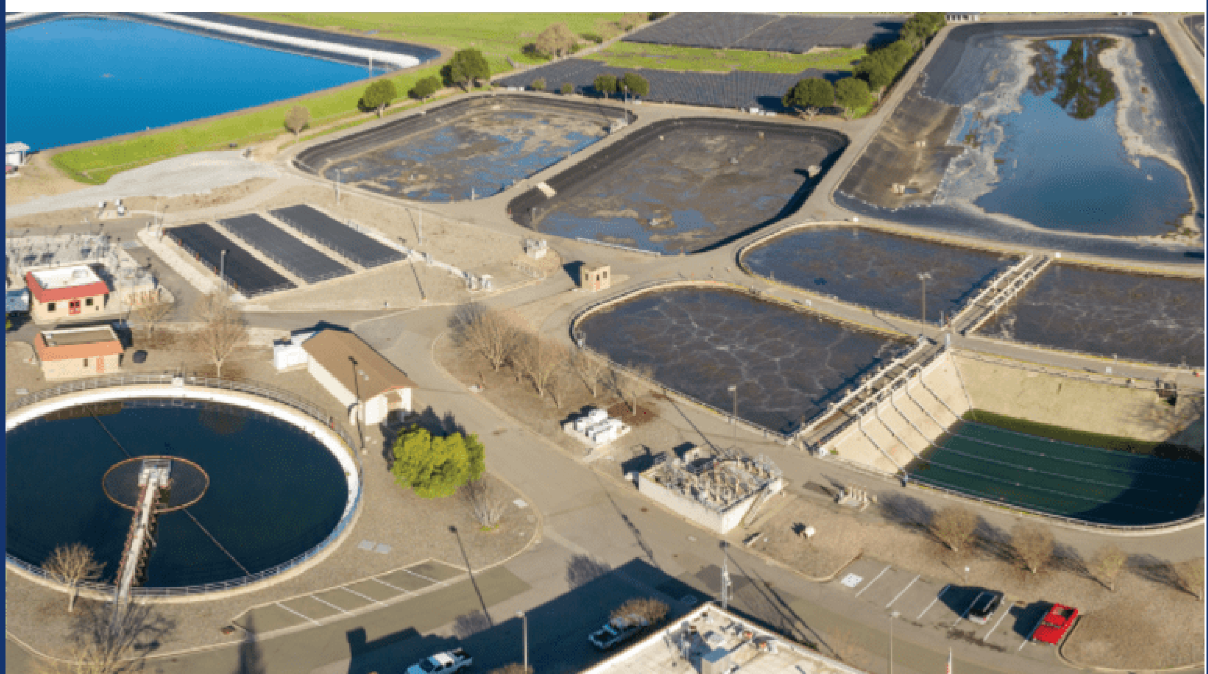
Learn more about the Sonoma-Maring Saving Water Partnership

Preparing for Natural Disasters: Sonoma Valley County Sanitation District (SVCSD) Local Hazard Mitigation Plan

Hazard mitigation planning reduces loss of life and property by minimizing the impact of disasters. A Local Hazard Mitigation Plan (LHMP) forms the foundation for a community's long-term strategy to reduce disaster losses and break the cycle of disaster damage, reconstruction, and repeated damage. It begins with local public agencies identifying natural disaster risks and vulnerabilities that are common in their area. After identifying these risks, they develop long-term strategies to protect people and property from similar events. Mitigation plans are key to breaking the cycle of disaster damage and reconstruction.

The Sonoma Valley County Sanitation District Local Hazard Mitigation Plan was approved by FEMA on September 13, 2016 for a period of five years. The District is currently updating its LHMP and a draft plan will be available for public review in September. The approval of this plan ensures the Sonoma Valley County Sanitation District's continued eligibility for project grants under FEMA's Hazard Mitigation Assistance programs and Flood Mitigation Assistance Program.

Prior to September 13, 2021, the District will review and revise its plan to reflect changes in development, progress in local mitigation efforts, and changes in priorities, and resubmit it for approval in order to continue to be eligible for mitigation project grant funding.



Learn more about the LHMP

Rainfall and Water Storage Update

Current water supply conditions as of 8/10/2021:

Lake Mendocino Target Water Supply Curve: 77,047 acre-feet
Current Storage: 22,946 acre-feet (29.78% of Target Water Supply Curve)

Lake Sonoma Target Storage Curve: 245,000 acre-feet
Current Storage: 120,184 acre-feet (49.05% of Water Supply Pool)

Current rainfall conditions (10/1/20 – 8/9/21)

Ukiah:
Average (1894-2020 water years): 36.54”
Current Water Year: 12.53” which is 34.29% of average

Santa Rosa:
Average (1950-2020 water years): 30.26"
Current Water Year: 12.86” which is 42.5% of average

Learn more about Water Supply Levels

Upcoming Events

The Board normally holds its regular meetings on Tuesdays, beginning at 8:30 a.m. and will be facilitated virtually through Zoom and at Board of Supervisors Chambers (BSC) 575 Administration Drive 102A.

Board of Directors Meetings
•August 17, 2021, virtual & BSC
•August 23, 2021, Virtual
Special Closed Session

Fact of the Month

Landscaping accounts for about half the water Californians use at home. Showers account for another 18%, while toilets use about 20%. Showering and bathing are the largest indoor uses (27%) of water domestically.

Employment Opportunities

Sonoma Water has job openings for people with a variety of skills and experience.

•August 24, 2021, virtual & BSC
•August 31, 2021, virtual & BSC

Board Agendas:
View upcoming Agenda items

Please visit SoCoEmergency.org for additional information and resources

Groundwater Sustainability Agency Board Meetings

Sonoma Valley - September 27, 2021 4:00pm
Petaluma Valley - September 23, 2021 4pm
Santa Rosa Plain - August 12, 2021 1pm

sonomagroundwater.org

Sonoma Water Events Calendar

- Water Agency Maintenance Worker II (Closes August 24, 2021)
- Water Agency Plant Operator-in-Training - Extra Help (Closes August 12, 2021)
- Sonoma Water Programmer/Developer (Continuous)
- Water Agency Business Systems Analyst - Extra-Help (Continuous)

Employment Opportunities

- Clerical Team Intern
- Water and Energy Education Intern

Internships

Sonoma Water | 404 Aviation Blvd, Santa Rosa, CA 95403 | sonomacountywater.org

STAY CONNECTED

Sonoma Water

Boletín de Sonoma Water | agosto 2021

¡Reserva la fecha! Kits gratuitos para ahorrar agua en el evento Drought Drop By el 21 de agosto de 2021, de 8 am a 12 pm en varios lugares

Sonoma Water y asociados en La Alianza para Ahorrar Agua de Sonoma-Marin (Sonoma-Marin Saving Water Partnership) animan a todos nuestros 600,000 clientes de agua a seguir ahorrando agua durante esta sequía histórica. La Alianza regalará miles de kits para ahorrar agua durante el evento "Para la Sequía, Para Aquí," el 21 de agosto en una región de tres condados.

Se distribuirán recipientes con herramientas gratuitos para ahorrar agua en la sequía – incluyen: baldes de reutilización de agua con cabezales de ducha de alta eficiencia, aireadores de grifos, temporizadores de ducha digitales, herramientas de detección de fugas y folletos informativos – a los participantes que se acerquen por orden de llegada.

Todas las ubicaciones están al aire libre con acceso directo a la banqueta
En este evento al aire libre, los protocolos de seguridad locales COVID-19 estarán en vigencia. Use un cubrebocas y siga los protocolos de distanciamiento social. Se puede

obtener una lista completa de ubicaciones y detalles sobre Sonoma-Marin Saving Water Partnership https://www.savingwaterpartnership.org/dropby

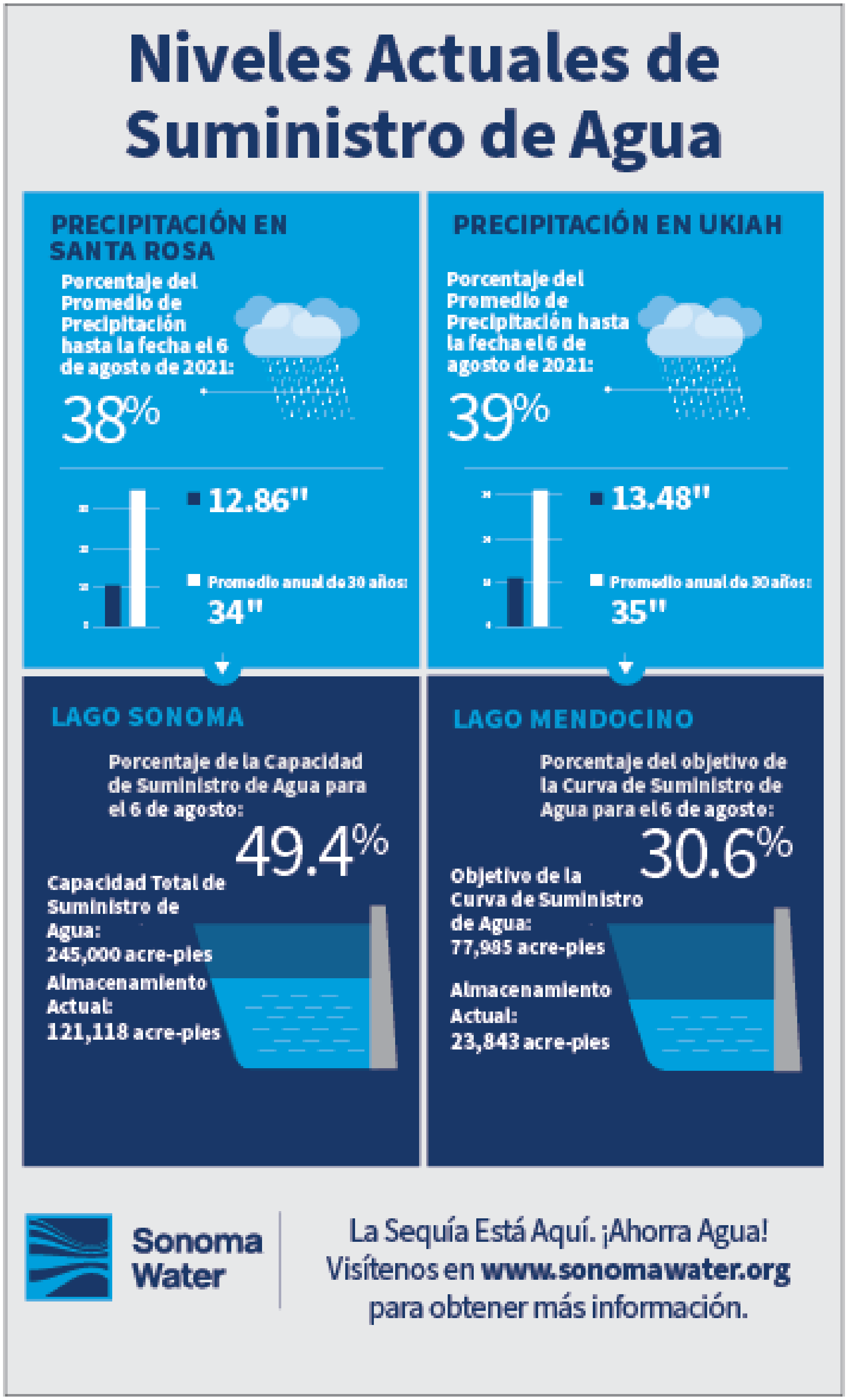
Obtenga más información sobre el evento Drought Drop By

Actualización del Suministro de Agua: La Sequía está Aquí. Ahorraremos Agua.

Vea una actualización sobre la sequía del gerente general de Sonoma Water, Grant Davis, y del supervisor James Gore.

Abordamos nuestros desafíos de frente y superaremos esta sequía juntos utilizando el agua de manera consciente y eficiente. Es esencial que nuestras comunidades ahorren agua de manera agresiva en este momento. Dos años de escasas precipitaciones han dejado al lago Sonoma y al lago Mendocino en niveles históricamente bajos. Cada gota de agua ahorrada ayuda a mantener los caudales en el río Ruso y mantiene el almacenamiento en las presas de agua.

Sonoma Water publica un gráfico de suministro de agua (abajo) semanalmente, para proporcionar una instantánea vista de la lluvia y el almacenamiento de agua para nuestros dos reservorios principales, el lago Sonoma y el lago Mendocino. Manténgase informado sobre las condiciones actuales del suministro de agua, las actualizaciones, las acciones y la información sobre la sequía de 2021. Para obtener más información sobre la sequía, visite sonomawater.org/drought



Obtenga más información sobre la sequía actual

Sintonice la serie de videos "Voces de nuestra comunidad sobre el ahorro de agua"

Sonoma Marin Saving Water Partnership está lanzando una nueva serie de videos de miembros de la comunidad local que comparten consejos para ahorrar agua y las mejores prácticas de uso eficiente del agua.

En nombre de la alianza, Sonoma Water presentará un video por semana a partir de la próxima semana en las redes sociales de Sonoma Water (a continuación). Sintonice cada semana para obtener algunas ideas para la conservación del agua en interiores y exteriores.
El agua es un recurso que comparte nuestra comunidad y es fundamental que todos protejamos y conservemos este valioso recurso. La sequía está aquí, haga cambios en los hábitos diarios eliminando el desperdicio de agua y reduciendo el uso de agua para obtener grandes ahorros de agua.
Redes sociales de Sonoma Water

- Facebook
- Instagram
- YouTube
- Twitter
- Nextdoor

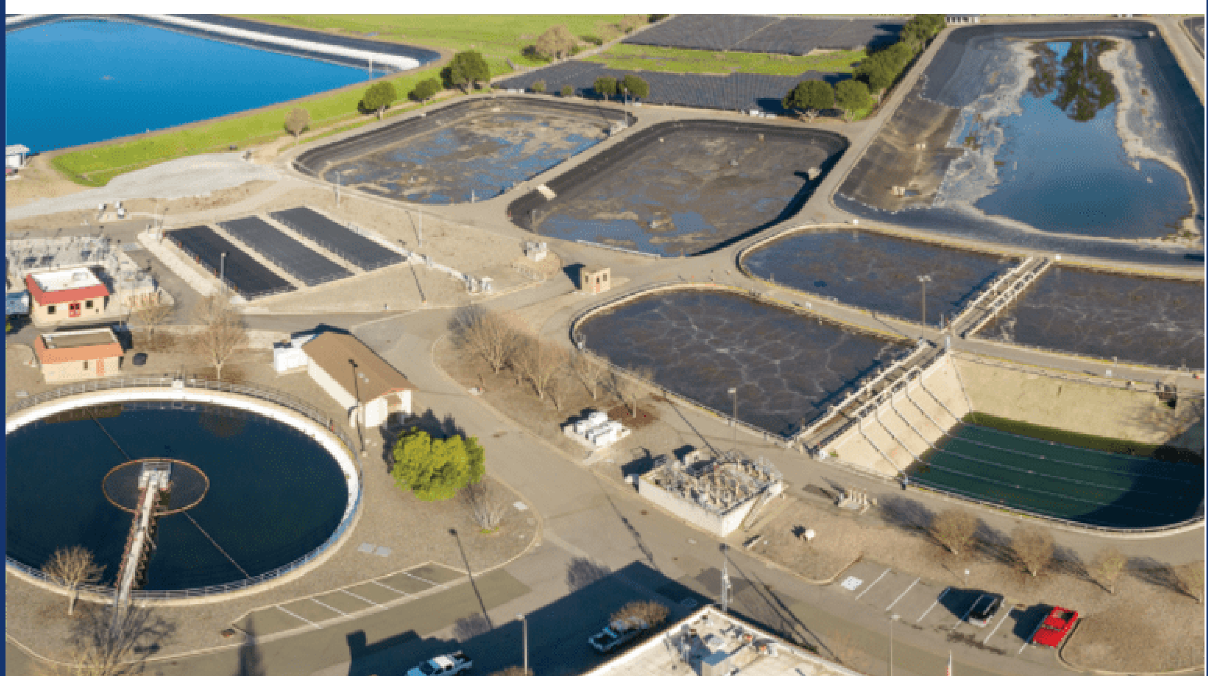
Obtenga más información sobre Sonoma-Maring Saving Water Partnership

Preparación para desastres naturales: Plan de mitigación de peligros locales del Distrito de saneamiento del condado de Sonoma Valley (SVCSD)

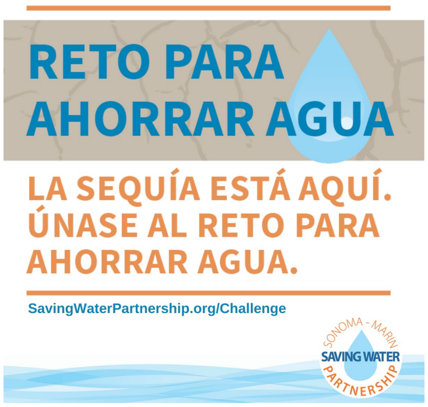
La planificación de la mitigación de peligros reduce la pérdida de vidas y propiedades al minimizar el impacto de los desastres. Un Plan de Mitigación de Riesgos Locales (LHMP) constituye la base de la estrategia a largo plazo de una comunidad para reducir las pérdidas por desastres y romper el ciclo de daños por desastres, reconstrucción y daños repetidos. Las agencias públicas locales identifican los riesgos de desastres naturales y las vulnerabilidades que son comunes en su área. Después de identificar estos riesgos, desarrollan estrategias a largo plazo para proteger a las personas y propiedades de eventos similares. Los planes de mitigación son clave para romper el ciclo de daños por desastres y reconstrucción.

El plan de mitigación de peligros locales del distrito de saneamiento del condado de Sonoma Valley fue aprobado por FEMA el 13 de septiembre de 2016 por un período de cinco años. El Distrito está actualizando su LHMP y un plan preliminar estará disponible para revisión pública en septiembre. La aprobación de este plan asegura la elegibilidad continua del Distrito de Saneamiento del Condado de Sonoma Valley para recibir asistencias de proyectos bajo los programas de Asistencia para la Mitigación de Riesgos y el Programa de Asistencia para la Mitigación de Inundaciones de FEMA.

Antes del 13 de septiembre de 2021, el Distrito revisará y modificará su plan para reflejar los cambios en el desarrollo, el progreso en los esfuerzos de mitigación locales y los cambios en las prioridades, y lo volverá a enviar para su aprobación a fin de seguir siendo elegible para la financiación de asistencias para proyectos de mitigación.



Más información sobre LHMP



Actualización de lluvia y almacenamiento de niveles de agua

Condiciones de suministro de agua actuales: 08/10/2021

Curva de suministro de agua objetivo del lago Mendocino: 77,047 acres-pies
Almacenamiento actual: 22,946 acres-pies
(29.78% de la curva de suministro de agua objetivo)

Almacenamiento de destino en el lago Sonoma
Curva: 245,000 acres-pies
Almacenamiento actual: 120,184 acres-pies
(49.05% de la piscina de suministro de agua)

Condiciones actuales de lluvia (10/1/20 – 8/9/21)

Ukiah:
Promedio (años 1894 a 2020 agua): 36.54”
Año actual agua: 12.53” , que es el 34.29% de la media

Santa Rosa:
Promedio (años 1950 a 2020 agua): 30.26"
Año actual agua: 12.86” , que es 42.5% de la media

Obten más información sobre los niveles de suministro de aguaLearn more about Water Supply Levels

Próximos Eventos

La Junta Directiva normalmente tiene reuniones los martes,

Hecho del mes

La jardineria representa aproximadamente la mitad del agua comienzan a las 8:30 a.m. y se facilitarán virtualmente a través de Zoom y en Board of Supervisors Chambers (BSC) 575 Administration Drive 102A.

Próximas reuniones de la Junta
•August 17, 2021, virtual & BSC
•August 23, 2021, Virtual Special Closed Session
•August 24, 2021, virtual & BSC
•August 31, 2021, virtual & BSC

Ver los próximos temas de la agenda

Visite SoCoEmergency.org para obtener información adicional sobre el coronavirus y la recuperación de incendios del condado de Sonoma.

Reuniones de la Junta de la Agencia de Sostenibilidad de Aguas Subterránea

Sonoma Valley - September 27, 2021 4:00pm
Petaluma Valley - September 23, 2021 4pm
Santa Rosa Plain - August 12, 2021 1pm

sonomagroundwater.org

Calendario de eventos de Sonoma Water

que los californianos usan en casa. Las duchas representan otro 18%, mientras que los inodoros utilizan alrededor del 20%. La ducha y el baño son los usos interiores más importantes (27%) del agua a nivel nacional.

Oportunidades de Empleo

Lo invitamos a explorar las oportunidades de empleo disponibles en Sonoma Water

Oportunidades de Empleo

Sonoma Water | 404 Aviation Blvd, Santa Rosa, CA 95403 | sonomacountywater.org

STAY CONNECTED

Press Releases

Select Language ▼

Sonoma Water

(/)

Public Input Needed on Sonoma Valley County Sanitation District Disaster Planning

FOR IMMEDIATE RELEASE October 29, 2021

CONTACT: Barry Dugan
707-331-2040 (cell) barry.dugan@scwa.ca.gov (mailto:barry.dugan@scwa.ca.gov)

(Spanish below) (Español abajo)

The Sonoma Valley County Sanitation District (District) has released a draft of its updated Local Hazard Mitigation Plan (LHMP) that creates a blueprint for reducing the damage to the District's infrastructure from natural disasters, such as floods, droughts, fires, and earthquakes. Members of the public are invited to submit comments on the draft LHMP during the 21-day public comment period that opens on November 1, 2021. To review the LHMP and provide input, visit: https://www.sonomawater.org/svlhmp (https://www.sonomawater.org/svlhmp)

The LHMP forms the foundation for a community's long-term strategy to reduce disaster losses and break the cycle of disaster damage, reconstruction, and repeated damage. The planning process includes public and stakeholder involvement. The District is working with its stakeholders to complete an update of the 2016 LHMP.

The District must update its LHMP every five years to ensure it remains relevant to current events and system conditions and to meet requirements set forth by FEMA. In particular, staff has reviewed the District's vulnerabilities and risks, as well as the prioritized listing of hazard mitigation actions.

LHMPs are public documents that create a framework for risk-based decision making to reduce damage to lives, property, and the economy from future disasters, such as earthquakes, fires, and floods. The Federal Emergency Management Agency (FEMA) utilizes LHMPs to issue grant funding for pre-disaster and hazard mitigation actions.

In 2008 the District initiated a natural hazard assessment, which was instrumental in creating the District's first LHMP in 2016, and includes a priority listing of hazard mitigation actions.

If you are interested in following the LHMP preparation, approval, and adoption process or providing input, visit: https://www.sonomawater.org/svlhmp (https://www.sonomawater.org/svlhmp) All LHMP drafts for public review will be posted for public review on this page. You can submit questions or comments by sending an email to LHMP@scwa.ca.gov (about%3Ablank).

Se necesitan comentarios del público sobre la planificación de desastres del distrito de saneamiento del condado en Sonoma Valley

El Distrito de Saneamiento del Condado en Sonoma Valley (Distrito) ha publicado un preliminar de su Plan de Mitigación de Riesgos Locales (Local Hazard Mitigation Plan, LHMP) actualizado que crea un plan para reducir el daño a la infraestructura del Distrito por desastres naturales, como inundaciones, sequías, incendios y terremotos. Se invita a los miembros del público a enviar comentarios sobre el preliminar del LHMP durante el período de 21 días para comentarios públicos que comienza el 1 de noviembre de 2021. Para revisar el LHMP y proporcionar comentarios, visite: https://www.sonomawater.org/svlhmp (https://www.sonomawater.org/svlhmp)

El LHMP forma la base de la estrategia a largo plazo de la comunidad para reducir las pérdidas por desastres y romper el ciclo de daños por desastres, reconstrucción y daños repetidos. El proceso de planificación incluye la participación del público y de las partes interesadas. El Distrito está trabajando con sus partes interesadas para completar una actualización del LHMP 2016.

El Distrito debe actualizar su LHMP cada cinco años para garantizar que siga siendo relevante para los eventos actuales y las condiciones del sistema y para cumplir con los requisitos establecidos por FEMA. En particular, el personal ha revisado las vulnerabilidades y riesgos del Distrito, así como la lista priorizada de acciones de mitigación de peligros.

Los LHMP son documentos públicos que crean la toma de decisiones basada en el riesgo para reducir los daños a vidas, propiedades y la economía de desastres futuros, como terremotos, incendios e inundaciones. La Agencia Federal para el Manejo de Emergencias (FEMA, Federal Emergency Management Agency) utiliza LHMP para emitir asistencias para acciones de mitigación de peligros y precedentemente del desastre.

En 2008, el Distrito inició una evaluación de peligros naturales, que fue fundamental para la creación del primer LHMP del Distrito en 2016, e incluye una lista de prioridades de acciones de mitigación de peligros.

Si está interesado en seguir el proceso de preparación, aprobación y adopción de LHMP o en proporcionar comentarios, visite: https://www.sonomawater.org/svlhmp (https://www.sonomawater.org/svlhmp) Todos los preliminares de LHMP para revisión pública se publicarán en esta página. Puede enviar preguntas o comentarios enviando un correo electrónico a LHMP@scwa.ca.gov (mailto:LHMP@scwa.ca.gov).

More: Press Releases (https://www.sonomawater.org/news/category/301/)

Select Language ▼

Sonoma Water (/)

Water Resources (https://www.sonomawater.org/water-resources) / Sanitation (https://www.sonomawater.org/sanitation) / Sanitation Districts and Zones (https://www.sonomawater.org/sanitation-districts-and-zones) / Sonoma Valley County Sanitation District (https://www.sonomawater.org/svcsd) / Sonoma Valley County Sanitation District Local Hazard Mitigation Plan (https://www.sonomawater.org/svlhmp)

Sonoma Valley County Sanitation District Local Hazard Mitigation Plan

The Sonoma Valley County Sanitation District is in the process of updating its Local Hazard Mitigation Plan. The previous plan was approved by FEMA on September 13, 2016 for a period of five years. The approval of the updated plan ensures the Sonoma Valley County Sanitation District's continued eligibility for project grants under FEMA's Hazard Mitigation Assistance programs and Flood Mitigation Assistance Program.

Every five years the District is required to review and revise its plan to reflect changes in development, progress in local mitigation efforts, and changes in priorities, and resubmit it for approval in order to continue to be eligible for mitigation project grant funding.

Public Comment Deadline: November 21, 2021

The District is asking for comment on the plan until November 21, 2021. Your comments will be reviewed by the Hazard Mitigation Planning Team and incorporated into the final plan as appropriate. Please send your comments to: LHMP@scwa.ca.gov or by postal mail to Sonoma County Water Agency, C/O Mollie Asay, 404 Aviation Blvd., Santa Rosa, CA 95403.

Documents

Sonoma Valley County Sanitation District Final Local Hazard Mitigation Plan (https://www.sonomawater.org/media/PDF/Projects/LHMP/Final Draft 2021 SVCSD LHMP_10.28.21_v2.pdf)

Contact Us

Submit questions or comments by sending an email to LHMP@scwa.ca.gov (mailto:LHMP@scwa.ca.gov).

About the District

The Sonoma Valley County Sanitation District began operations in 1953 and serves 17,027 Equivalent Single-Family Dwellings within a 4,500-acre service area. The treatment plant has a design capacity of 3 million gallons per day and the District provides high-quality tertiary treated water for local agricultural uses.

Quick Links

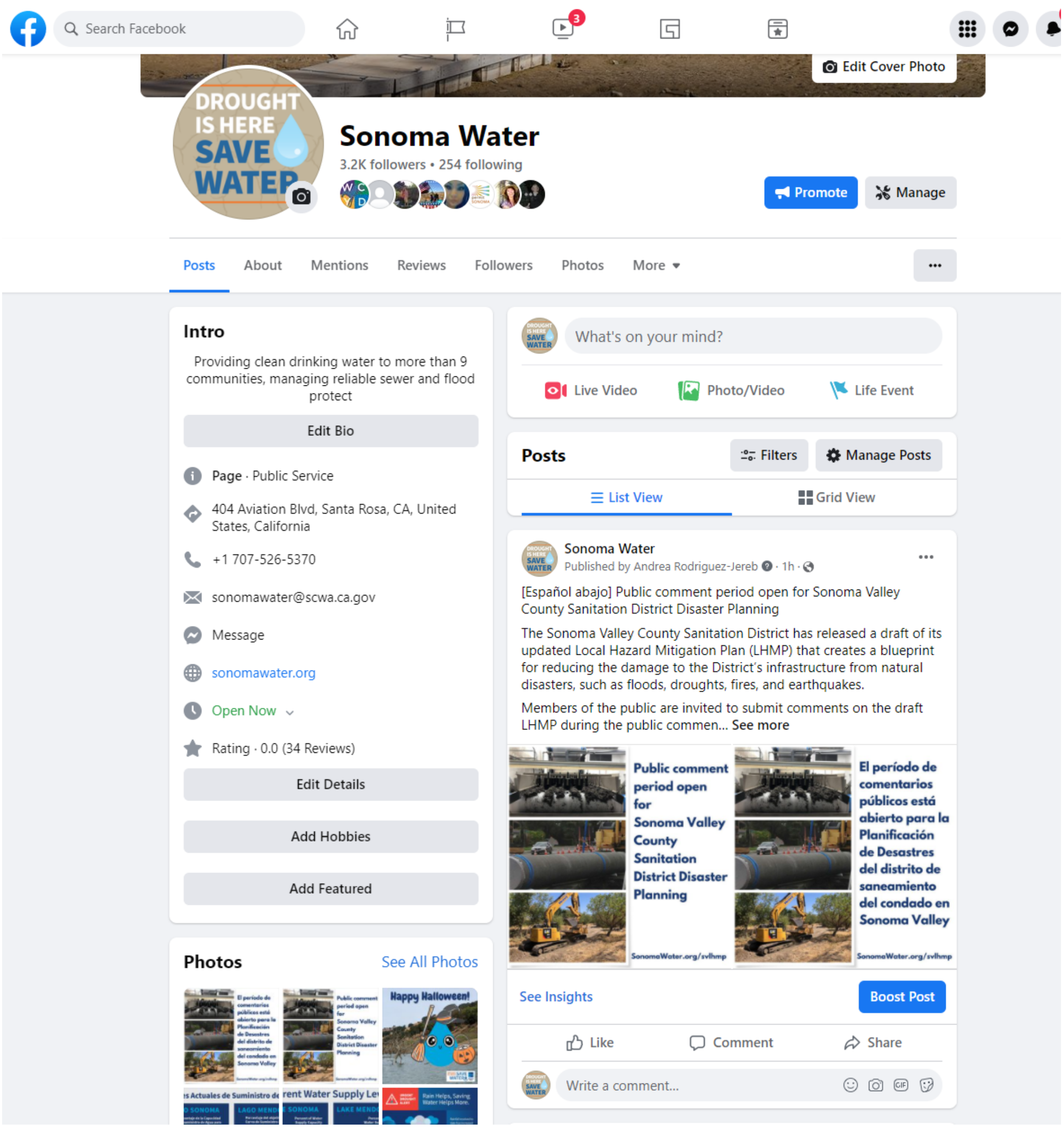
Drought Is Here. Save Water. (https://www.sonomawater.org/drought)
Frequently Asked Questions (/faq)
E-News Email Newsletter (/e-news)
Employment (/current-job-openings)
Contact Us (/contact-us)

Contact Us

404 Aviation Boulevard
Santa Rosa, CA 95403
Administration Office: 707-526-5370
Operations Desk (24 Hours): 707-523-1070

Social Media Outreach

Facebook



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+1 707-526-5370
sonomawater@scwa.ca.gov
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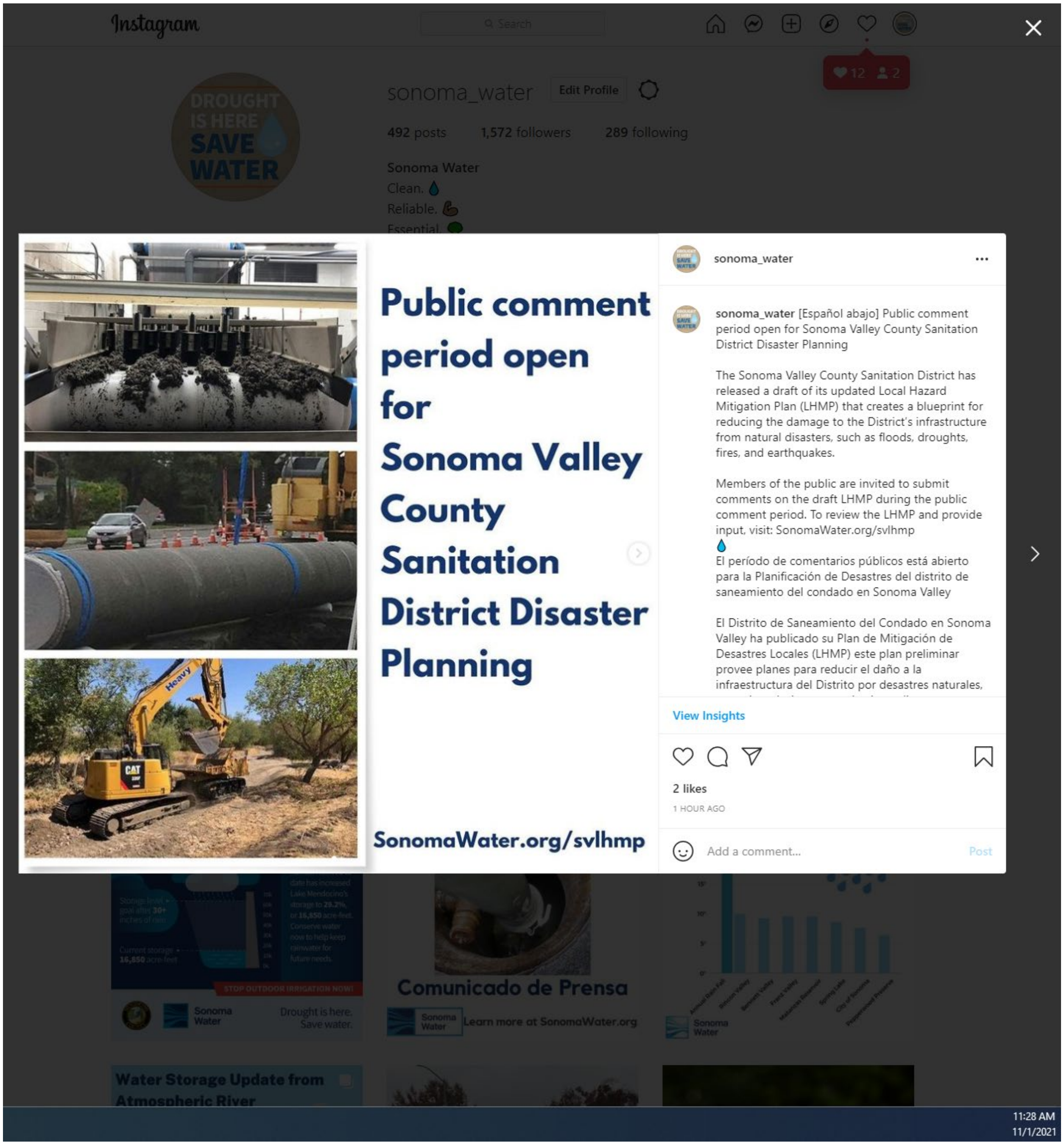
sonomawater.org
Open Now
Rating · 0.0 (34 Reviews)
Edit Details
Add Hobbies
Add Featured
Photos
See All Photos
Happy Halloween!
What's on your mind?
Live Video
Photo/Video
Life Event
Posts
Filters
Manage Posts
List View
Grid View
Sonoma Water
Published by Andrea Rodriguez-Jereb · 1h
[Español abajo] Public comment period open for Sonoma Valley County Sanitation District Disaster Planning
The Sonoma Valley County Sanitation District has released a draft of its updated Local Hazard Mitigation Plan (LHMP) that creates a blueprint for reducing the damage to the District's infrastructure from natural disasters, such as floods, droughts, fires, and earthquakes.
Members of the public are invited to submit comments on the draft LHMP during the public commen... See more
Public comment period open for Sonoma Valley County Sanitation District Disaster Planning
SonomaWater.org/svlhmp
El período de comentarios públicos está abierto para la Planificación de Desastres del distrito de saneamiento del condado en Sonoma Valley
SonomaWater.org/svlhmp
See Insights
Boost Post
Like
Comment
Share
Write a comment...

Instagram



Instagram
sonoma_water
Edit Profile
492 posts
1,572 followers
289 following
DROUGHT IS HERE SAVE WATER
Sonoma Water
Clean.
Reliable.
Public comment period open for Sonoma Valley County Sanitation District Disaster Planning
SonomaWater.org/svlhmp
sonoma_water
sonoma_water [Español abajo] Public comment period open for Sonoma Valley County Sanitation District Disaster Planning
The Sonoma Valley County Sanitation District has released a draft of its updated Local Hazard Mitigation Plan (LHMP) that creates a blueprint for reducing the damage to the District's infrastructure from natural disasters, such as floods, droughts, fires, and earthquakes.
Members of the public are invited to submit comments on the draft LHMP during the public comment period. To review the LHMP and provide input, visit: SonomaWater.org/svlhmp
El período de comentarios públicos está abierto para la Planificación de Desastres del distrito de saneamiento del condado en Sonoma Valley
El Distrito de Saneamiento del Condado en Sonoma Valley ha publicado su Plan de Mitigación de Desastres Locales (LHMP) este plan preliminar provee planes para reducir el daño a la infraestructura del Distrito por desastres naturales,
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11:28 AM
11/1/2021

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Sonoma Water @sonomawater · 1h

The Sonoma Valley County Sanitation District has released a draft of its updated Local Hazard Mitigation Plan. SonomaWater.org/svlhmp

El Distrito de Saneamiento del Condado en Sonoma Valley ha publicado su Plan de Mitigación de Desastres Locales. SonomaWater.org/svlhmp

From: Nextdoor <reply@rs.email.nextdoor.com>
Sent: Monday, November 1, 2021 11:44 AM
To: Andrea Rodriguez <Andrea.Rodriguez@scwa.ca.gov>
Subject: Public comment period open for Sonoma Valley County Sanitation District

The Sonoma Valley County Sanitation District has released a draft of its updated Local Hazard Mitigation Plan (LHMP) that...

nextdoor

Community and Government Affairs Andrea R. · Sonoma Water AGENCY

Public comment period open for Sonoma Valley County Sanitation District The Sonoma Valley County Sanitation District has released a draft of its updated Local Hazard Mitigation Plan (LHMP) that creates a blueprint for reducing the damage to the... See more

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Public Review Comments

District provided the draft LHMP for public to review and comment from November 1, 2021 to November 21, 2021 through District's website. The District received two public comments. The comments and correspondences are presented herein.

From:	Mollie Asay
To:	Parastou Hooshialsadat
Subject:	FW: public comment on SVCSD disaster plan
Date:	Wednesday, March 9, 2022 10:07:05 AM

From: Local Hazard Mitigation Plans
Sent: Monday, December 13, 2021 4:07 PM
To: Fred Allebach <fallebach@gmail.com>
Subject: RE: public comment on SVCSD disaster plan

Dear Mr. Allebach,

Thank you for taking the time to read and comment on the 2021 SVCSD LHMP. We have reviewed your comment relating to AB-686 and associated land use and housing requirements. SVCSD's LHMP addresses hazard mitigation actions related to existing sewer and recycled water systems, infrastructure and facilities. The District believes this disaster mitigation planning document promotes no actions that are inconsistent with the objectives of AB-686. The concerns you have raised may be more appropriately addressed to the City of Sonoma and the County of Sonoma as the entities responsible for land use decisions and planning. Thank you again for your time and input in helping the District update its Local Hazard Mitigation Plan. Please let us know if you have any questions and/or concerns regarding this response.

Sincerely,

The SVCSD LHMP Core Planning Team

From: Fred Allebach <fallebach@gmail.com>
Sent: Friday, November 5, 2021 5:09 PM
To: Local Hazard Mitigation Plans <LocalHazard.MitigationPlans@scwa.ca.gov>; Ann DuBay <Ann.DuBay@scwa.ca.gov>
Subject: public comment on SVCSD disaster plan

Fred Allebach 11/5/21 Vineburg, CA 95487

The SVCSD Hazard Mitigation Plan hopefully relates to and accounts for federal and state (AB-686) Affirmatively Furthering Fair Housing (AFFH) laws. AB 686 was signed into law in 2018.

To quote from the California Department of Housing and Community Development (HCD) on AFFH:

“Addressing disaster risk is not a justification for furthering segregation, and policies that seek to address this risk should include strategies that mitigate the risk of displacement and exclusion. In this HCD Housing Element AFFH analysis, jurisdictions should make note of potential impacts of disasters on protected classes and low-income residents, particularly low-income renter populations. Research has shown that low-income renter populations are disproportionately exposed to environmental hazards and that housing tenure is a telling determinant of social vulnerability to disasters.”

City and county UWMPs say there is enough water to support future development and Genral Plan build-out. It appears the SVCSD has capacity to treat more water and the only current hard limits are in wet season treatment plant discharge capacity and fixing up SDC leaking pipes .

Some local players in Sonoma are positioning drought, water supply, SVCSD system capacity, fire, flood and reaction to state housing laws as proxy reasons to limit city housing developments. Such restrictions mean the City and County might seek to limit housing inventory sites for potential low-income and protected classes (race, ethnic, citizenship, renter status). The City and Sonoma Valley would then become more segregated and exclusive. AB 686 prohibits this kind of burn-the-bridge-planning.

I suggest for SVCSD disaster planning that staff educate themselves on AB 686 and AFFH. This law is intended to apply to all agencies and departments and their impacts on AFFH even if these are not specifically in planning and housing.

Here's the take-home point: With clear and demonstrable inequity and segregation in Sonoma Valley, UWMP and Hazard Mitigation plans all need to take to heart that "addressing disaster risk is not a justification for furthering segregation." The community needs to conserve more water and manage wastewater infrastructure so as to include essential workers and protected classes. The law calls for this. Our community needs to figure out how to conserve and include at the same time not how to build more walls around what is already privileged.

The Bay Area is one of the most highly segregated areas in the U.S. Sonoma is the second whitest city in the county and in the top 20 whitest cities in the Bay Area. How do you spell segregation?

The City borders the unincorporated Springs, a contiguous area all in the SVCSD service area with clear census data that links structural poverty to Latino race and ethnicity.

I submit that using water, drought and disaster rationales that end up protecting existing property owners while limiting potential lower-income housing stakes in the community will violate AB 686. Cross-cutting, integrative policies and laws like AB 686 make agency responses like the SVCSD hazard mitigation into serious collective issues. I hope the SVCSD hazard mitigation plan will look into and account for AB 686, and make sure that the policy does not adversely affect protected classes.

See AFFH law here.

From: Parastou Hooshialsadat
To: mobilizesonoma@vom.com
Cc: Mollie Asay; Joan Hultberg; Nicole McGloin
Subject: Fwd: Comments re the draft Local Hazard Mitigation Plan for the Sonoma Valley
Date: Monday, January 3, 2022 2:50:00 PM
Attachments: PDF Comments re Local Hazard Mitigation Plan .pdf
image001.png

Good afternoon Mr. Gilroy,

Thank you for taking the time to read and comment on the 2021 SVCSD LHMP. We have reviewed your comments relating to storm generated overflows and the presence of liquid petroleum gas (LPG) stored at Sonoma Marin Area Rail Transit (SMART) yard south of WWTP. Please refer to the following responses:

1. There is an engineering levee between the WWTP and Shell Creek. The elevation at the top of the levee is 22 feet which is one foot higher than the 100-year flood elevation shown in FEMA maps. Mean sea level rise is estimated to be 0.92 feet by 2050 based on Sonoma Water Climate Adaptation Plan (CAP). Therefore, we do not anticipate any overflows from WWTP to Shell Creek and its adjacent marshland or the impact of sea level rise to WWTP in the near future. Furthermore, both the LHMP and CAP include mitigation actions to eliminate WWTP hydraulic constraints at the Slough outfall during wet weather flows due to climate change. A copy of the CAP is available at: https://www.sonomawater.org/media/PDF/Environment/Climate%20Adaptation%20Planning/SW_CAP_Final_October_2021.pdf

2. We added a paragraph to Section 4.3.2.3 in the LHMP and identified the presence of LPG at the SMART yard in Schellville as a potential hazard to the WWTP and other District-assets. We also contacted SMART and were notified that SMART has been actively reviewing the future storage of LPG. The District has been informed that the SMART Board of Directors discussed future LPG storage at their November 17, 2021 meeting and their plan is to remove LPG in the near future. We will continue tracking the development of this action moving forward.

Thank you again for your time and input in helping the District update its Local Hazard Mitigation Plan.

Sincerely,
Parastou

Parastou Hooshialsadat, PE
WA ENGINEER
Phone ~~707.547.1961~~ 707-206-2984
Fax 707.544.6123

404 Aviation Boulevard
Santa Rosa, CA 95403

sonomawater.org

From: Mobilize Sonoma <mobilizesonoma@vom.com>
Sent: Monday, November 8, 2021 10:01 AM
To: Local Hazard Mitigation Plans <LocalHazard.MitigationPlans@scwa.ca.gov>
Subject: Fwd: Comments re the draft Local Hazard Mitigation Plan for the Sonoma Valley

Attached for your consideration are our comments re the draft LHMP. Please contact us if you have questions or need more information.

Norman Gilroy, for Mobilize Sonoma.

MOBILIZE SONOMA

November 3, 2021

To: Sonoma Valley County Sanitation District

From: Norman Gilroy, on behalf of Mobilize Sonoma.

Re: Comments re the Sonoma Valley County Sanitation District's "Draft Local Hazard Mitigation Plan".

Thank you for the opportunity to comment on the Draft Local Hazard Mitigation Plan for the Sonoma Valley. We thank you for the very evident amount of effort and care that has gone into the preparation of the plan. It would appear that it is comprehensive, and that it covers many of the issues that concern the residents and businesses of the Sonoma Valley.

There are, however, two significant hazardous exposures that are not covered in the plan that should be addressed:

1. **Storm-generated overflows.**

   We are concerned that there is no mention of the potential hazardous impacts that could be imposed on the sensitive Baylands marshland environment south of the treatment plant should overflows at the plant reach it following a large storm event. Past events have shown that heavy storm inflow could overwhelm the capacity of the plant and, should that happen, untreated sewage and wastewater could escape into the surrounding creeks and waterways and potentially be carried all the way to San Francisco Bay.

   With climate change fueling an increasing frequency of large atmospheric-river events in Northern California, and with sea level rise further limiting the tidal capacity of downstream marshlands over time, the likelihood of a major flooding event in the vicinity of the plant seems to be a predictable hazard. It therefore seems appropriate that that hazard be considered and planned for in a hazard mitigation plan of the kind you are now considering.

   Just the storm and flooding events that were caused by an atmospheric river event coupled with high tides during the past few weeks underlines the need for this kind of overview and advanced planning in any hazard mitigation plan that looks to the future. .

2. **The potential for damage due to explosions at the nearby existing hazardous materials storage site.**

   While the hazards presented by wildfires are well covered in the draft plan, no mention seems to be made of the presence of an existing hazardous-materials rail-storage yard located on tracks owned by Sonoma Marin Area Rail Transit (SMART) only a short distance to the south from the plant at the intersection of 8th Street East and Hwy. 121.

The omission is significant because:

a) the yard is frequently used in winter for the storage of up to 5 million gallons of highly explosive liquid petroleum gas (LPG) at any one time, and

b) the waste-water treatment plant is well within the blast zone and evacuation zone of a potential explosion and fire, and it could be heavily damaged should an explosion occur at the northern end of the storage yard.

This concern is also relevant to the first point mentioned in this letter, in that an explosion and "bleve" (boiling liquid expanding vapor explosion) caused by one or more ruptured tankers could create a blast and fire that we are concerned could completely disable the District's treatment plant. In such an event, the incoming flow of sewage and storm-water from the stated 40,000 people in the service area would continue unabated, potentially resulting in significant overflows to the surrounding creeks and marshlands of the Baylands and, under certain circumstances, even to San Francisco Bay.

The predictable "solution" in such an event might be to evacuate the entire upstream population that depends on the plant for its treatment facilities, but that would be both costly and a logistical nightmare for all concerned. Closure under such circumstances is certainly a hazard to be avoided.

Present conditions at the yard are not conducive to safety, however. It lacks security fencing to prevent vandalism or domestic terrorism. Its storage tracks are also founded on unconsolidated marshland soils which are susceptible to liquefaction in an earthquake or slumping in the flooding that occurs almost every year during the periods of heavy rain which occur in winter – the time when LPG storage is greatest at the yard. And the 160 tankers that the yard often contains are closely packed together, creating the potential for a chain reaction if a single tanker rupture occurs. All are conditions that could lead to an overturning or a derailment, the largest cause of tanker-related explosions in North America in the last several years.

Storage of large amounts of LPG began at the yard in 2016, and there is presently no indication that it will not continue long into the future. So it would seem that the presence of the yard, and the hazards that it presents, should be mentioned in the plan, and that decisions should be made in the plan for appropriate mitigations - including providing support for the local effort to encourage discontinuance of the storage of LPG as SMART takes over responsibility for freight services at that location.

Thank you for the opportunity to comment on the draft plan. We are available to provide additional information should that be needed.

Norman Gilroy, on behalf of Mobilize Sonoma.

Contact us at: Mobilize Sonoma, PO Box 552, Vineburg CA 95487.
Email: Mobilizesonoma@vom.com Web: www.mobilizesonoma.org

Appendix C

(Placeholder)

Board Resolution Adopting the 2021 SVCSD Local Hazard Mitigation Plan

Appendix D

- Technical Review Team Meetings
    1. Technical Review Team Meeting #1 – Kickoff Meeting
    2. Technical Review Team Meeting #2 – Update Meeting
    3. Technical Review Team Meeting #3 – Final Meeting

- Consultant Coordination Meetings
    1. 2/11/2021 Meeting
    2. 3/19/2021 Meeting
    3. 4/2/2021 Meeting
    4. 4/16/2021 Meeting
    5. 4/30/2021 Meeting
    6. 5/14/2021 Meeting
    7. 5/28/2021 Meeting
    8. 6/11/2021 Meeting
    9. 7/9/2021 Meeting
    10. 7/23/2021 Meeting
    11. 7/29/2021 Meeting
    12. 8/6/2021 Meeting

Technical Review Team Meetings

1. Technical Review Team Meeting #1 – Kickoff Meeting
    a. Agenda
    b. Participant List

2. Technical Review Team Meeting #2 – Update Meeting
    a. Agenda
    b. Participant List

3. Technical Review Team Meeting #3 – Final Meeting
    a. Agenda
    b. Participant List

SVCSD LHMP Update 2021

Technical Review Team
Kickoff Meeting

January 6, 2021

Sonoma Water sonomawater.org

Agenda

- Introduction
- What is the SVCSD LHMP
  - History
  - Purpose and Contents
- Review 2016 SVCSD LHMP
  - Hazards Identification
  - Mitigation Goals, Objectives, and Actions
  - Plan Implementation
- 2021 LHMP Update
- 2021 LHMP Timeline
- Next Steps

Sonoma Water

01.06.2021 Technical Review Team Meeting #1 (Kickoff Meeting)
Participation List

Name (Original Name)	Join Time	Leave Time	Duration (Minutes)
Devin Chatoian	01/06/2021 09:23:53 AM	01/06/2021 10:42:52 AM	79
Parastou Hooshialsadat	01/06/2021 09:30:38 AM	01/06/2021 10:42:52 AM	73
Mollie Asay	01/06/2021 09:46:42 AM	01/06/2021 10:42:53 AM	57
Heather Kelley (Draft Tech)	01/06/2021 09:58:37 AM	01/06/2021 10:34:56 AM	37
Andrea Rodriguez	01/06/2021 09:58:40 AM	01/06/2021 10:34:57 AM	37
Carlos Diaz	01/06/2021 10:00:30 AM	01/06/2021 10:34:55 AM	35
Garett Walker	01/06/2021 10:01:27 AM	01/06/2021 10:32:00 AM	31
Mike West	01/06/2021 10:01:41 AM	01/06/2021 10:34:58 AM	34
Barry Dugan	01/06/2021 10:02:20 AM	01/06/2021 10:35:00 AM	33
Kent Gylfe	01/06/2021 10:04:53 AM	01/06/2021 10:34:58 AM	31
Ellen Simm	01/06/2021 10:05:03 AM	01/06/2021 10:34:51 AM	30
Dale Roberts	01/06/2021 10:05:05 AM	01/06/2021 10:34:51 AM	30
Kevin Booker	01/06/2021 10:05:41 AM	01/06/2021 10:30:13 AM	25
Jens Salzgeber (he\his)	01/06/2021 10:10:36 AM	01/06/2021 10:34:58 AM	25
Scott Carter	01/06/2021 10:29:55 AM	01/06/2021 10:34:58 AM	6

SVCSD LHMP Update 2021

Technical Review Team and InfraTerra

February 22, 2021

sonomawater.org

Agenda

- Introduction
- Introduce Consultant to TRT
- Brief Overview of Vulnerabilities Identified in 2016 SVCSD LHMP
- Review 2016 Mitigation Goals, Objectives and Actions
- Update Mitigation Actions for 2021 SVCSD LHMP
- Next Steps

Sonoma Water

02.22.2021 Technical Review Team Meeting #2
Participation List

Meeting ID	Start Time	End Time	Duration (Minutes)
Name (Original Name)	Join Time	Leave Time	Duration (Minutes)
Mollie Asay	02/22/2021 08:45:15 AM	02/22/2021 10:01:37 AM	77
Parastou Hooshialsadat	02/22/2021 08:45:34 AM	02/22/2021 10:01:37 AM	77
Barry Dugan	02/22/2021 08:58:37 AM	02/22/2021 09:29:16 AM	31
Heather Kelley (Draft Tech)	02/22/2021 08:58:40 AM	02/22/2021 10:01:37 AM	63
Mitchell Southard	02/22/2021 08:58:42 AM	02/22/2021 10:01:33 AM	63
Jenny Taing	02/22/2021 08:59:18 AM	02/22/2021 10:01:37 AM	63
Mike West	02/22/2021 08:59:54 AM	02/22/2021 10:01:38 AM	62
David Royall	02/22/2021 08:59:55 AM	02/22/2021 10:01:37 AM	62
Dale Roberts (Energy Resources)	02/22/2021 09:00:12 AM	02/22/2021 10:01:38 AM	62
Kent Gylfe	02/22/2021 09:01:17 AM	02/22/2021 10:01:37 AM	61
Garett Walker	02/22/2021 09:01:38 AM	02/22/2021 10:00:37 AM	59
Joan	02/22/2021 09:01:38 AM	02/22/2021 10:01:37 AM	60
Andrea Rodriguez	02/22/2021 09:01:41 AM	02/22/2021 10:01:38 AM	60
Scott Carter	02/22/2021 09:03:19 AM	02/22/2021 10:01:35 AM	59
Steven Hancock	02/22/2021 09:04:13 AM	02/22/2021 10:01:31 AM	58
Ahmed Nisar	02/22/2021 09:12:26 AM	02/22/2021 10:01:37 AM	50
Carlos Diaz	02/22/2021 09:21:10 AM	02/22/2021 10:01:37 AM	41
Barry Dugan	02/22/2021 09:30:33 AM	02/22/2021 10:01:37 AM	32

SVCSD LHMP Update 2021

Technical Review Team and InfraTerra

July 7, 2021

Sonoma Water sonomawater.org

Agenda

- Introduction
  - What’s happened since last meeting
- InfraTerra Presentation
  - Vulnerabilities
  - Risks
  - Mitigation Actions
- Discuss 2021 Mitigation Actions
- Next Steps

Sonoma Water

07.07.2021 Technical Review Team Meeting #3
Participation List

Name (Original Name)	Join Time	Leave Time	Duration (Minutes)
Mollie Asay	07/07/2021 03:13:16 PM	07/07/2021 04:35:43 PM	83
Parastou Hooshialsadat	07/07/2021 03:18:15 PM	07/07/2021 04:35:43 PM	78
Devin Chatoian	07/07/2021 03:28:10 PM	07/07/2021 04:35:44 PM	68
Vladimir Calugaru	07/07/2021 03:28:43 PM	07/07/2021 04:35:43 PM	67
Jenny Taing	07/07/2021 03:29:14 PM	07/07/2021 04:35:43 PM	67
Andrea Rodriguez	07/07/2021 03:29:29 PM	07/07/2021 04:17:39 PM	49
Ahmed Nisar	07/07/2021 03:29:37 PM	07/07/2021 04:35:44 PM	67
Jenny Taing	07/07/2021 03:29:37 PM	07/07/2021 04:35:43 PM	67
Scott Carter	07/07/2021 03:30:34 PM	07/07/2021 04:35:44 PM	66
David Royall (Sonoma Water Maintenance)	07/07/2021 03:31:14 PM	07/07/2021 04:35:41 PM	65
Dale Roberts (Energy Resources)	07/07/2021 03:31:27 PM	07/07/2021 04:35:42 PM	65
Steve Girard	07/07/2021 03:31:52 PM	07/07/2021 04:35:44 PM	64
Heather Kelley (Draft Tech)	07/07/2021 03:31:57 PM	07/07/2021 04:35:40 PM	64
Draft Tech	07/07/2021 03:32:15 PM	07/07/2021 04:35:35 PM	64
Kent Gylfe	07/07/2021 03:32:37 PM	07/07/2021 04:35:43 PM	64
Steven Hancock	07/07/2021 03:33:22 PM	07/07/2021 04:35:41 PM	63
Mike West	07/07/2021 03:35:27 PM	07/07/2021 04:35:43 PM	61
Carlos Diaz	07/07/2021 03:35:43 PM	07/07/2021 04:35:43 PM	60
Ellen Simm	07/07/2021 03:35:54 PM	07/07/2021 04:35:45 PM	60

Consultant Coordination Meetings

1. 3/19/2021 Meeting
    a. Participant List
    b. Presentation

2. 4/2/2021 Meeting
    a. Participant List
    b. Presentation

3. 4/16/2021 Meeting
    a. Participant List
    b. Presentation

4. 4/30/2021 Meeting
    a. Participant List
    b. Presentation

5. 5/14/2021 Meeting
    a. Participant List
    b. Presentation

6. 5/28/2021 Meeting
    a. Participant List
    b. Presentation

7. 6/11/2021 Meeting
    a. Participant List

8. 7/9/2021 Meeting
    b. Participant List

9. 7/23/2021 Meeting
    a. Participant List

10. 7/29/2021 Meeting
    a. Participant List

11. 8/6/2021 Meeting
    a. Participant List

3-19-2021

Attendees

SCWA

- Parastou Hooshialsadat

InfraTerra

- Jenny Taing
- Ahmed Nisar

MAR
19

SVCSD Bi-Weekly Call

9:00 AM - 25 min | ID: 782846717

Attendees

Diagnostics

Attendee	Join & leave times	Location
PA Parastou Hooshialsadat parastou.hooshialsadat@scwa.ca.gov	9:00 AM - 9:25 AM	Santa Rosa
AH Ahmed Nisar anisar@infraterra.com	9:01 AM - 9:25 AM	Walnut Creek
JE Jenny Taing jtaing@infraterra.com	9:00 AM - 9:25 AM	Oakland

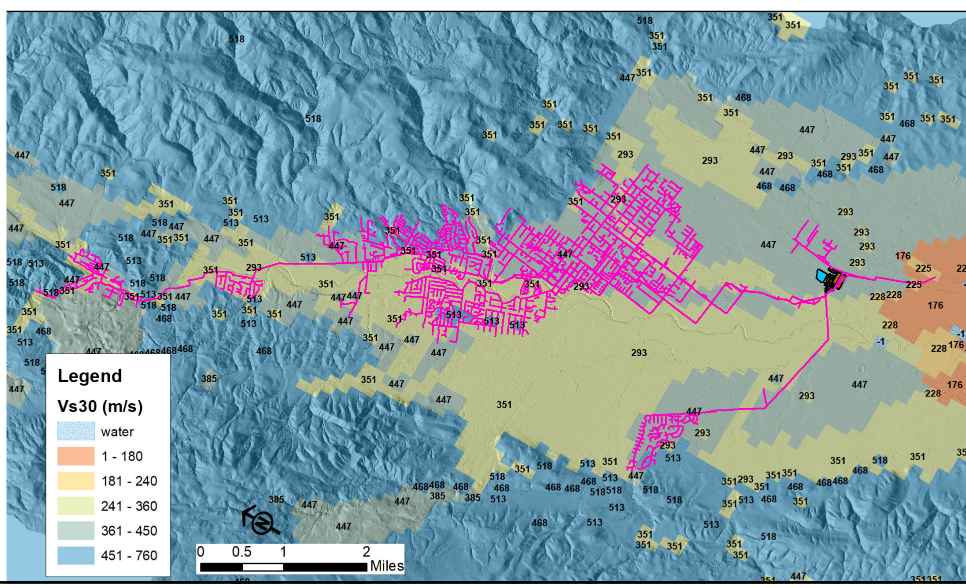
PRELIMINARY

SVCSD Bi-Weekly

March 19, 2021

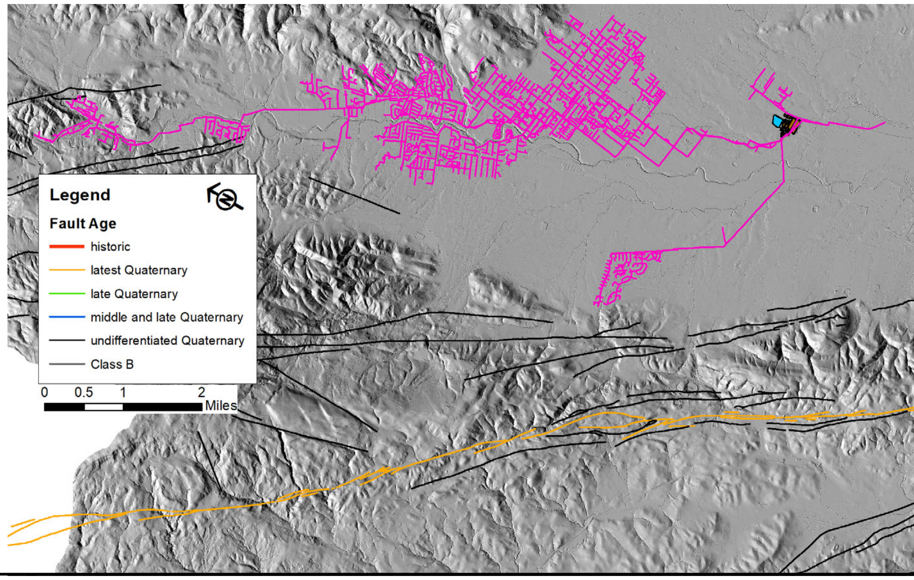
PRELIMINARY

Vs30 (Thompson et al., 2018)



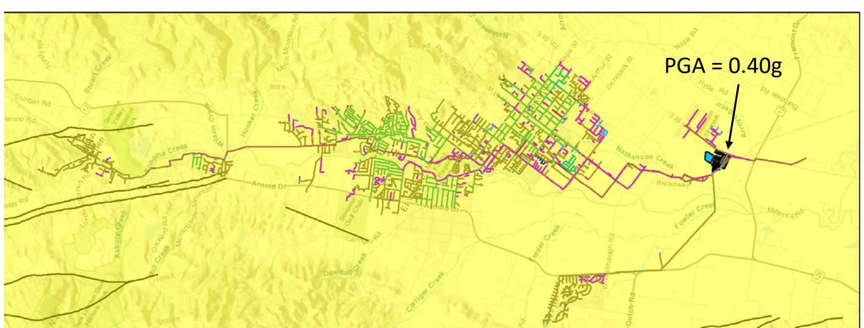
PRELIMINARY

Quaternary Faults

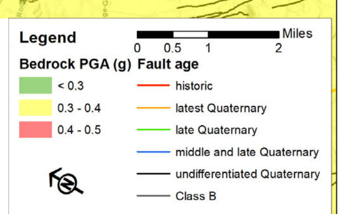


PRELIMINARY

Ground Shaking
475 Year Return Period Bedrock PGA

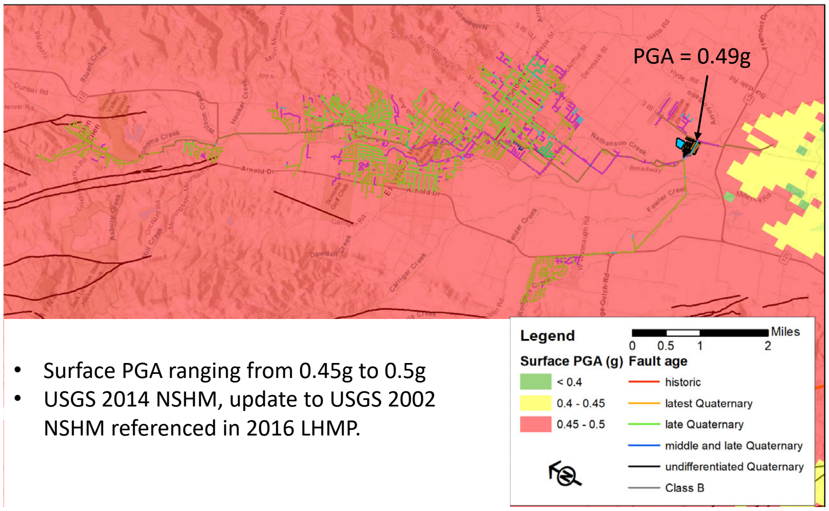


- Bedrock PGA ranging from 0.3g to 0.4g
- USGS 2014 NSHM, update to USGS 2002 NSHM referenced in 2016 LHMP.
- 2016 LHMP shows 0.45g for Site Class B at the WWTP



PRELIMINARY

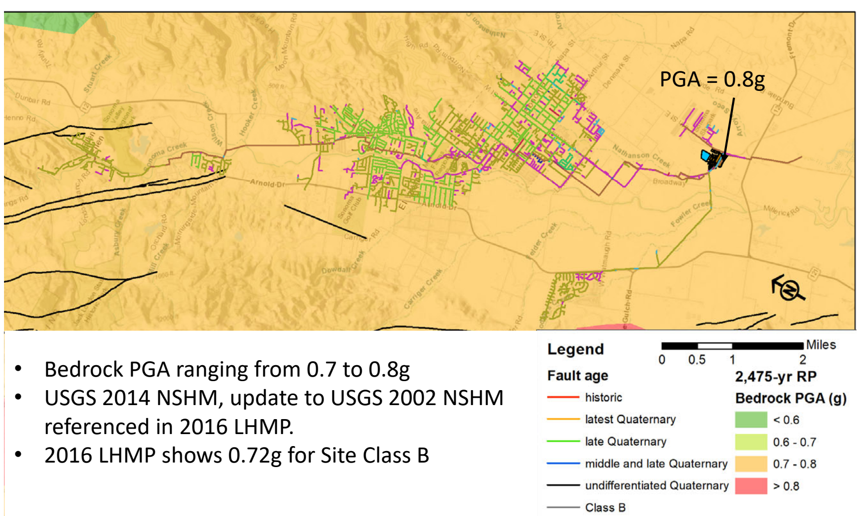
Ground Shaking
475 Year Return Period Surface PGA



- Surface PGA ranging from 0.45g to 0.5g
- USGS 2014 NSHM, update to USGS 2002 NSHM referenced in 2016 LHMP.

PRELIMINARY

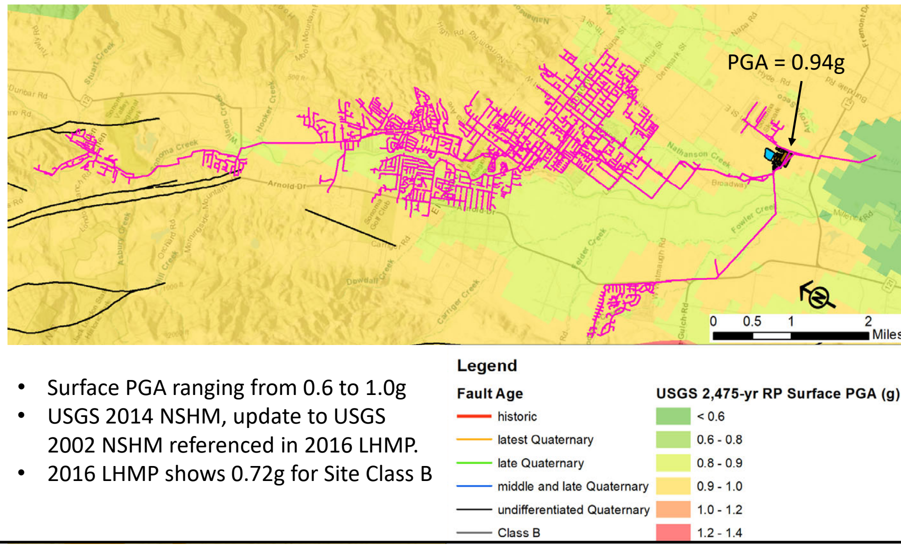
Ground Shaking
2,475 Year Return Period Bedrock PGA



- Bedrock PGA ranging from 0.7 to 0.8g
- USGS 2014 NSHM, update to USGS 2002 NSHM referenced in 2016 LHMP.
- 2016 LHMP shows 0.72g for Site Class B

PRELIMINARY

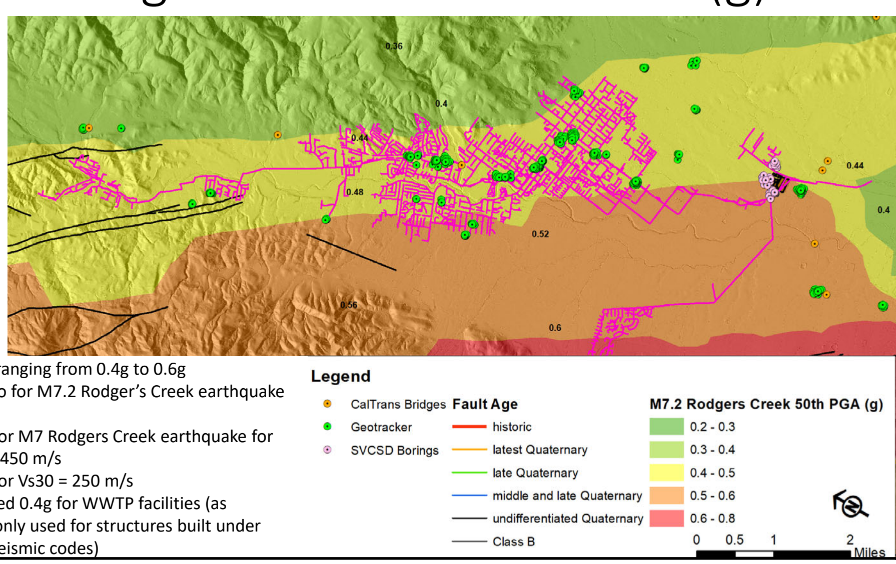
Ground Shaking
2,475 Year Return Period Surface PGA



- Surface PGA ranging from 0.6 to 1.0g
- USGS 2014 NSHM, update to USGS 2002 NSHM referenced in 2016 LHMP.
- 2016 LHMP shows 0.72g for Site Class B

PRELIMINARY

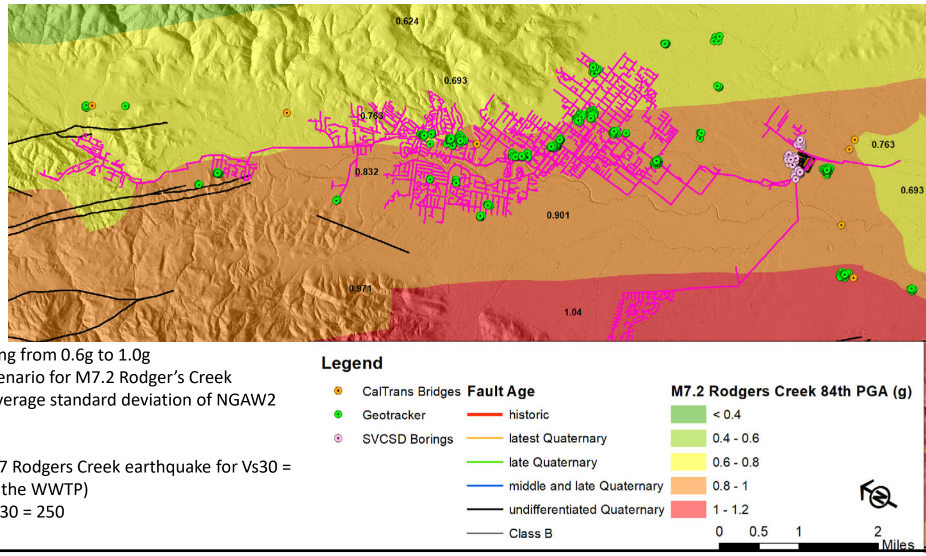
Ground Shaking
M7.2 Rodgers Creek Median PGA (g)



- Surface PGA ranging from 0.4g to 0.6g
- USGS scenario for M7.2 Rodger's Creek earthquake
- 2016 LHMP:
  - 0.42g for M7 Rodgers Creek earthquake for Vs30 = 450 m/s
  - 0.36g for Vs30 = 250 m/s
  - Assumed 0.4g for WWTP facilities (as commonly used for structures built under older seismic codes)

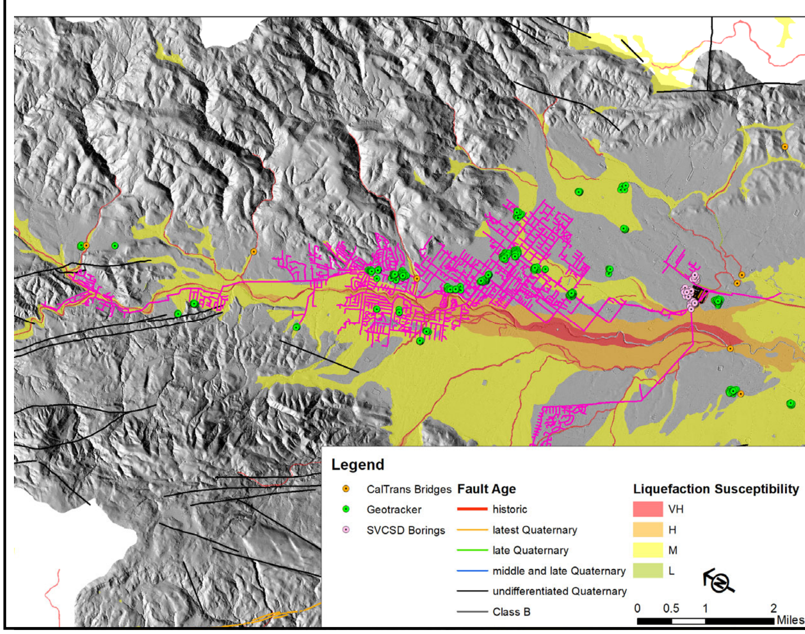
PRELIMINARY

Ground Shaking
M7.2 Rodgers Creek 84th Percentile PGA (g)



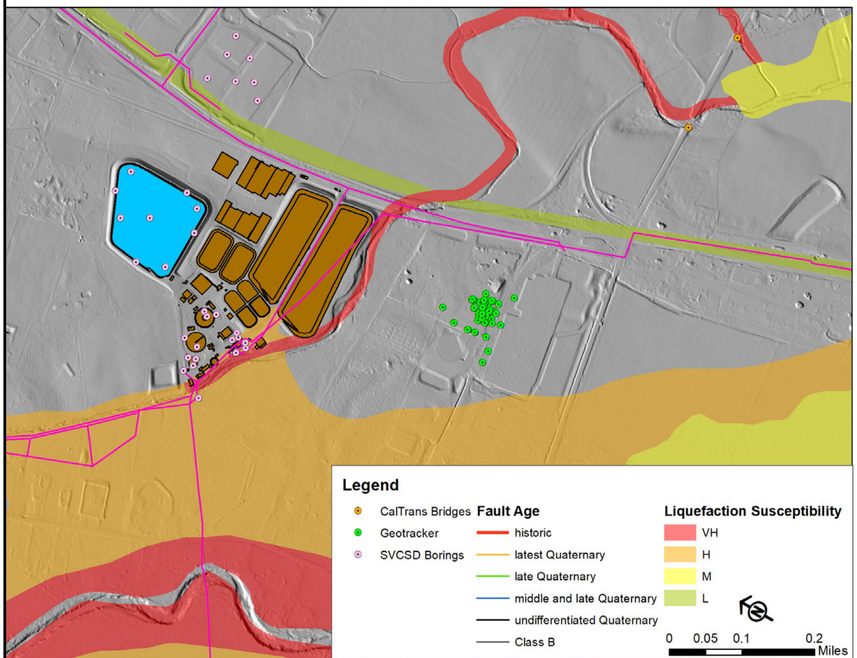
- Surface PGA ranging from 0.6g to 1.0g
- Based on USGS scenario for M7.2 Rodger's Creek earthquake and average standard deviation of NGAW2 models
- 2016 LHMP
  - 0.74g for M7 Rodgers Creek earthquake for Vs30 = 450 m/s (at the WWTP)
  - 0.56g for Vs30 = 250

PRELIMINARY



- High resolution 1m DEM (2016)
- Regional liquefaction mapping by Witter et al., 2006
- Potential borings from Geotracker and CalTrans bridge locations

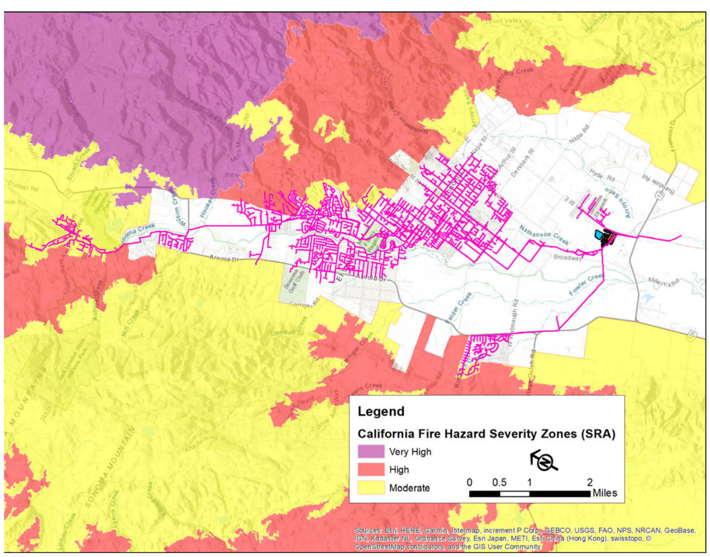
PRELIMINARY



- High resolution 1m DEM (2016)
- Regional liquefaction mapping by Witter et al., 2006
- SVCSD borings show primarily clayey/silty deposits at the WWTP

PRELIMINARY

Fire Hazard



PRELIMINARY

Items Discussed

- Recycled water pipeline GIS
- Likely no set of drawings for the WWTP
- Currently working on project for clarifiers
  - Uploaded by Parastou
- Master Planning
  - No future planning documents
  - Look at system and see if there is anywhere that needs an extra look

4-02-2021

Attendees

SCWA

- Parastou Hooshialsadat

InfraTerra

- Jenny Taing
- Ahmed Nisar

APR
2

SVCSD Bi-Weekly Call

8:59 AM - 21 min | ID: 782846717

Attendees

Diagnostics

Attendee	Join & leave times	Location
JE Jenny Taing jtaing@infraterra.com	8:59 AM - 9:20 AM	Oakland
AH Ahmed Nisar anisar@infraterra.com	9:00 AM - 9:20 AM	Walnut Creek
PA Parastou Hooshilasadat parastou.hooshialsadat@scwa.ca.gov	9:00 AM - 9:20 AM	Santa Rosa

PRELIMINARY

SVCSD Bi-Weekly

April 2, 2021

PRELIMINARY

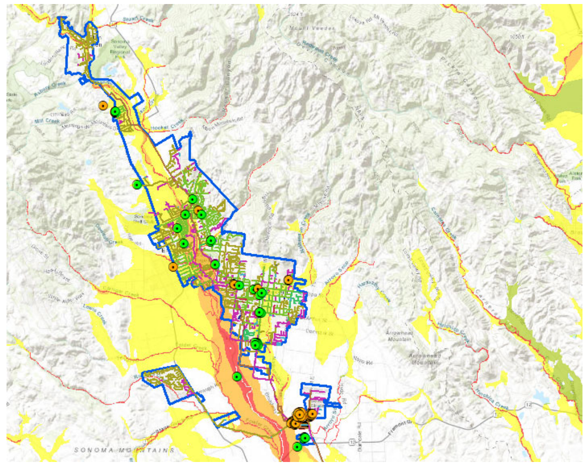
Summary of Work Performed

- Downloaded and reviewed Geotracker and Caltrans borings
  - In general, they are consistent with the regional mapping. There are select locations where limited borings located in high liquefaction zones show generally dense subsurface (i.e. lower liquefaction hazard). To be evaluated further.
- High level review of recycled water pipeline drawings
- Reviewed 2014 Napa EQ

PRELIMINARY

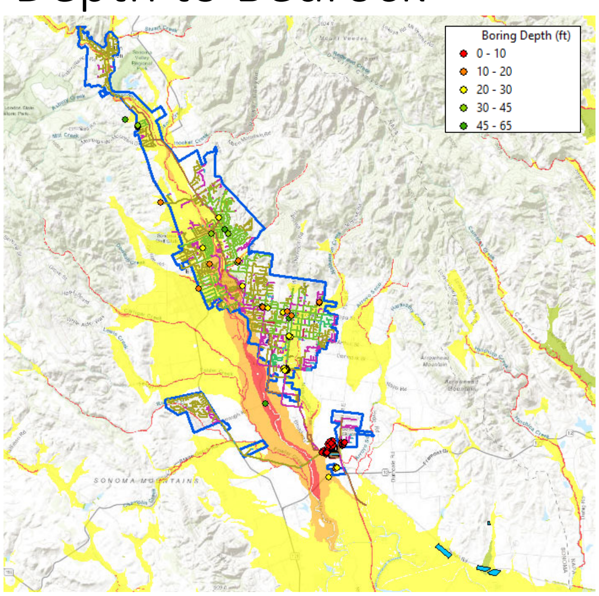
Downloaded Borings from Geotracker and Caltrans

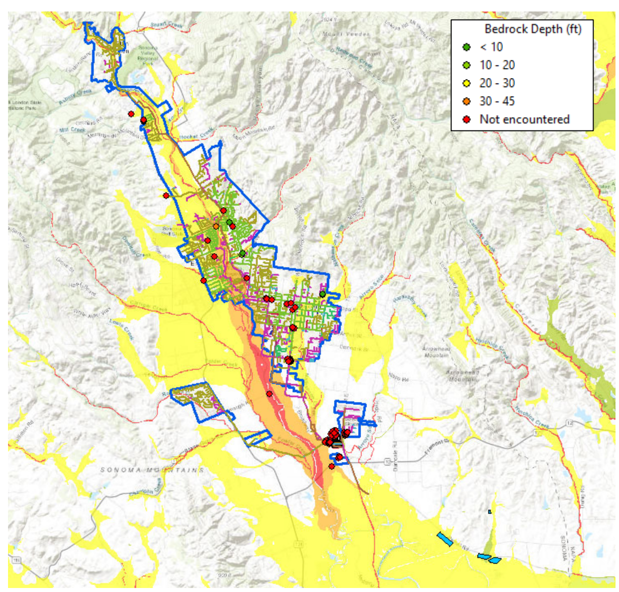
- Green dots indicate soil density information available
- Orange dots indicate only lithology (classification) information available
- ~50 new borings downloaded and reviewed
- Borings are generally shallow (<30 ft)



PRELIMINARY

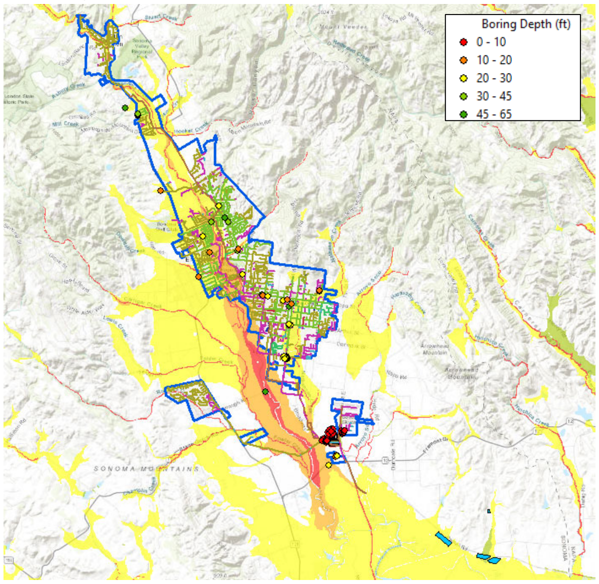
Depth to Bedrock

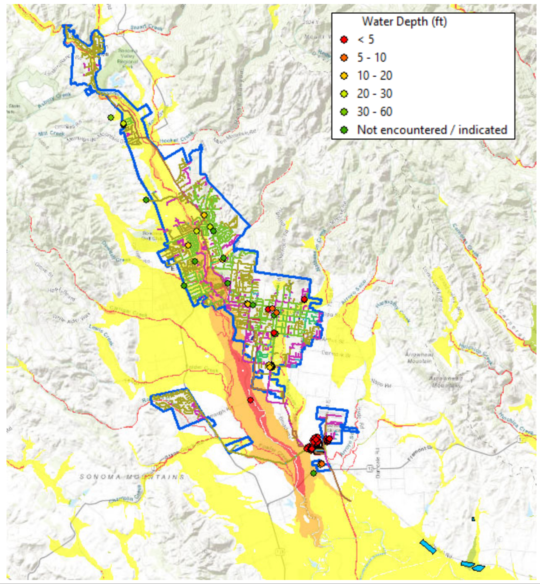




PRELIMINARY

Depth to Water

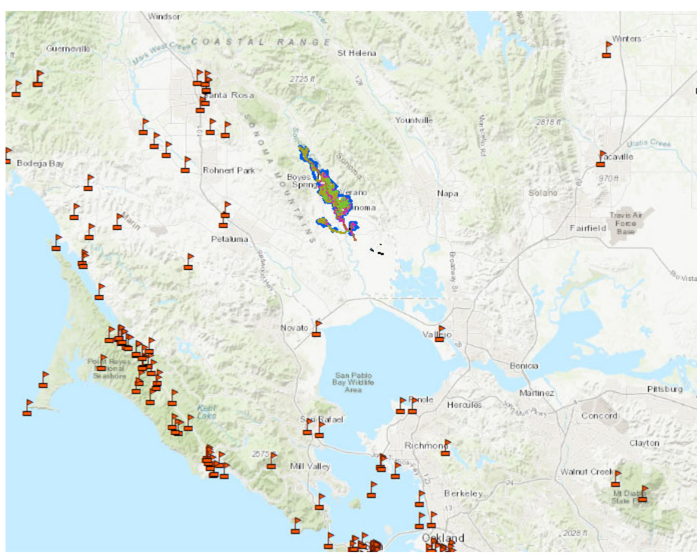




PRELIMINARY

Historical Liquefaction in the Bay Area

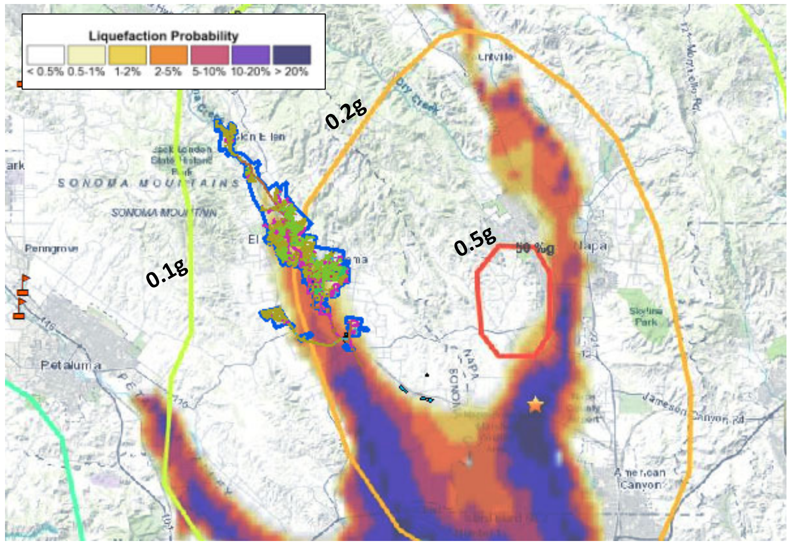
- Compiled by Knudsen et al., 2000



PRELIMINARY

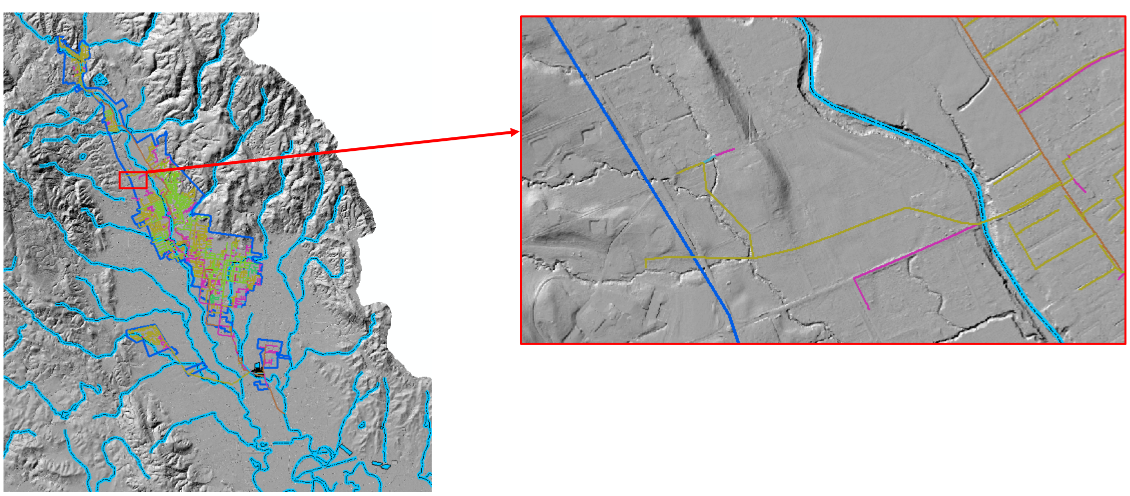
2014 M6.0 South Napa Earthquake

- PGAs from 0.1g to 0.3g through SVCSD system
- 2016 LHMP indicates no damage to WWTP
  - Pipes? Other facilities?



PRELIMINARY

Review Stream Crossings



PRELIMINARY

Items Discussed

- SVCSD has an internal weekly meeting on Wednesdays.
- Natural hazards
  - Sea level rise impacts?
  - Hydrostatic pressure on pipes?
  - Impact of SLC may be more impact for coastal rather than inland
- Climate change and lack of rainfall?
  - Since the system is only wastewater, it should not affect the system. This should be checked with operations.
- Need invoice
- Draft data review

4-16-2021

Attendees

SCWA
- Parastou Hooshialsadat
- Mollie Asay
- Devin Chatoian

InfraTerra
- Jenny Taing
- Ahmed Nisar
- Vladimir Calugaru

APR
16

SVCSD Bi-Weekly Call

8:59 AM - 52 min | ID: 782846717

Attendees

Diagnostics

Attendee	Join & leave times	Location
JE Jenny Taing jtaing@infraterra.com	9:00 AM - 9:51 AM	Oakland
VL Vladimir Calugaru vcalugaru@infraterra.com	9:00 AM - 9:51 AM	San Rafael
MO Mollie Asay	9:00 AM - 9:51 AM	Windsor
DE Devin Chatoian devin.chatoian@scwa.ca.gov	9:00 AM - 9:51 AM	Sunnyvale
PA Parastou Hooshilasadat parastou.hooshialsadat@scwa.ca.gov	9:00 AM - 9:51 AM	Santa Rosa
AH Ahmed Nisar anisar@infraterra.com	9:01 AM - 9:51 AM	Walnut Creek

PRELIMINARY

SVCSD Bi-Weekly

April 16, 2021

PRELIMINARY

Summary of Work Performed

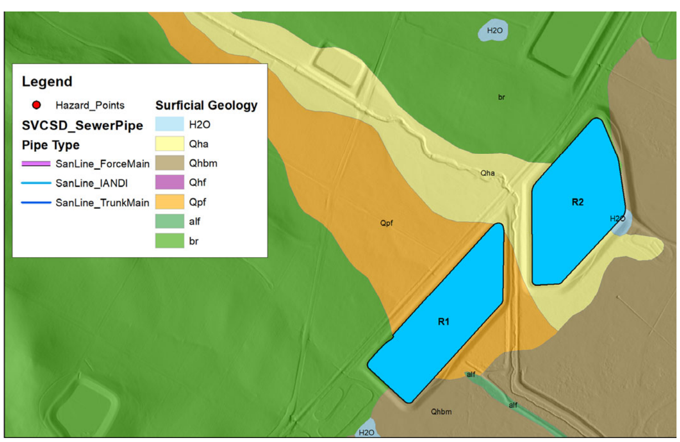
- Detail review and preliminary assessment of reservoirs
- Preliminary assessment of collection system
- Preliminary assessment of wildfire, climate change, and flooding hazards

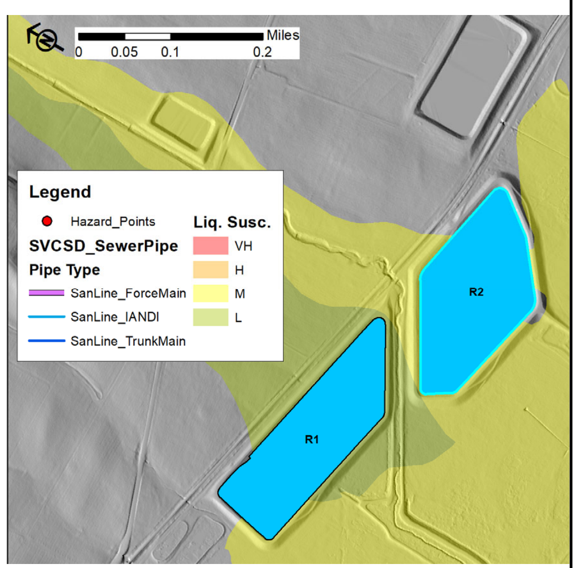
PRELIMINARY

Reservoirs

PRELIMINARY

R1 Geology and Liquefaction





- Minor bay mud

Emergency repair in late 90s
What was the extent of DSOD inspection in 2013?

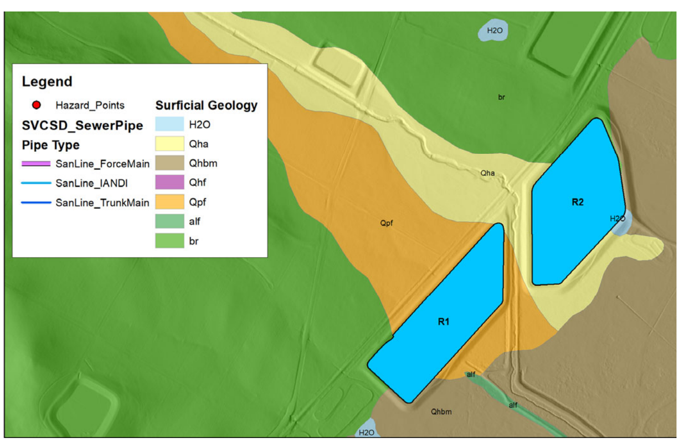
PRELIMINARY

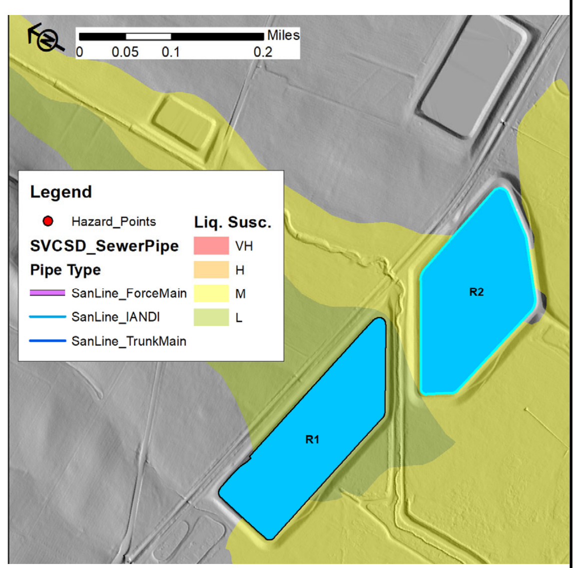
R1

Parameter	Value
Geology (Primary)	Qpf Latest Pleistocene alluvial fan deposits
Geology (Secondary)	Qhbm Artificial fill over bay mud
Liquefaction Hazard	L - M
Vs30	447
Site Class	C
M7.2 Rodgers Creek Median Surface PGA (g)	0.44
M7.2 Rodgers Creek Median +1Sigma Surface PGA (g)	0.76
475-yr Bedrock PGA (g)	0.48
2,475-yr Surface PGA (g)	0.98

PRELIMINARY

R2 Geology and Liquefaction





- Mostly Qha (loose to medium dense) and bedrock

Emergency repair in late 90s

What was the extent of DSOD inspection in 2013?

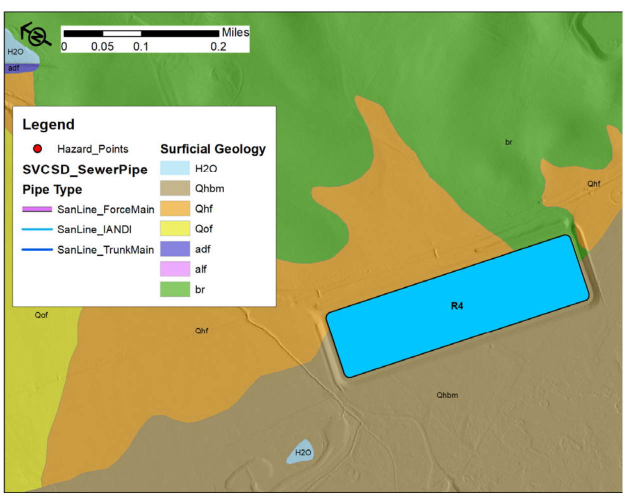
PRELIMINARY

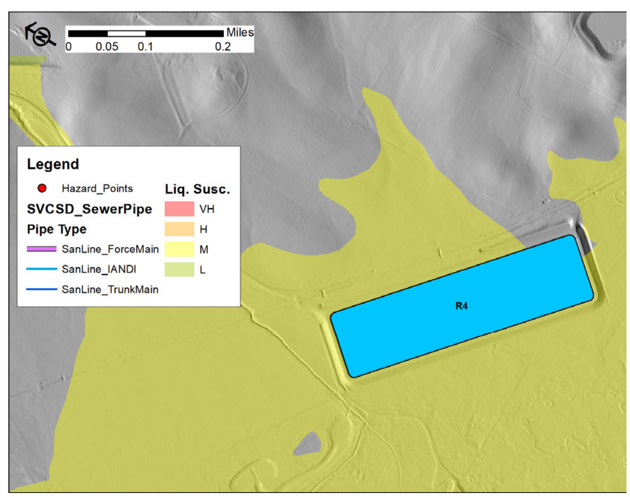
R2

Parameter	Value
Geology (Primary)	Qha Latest Holocene alluvial deposits
Geology (Secondary)	bedrock
Liquefaction Hazard	M
Vs30	228
Site Class	D
M7.2 Rodgers Creek Median Surface PGA (g)	0.4
M7.2 Rodgers Creek Median +1Sigma Surface PGA (g)	0.69
475-yr Bedrock PGA (g)	0.48
2,475-yr Surface PGA (g)	0.86

PRELIMINARY

R4 Geology and Liquefaction





Half located on Bay Mud

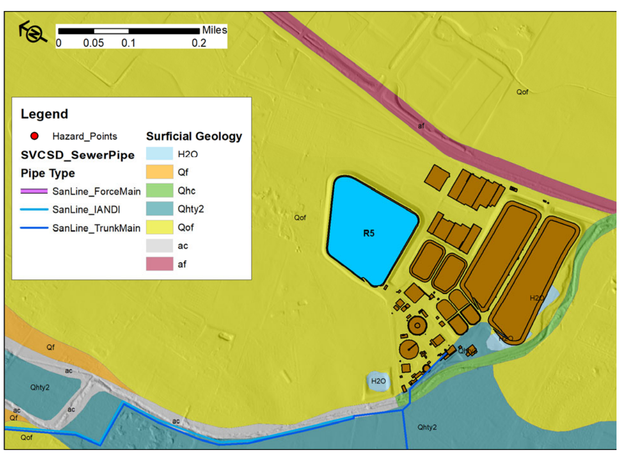
PRELIMINARY

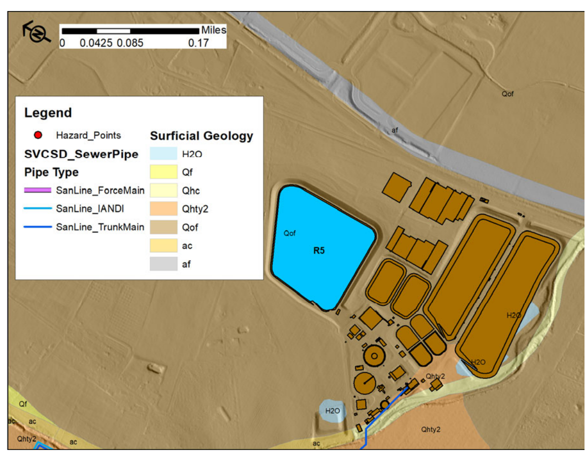
R4

Parameter	Value
Geology	**Qhbm** Holocene San Francisco Bay Mud **Qhf** Holocene alluvial fan deposits
Liquefaction Hazard	M
Vs30	176
Site Class	E
M7.2 Rodgers Creek Median Surface PGA (g)	0.44 - 0.48
M7.2 Rodgers Creek Median +1Sigma Surface PGA (g)	0.76 - 0.83
475-yr Bedrock PGA (g)	0.49
2,475-yr Surface PGA (g)	0.79

PRELIMINARY

R5 Geology and Liquefaction





PRELIMINARY

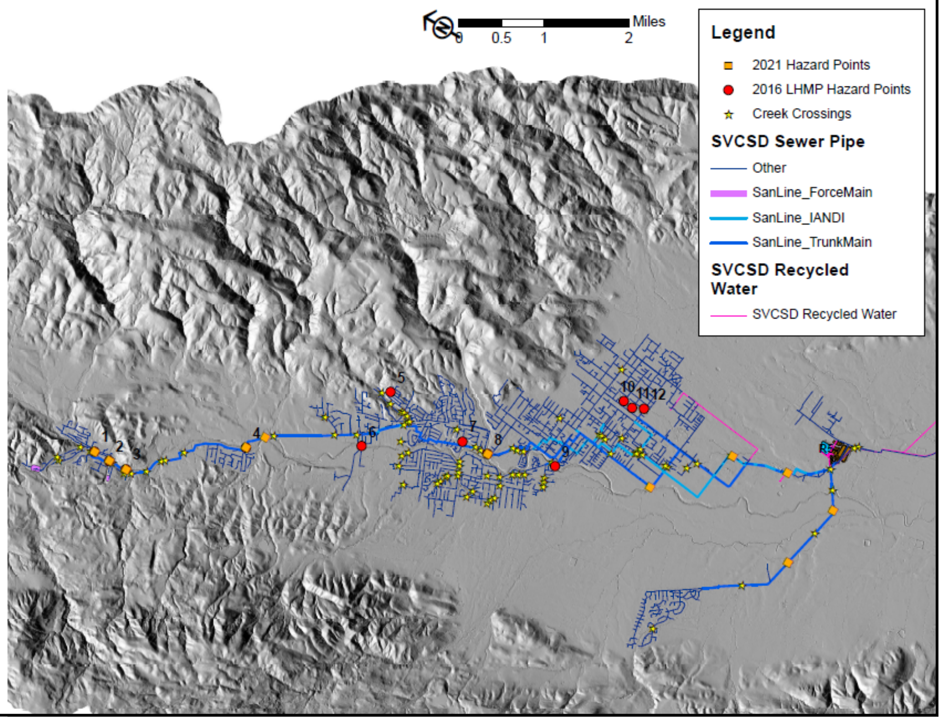
R5

Parameter	Value
Geology	Qof Early to late Pleistocene alluvial fan deposits
Liquefaction Hazard	VL
Vs30	447
Site Class	C
M7.2 Rodgers Creek Median Surface PGA (g)	0.48 - 0.52
M7.2 Rodgers Creek Median +1Sigma Surface PGA (g)	0.83 - 0.9
475-yr Bedrock PGA (g)	0.49
2,475-yr Surface PGA (g)	1.03

PRELIMINARY

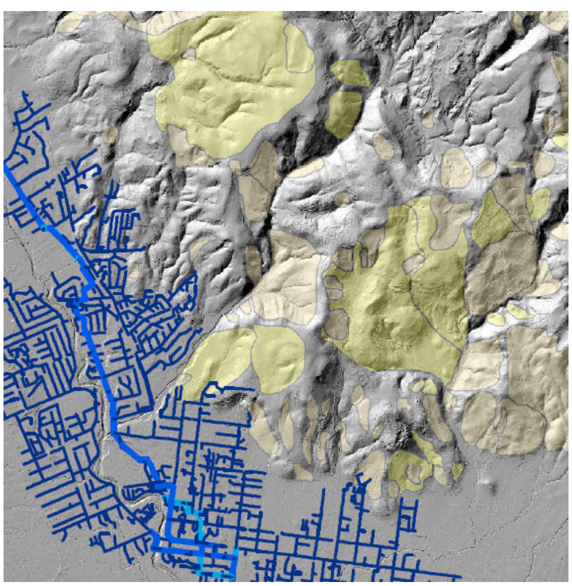
Hazards

Hazard Points



Mapped Landslides (CGS)

PRELIMINARY



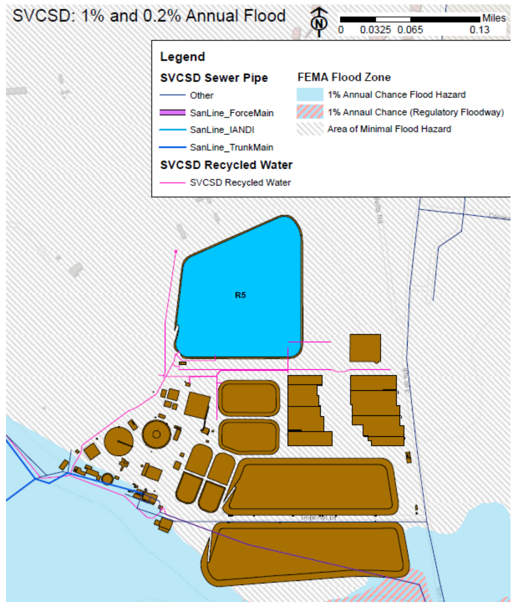
Mapped Landslide (CGS)

- Confidence level not documented
- definite (100% confident it is a landslide; numerous geomorphic features indicating landslide origin; historic, recent or active movement)
- probable (75% confident it is a landslide; one or two geomorphic features suggesting a landslide origin; features recognizable but subdued by erosion)
- questionable (50% confident it is a landslide; a geomorphic feature or features that could be explained by other processes; cannot be sure it is a landslide without detailed site investigation)

PRELIMINARY

Flooding

- Headworks,
- Influent-effluent pump station,
- generator room and emergency generator,
- sludge thickener,
- sludge dewatering,
- septic discharge



- Flooding in greater may result in increased erosion which may damage shallow pipe near crossings. Generally how deep is collection system?

PRELIMINARY

Other

- Wildfire
  - PVC piping above ground or near surface may be damaged by heat
    - Can we quantify a depth of cover that would be unaffected by wildfire heat?
  - Power disruption (from fires as well as likely increasing public safety power shutoff (PSPS) events)
- Climate change
  - Sea level rise leading to increased inundation and flooding, changes in groundwater levels

PRELIMINARY

Next Steps

- Seismic slope stability for reservoirs
  - R1, R2, and R4 levee materials. Same as R5?
- Detail structural site visit
- Geologic/geotechnical reconnaissance at hazard points
- Quantify PVC vulnerability to wildfire if possible
- Further review of projected groundwater rise in region

4-30-2021

Attendees

SCWA
- Parastou Hooshialsadat

InfraTerra
- Jenny Taing
- Ahmed Nisar
- Vladimir Calugaru

APR
30

SVCSD Bi-Weekly Call

8:59 AM - 42 min | ID: 782846717

Attendees

Diagnostics

Attendee	Join & leave times	Location
AH Ahmed Nisar anisar@infraterra.com	9:02 AM - 9:41 AM	Walnut Creek
VL Vladimir Calugaru vladimir.calugaru@gmail.com	8:59 AM - 9:41 AM	San Rafael
JE Jenny Taing jtaing@infraterra.com	8:59 AM - 9:41 AM	Oakland
PA Parastou Hooshilasadat parastou.hooshialsadat@scwa.ca.gov	9:02 AM - 9:41 AM	Santa Rosa

PRELIMINARY

SVCSD Bi-Weekly

April 30, 2021

PRELIMINARY

Summary of Work Performed

- Preliminary analysis of R1
- Profiles for R2, R4, R5
- Additional review of structures at WWTP and plan for site visit
- Preliminary analysis of collection system

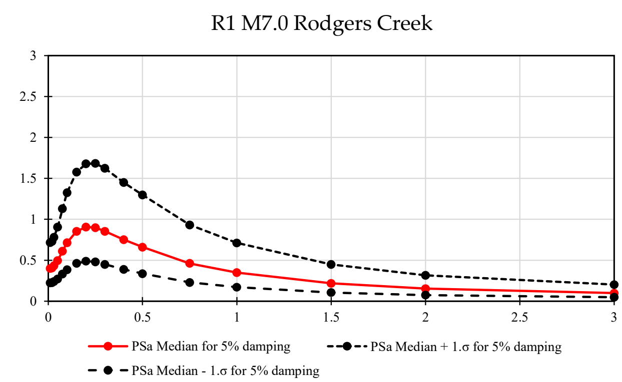
PRELIMINARY

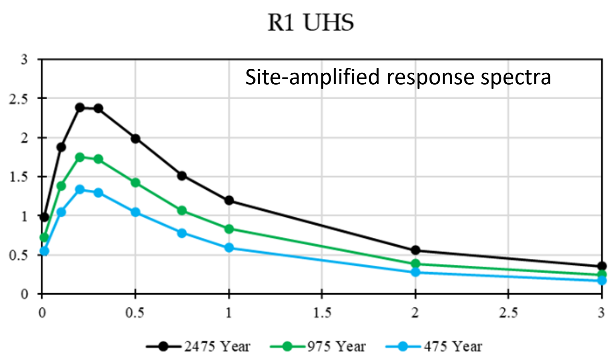
Reservoirs

PRELIMINARY

R1 Seismic Hazard

- Regional Vs30 = 447 m/s
  - Rodgers Creek scenario slightly less than 2016 LHMP because not using I14 model which is not applicable for Vs30 < 450 m/s

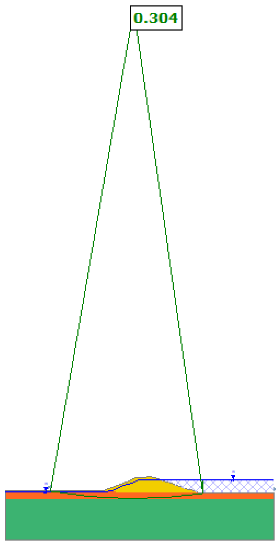




PRELIMINARY

R1 Analysis

Southern Section



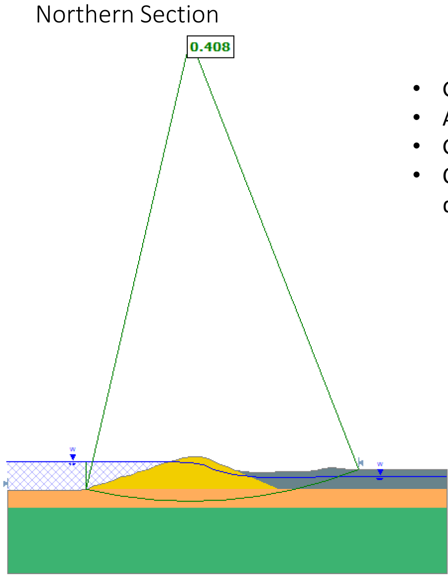
- Ground surface from LiDAR
- Assumed bedrock at a depth of 10 feet
- Generic assumed soil parameters for embankment and native soil
- Calculated k_y = 0.3 and Bray and Travasarou (2007) to calculate seismic displacements (in) for the following return periods. Assume M = 7.0
  - Regional Vs_{30} and assumed Vs through failure plane

Percentile	Rodgers Creek Median	Rodgers Creek Median +1	2,475 Year	975 Year	475 Year
84	2	10	16	8	4
50	**1**	**5**	**8**	**4**	**2**
16	< 1	3	4	2	1

PRELIMINARY

R1 Analysis

Northern Section



- Ground surface from LiDAR
- Assumed bedrock at a depth of 10 feet
- Generic assumed soil parameters for embankment and native soil
- Calculated k_y = 0.41 and Bray and Travasarou (2007) to calculate seismic displacements (in) for the following return period and assume M = 7.0
  - Regional Vs_{30} and assumed Vs through failure plane

Percentile	Rodgers Creek Median	Rodgers Creek Median +1	2,475 Year	975 Year	475 Year
84	1	5	13	5	3
50	**< 1**	**3**	**7**	**2**	**1**
16	< 1	1	3	1	1

PRELIMINARY

Collection System

Liquefaction

Table 1: Pipe Collection System

Pipe Material*	Length (Miles)	Diameter (Inches)
ABS	0.33	6
ACP	57.58	4, 6, 8, 10, 12, 16, 18, 36
CIP	0.37	4, 6, 8, 18
CP	0.57	6, 8
DIP	3.01	4, 6, 8, 10, 12, 16, 18, 21, 42
N.A.	3.22	4, 6, 8
PEP	2.75	6, 8, 10
PVC	22.67	2, 4, 5, 6, 8, 10, 12, 15, 18, 21, 27, 30, 36, 42
RCP	12.23	6, 8, 12, 18, 21, 24, 27, 30
SC	0.03	30
VCP	37.66	6, 8, 10, 12, 15, 18, 21, 27
Total	**140.42**	

2016 LHMP

Material	Miles
ABS	0.37
AC	53.78
CIP	**0.00**
CP	0.56
DIP	2.56
N.A.	**0.32**
PE	3.02
PVC	26.16
RCP	12.42
SP	0.02
VCP	37.45
Total	**136.7**

2021 GIS

- Includes 3.4 miles with attribute "SanLine_Abandoned". Propose remove.

PRELIMINARY

Collection System

Liquefaction

Table9: Pipe Damage – Rodgers (

Liquefaction Zone	Total Pipe Length (miles)
Very High	1.6
High	20.4
Moderate	52.7
Low, None	65.7
Total	**145.4**

2016 LHMP

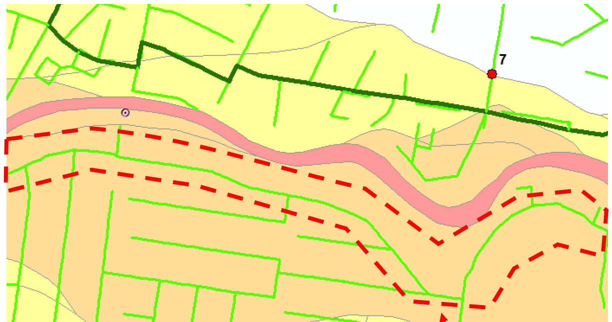
Liquefaction Zone	Total Length (mi)	Distribution	Trunk Main	I and I	New + Proposed	Abandoned
Very High	2.0	1.1	0.8	0.0	0	0.1
High	15.1	10.1	2.9	1.1	0	1.0
Moderate	32.4	26.7	4.3	0.8	0	0.6
Low, None	87.1	75.4	6.2	3.7	0.1	1.8
Total	**136.7**	**113.3**	**14.2**	**5.6**	**0.1**	**3.4**

2021 GIS

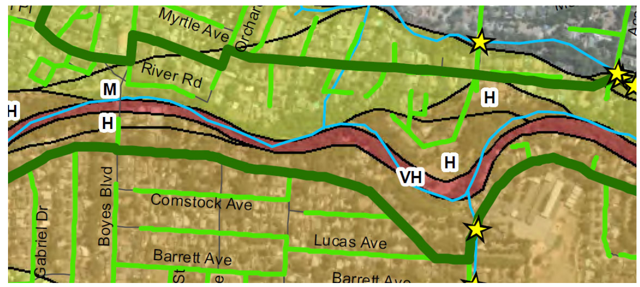
- Includes 3.4 miles with attribute "SanLine_Abandoned". Propose remove.

PRELIMINARY

Trunk Main



2021 GIS – coded by Pipe Type



2016 LHMP Figure

Trunk Main?

Other pipe property to show trunk main? Diameter?

PRELIMINARY

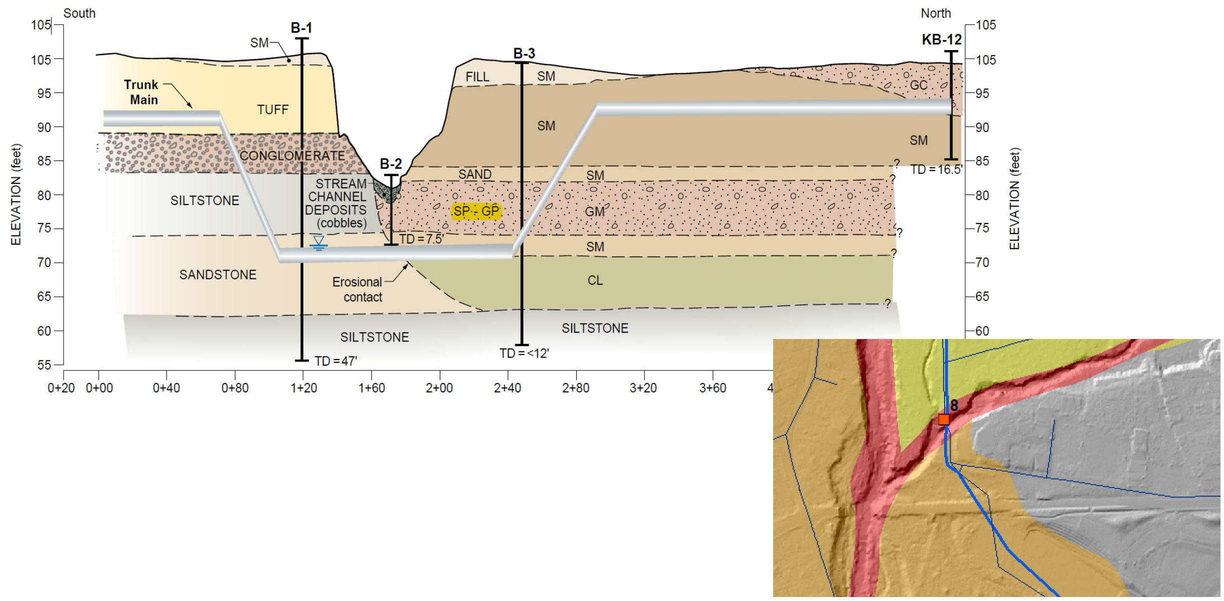
Collection System

Liquefaction

		RC Median	RC Median+1	2475-yr RP
Repairs	PGD	PGV	PGV	PGV
SanLine	99	22	39	40
SanLine_Abandoned	10	1	1	1
SanLine_TrunkMain	30	2	2	2
SanLine_IANDI	10	1	1	1
SanLine_New	0	0	0	0
SanLine_ForceMain	0	0	0	0
SanLine_Proposed	0	0	0	0
Total	**148**	**25**	**43**	**44**

Agua Caliente Crossing

PRELIMINARY



5-14-2021

Attendees

SCWA

- Parastou Hooshialsadat
- Carlos Diaz
- Kent Gylfe

InfraTerra

- Jenny Taing
- Ahmed Nisar
- Vladimir Calugaru
- Nick Doumbalski

MAY
14

SVCSD Bi-Weekly Call

8:59 AM - 95 min | ID: 782846717

Attendees

Diagnostics

Attendee	Join & leave times	Location
KE Kent Gylfe	9:02 AM - 10:09 AM	Napa
VL Vladimir Calugaru vladimir.calugaru@gmail.com	8:59 AM - 10:34 AM	San Rafael
NI Nick Doumbalski ndoumbalski@infraterra.com	8:59 AM - 10:34 AM	Walnut Creek
JE Jenny Taing jtaing@infraterra.com	8:59 AM - 10:34 AM	Oakland
CA Carlos Diaz	9:01 AM - 10:01 AM	Sunnyvale
AH Ahmed Nisar anisar@infraterra.com	9:00 AM - 10:34 AM	Walnut Creek
PA Parastou Hooshilasadat parastou.hooshialsadat@scwa.ca.gov	9:00 AM - 10:17 AM	Santa Rosa

PRELIMINARY

SVCSD Bi-Weekly

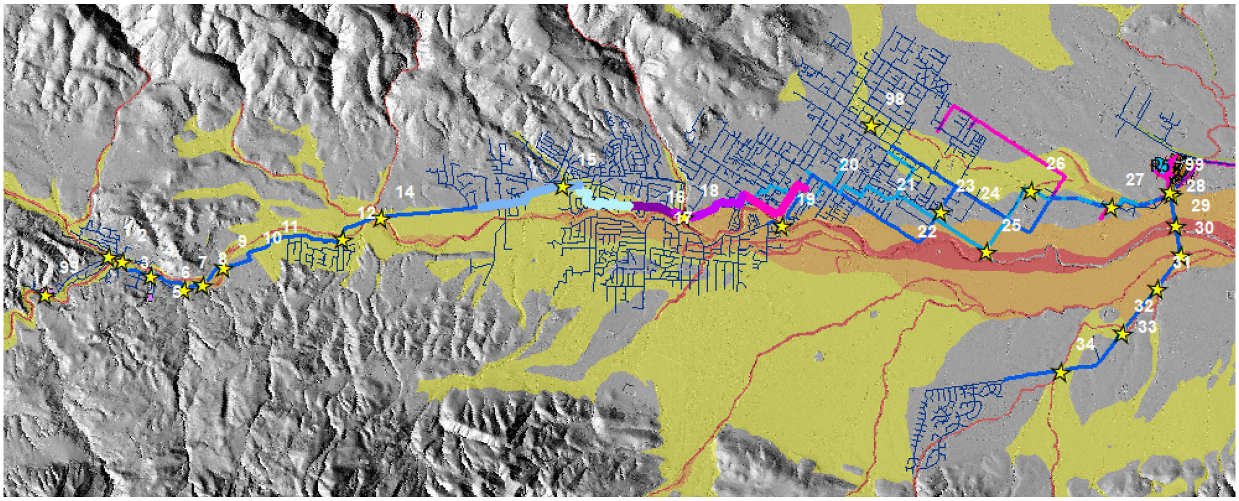
May 14, 2021

PRELIMINARY

Collection System

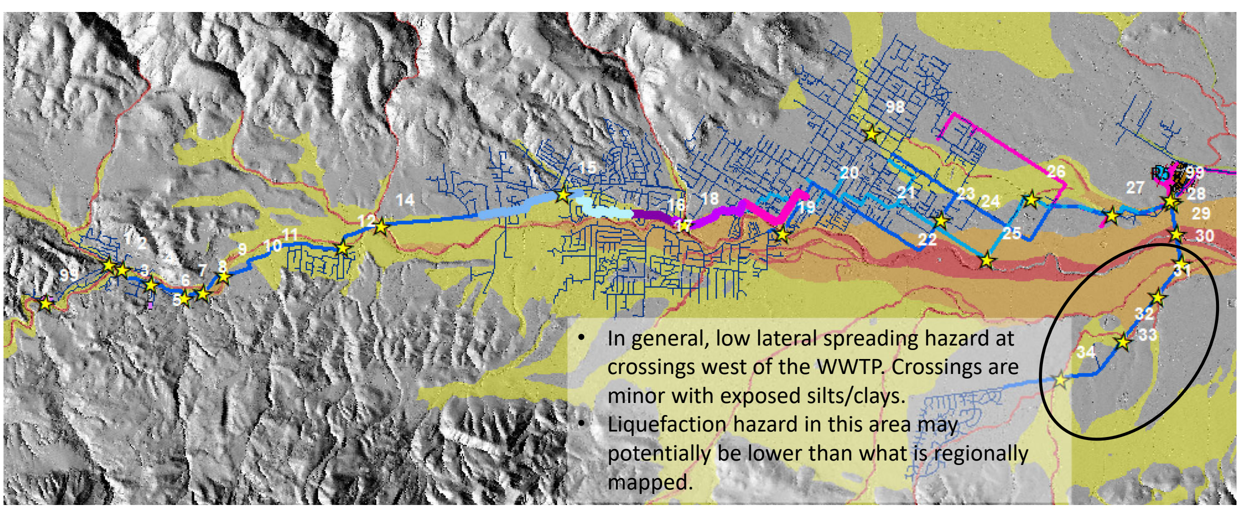
PRELIMINARY

Sites Visited



PRELIMINARY

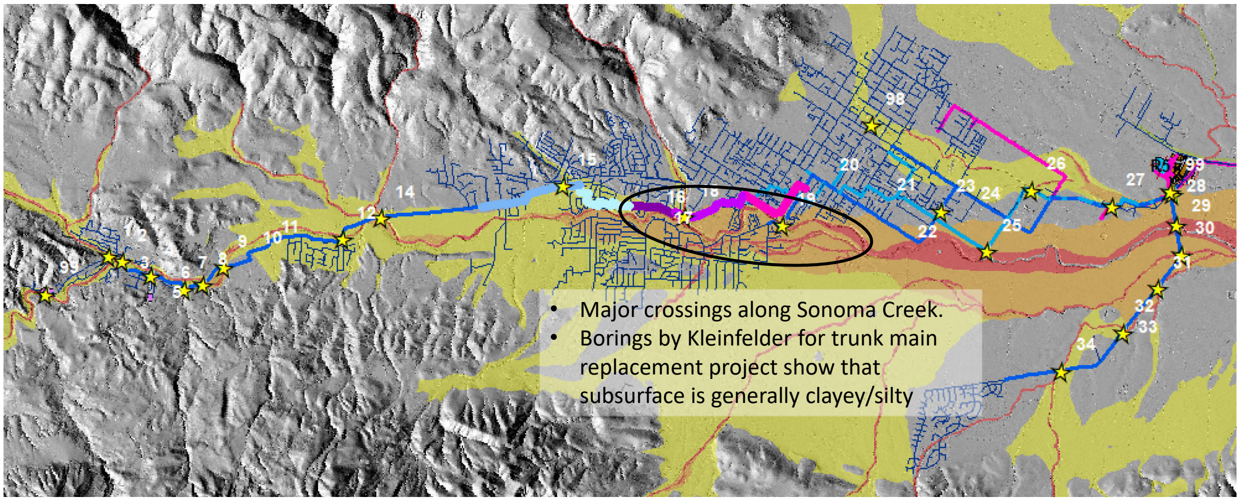
Sites Visited



- In general, low lateral spreading hazard at crossings west of the WWTP. Crossings are minor with exposed silts/clays.
- Liquefaction hazard in this area may potentially be lower than what is regionally mapped.

PRELIMINARY

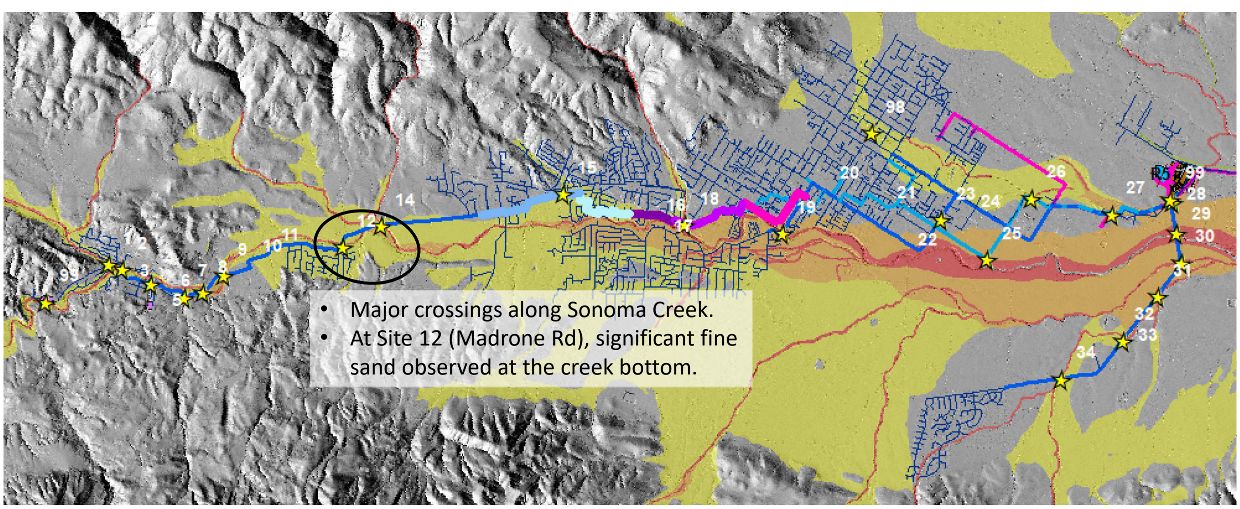
Sites Visited



- Major crossings along Sonoma Creek.
- Borings by Kleinfelder for trunk main replacement project show that subsurface is generally clayey/silty

PRELIMINARY

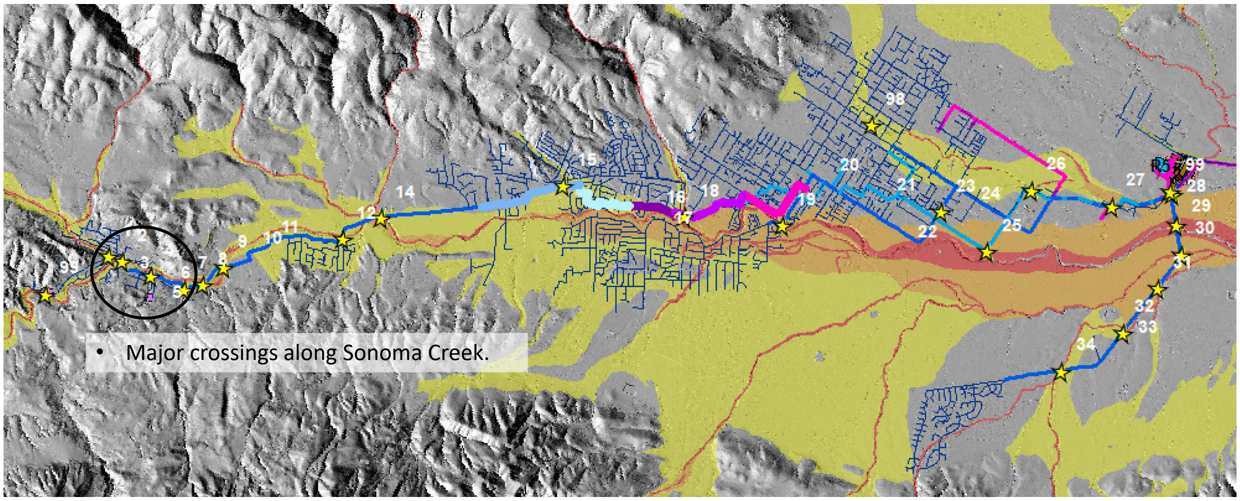
Sites Visited



- Major crossings along Sonoma Creek.
- At Site 12 (Madrone Rd), significant fine sand observed at the creek bottom.

PRELIMINARY

Sites Visited

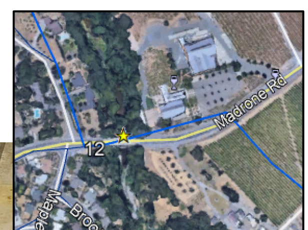


- Major crossings along Sonoma Creek.

PRELIMINARY

Site 12

- Two pipe crossings: one above ground and one below ground. Above ground pipe laterally fixed to the bridge support. GIS indicates that the pipe material is RCP and transitions to DIP at the crossing, where it is suspended at the bridge, and transitions back to RCP at the opposite end of the crossing
- Per operators, siphon has experienced failure in the past.
- Significant sand located at the creek bottom. Liquefaction hazard likely present at this site.
- Serves the Glen Ellen and Eldridge communities



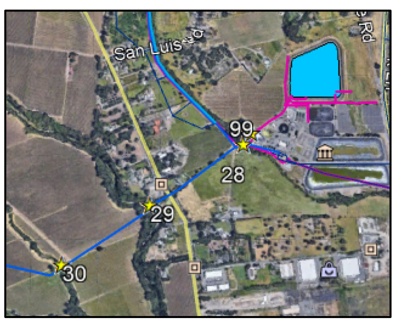
PRELIMINARY

Site 14

- Major crossing on Hooker Creek near Madrone Rd.
- (Per GIS) RCP above ground pipe on two supports. Per operators, pipe may potentially be abandoned and current active line may be the nearby PVC line below bridge.
- Potential stability issues due to the shape of the southern support as well as potential permanent ground deformation from liquefaction
- Serves the Glen Ellen and Eldridge communities

- Need confirmation on whether or not this pipe has been abandoned. If not abandoned, are there drawings?

Site 30



PRELIMINARY

- Unnamed creek, tributary to Sonoma Creek
- Major crossing with banks up to about 20 feet tall on eastern side. Eastern bank lined with sand bags. Some undermining observed on southern portion of wall.
- Sand bag walls may fail during significant flooding.
- Silty soils observed along banks, but coarse sand on creek bottom.
- Serves Temelec community

PRELIMINARY

Collection System

Liquefaction

Table9: Pipe Damage – Rodgers (

Liquefaction Zone	Total Pipe Length (miles)
Very High	1.6
High	20.4
Moderate	52.7
Low, None	65.7
Total	**145.4**

2016 LHMP

Liquefaction Zone	Total Length (mi)	Distribution	Trunk Main	I and I	New + Proposed	Abandoned
Very High	2.0	1.1	0.8	0.0	0	0.1
High	15.1	10.1	2.9	1.1	0	1.0
Moderate	32.4	26.7	4.3	0.8	0	0.6
Low, None	87.1	75.4	6.2	3.7	0.1	1.8
Total	**136.7**	**113.3**	**14.2**	**5.6**	**0.1**	**3.4**

2021 GIS

- Includes 3.4 miles with attribute, "SanLine_Abandoned", to be removed.

PRELIMINARY

Collection System

Liquefaction

Table9: Pipe Damage – Rodgers Creek M 7.0 Earthquake

Liquefaction Zone	Total Pipe Length (miles)	Total Pipe Repairs	Pipe Breaks	Pipe Leaks
Very High	1.6	12	6	6
High	20.4	10	5	5
Moderate	52.7	4	2	2
Low, None	65.7	< 1	< 1	<1
Total	**145.4**	**26+**	**13+**	**13+**

2016 LHMP

- Limited documentation
  - PGA = 0.42g
  - ALA (2001)
- Does not appear to have accounted for TGD

	PGD Repairs	PGV Repairs	PGV Repairs	PGV Repairs
	Total	RC Median	RC Median +1	2475 Year
SanLine	97.3	21.7	39.6	40.3
SanLine_Abandoned	9.7	0.6	1.0	1.0
SanLine_TrunkMain	29.6	2.1	3.8	3.9
SanLine_IANDI	10.3	1.1	2.0	2.0
SanLine_New	0.0	0.0	0.0	0.0
SanLine_ForceMain	0.1	0.0	0.0	0.0
SanLine_Proposed	0.0	0.0	0.0	0.0
Total	**147**	**26**	**46**	**47**

Current Study

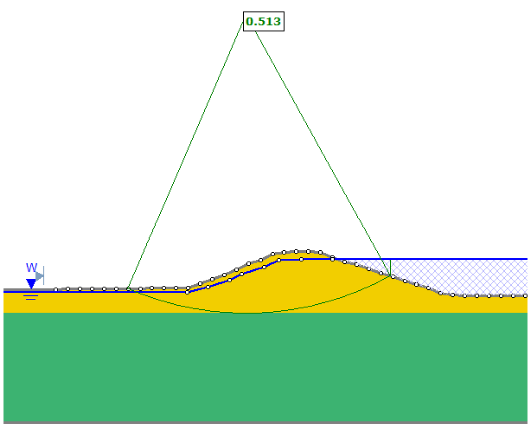
PRELIMINARY

Reservoirs

PRELIMINARY

R1 Analysis - Example

Southern Section



- Ground surface from LiDAR
- 1993 explorations did not encounter materials susceptible to liquefaction
- Strength parameters based on 1993 study
- Calculated k_y is slightly higher than calculated in 1993 study. Displacement is similar to 1993 study.
  - Regional Vs_{30} and assumed Vs through failure plane

Percentile	Rodgers Creek Median	Rodgers Creek Median +1
16	Negligible	Negligible
50	**Negligible**	**~ 1/3**
84	Negligible	~ 1

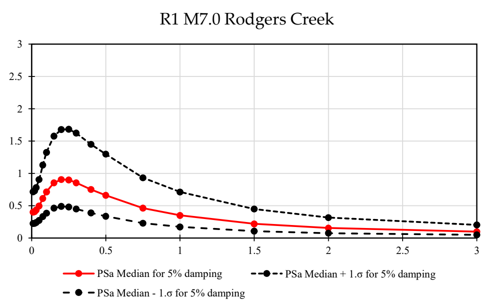
PRELIMINARY

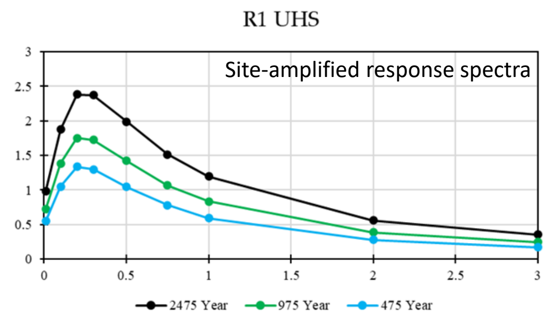
R1 Seismic Hazard

PGA

RC Median	RC Median +1	2,475 Year	975 Year	475 Year
0.40	0.71	0.98	0.72	0.55

- Regional Vs30 = 447 m/s
  - Rodgers Creek scenario slightly less than 2016 LHMP because not using I14 model which is not applicable for Vs30 < 450 m/s





PRELIMINARY

Reservoir Seismic Stability

Reservoir	Rodger s Creek Median	Rodger s Creek Median +1Sigma
R1	Insignificant	Up to ~1 inch
R2	Insignificant	Up to ~1 inch.
R4*	Insignificant	Up to ~1 inch.
R5	Pending • Similar geometry to R1 and R2 • Subsurface generally denser than R1 and R2 • Analyses by others Based on above, likely insignificant deformations	Pending • Similar geometry to R1 and R2 • Subsurface generally denser than R1 and R2 • Analyses by others Based on above, likely insignificant to ~1 inch of deformations

*R4 reservoir: assumed similar properties to R1 and R2, based on available borings from Napa-Sonoma Marsh Restoration Pipeline Report. However, only limited borings from the northern portion of R4 (close to the pipeline alignment) are shown. Recommend locating original Taber report for R4.

PRELIMINARY

Seismic Assessment of Structures

- Data collection
- WWTP structural site visit
- Structural assessment methodology
  - Finite element modeling for
    - Secondary Clarifiers 1 and 2
    - Gravity thickener
    - Screw press building
  - Hand calculations for other water retaining structures
  - ASCE 41-17 Tier 1 assessment for CMU buildings
- Seismic performance goals

PRELIMINARY

EQ-2 and EQ-3

- Water damage
- Structural deterioration

PRELIMINARY

Floc – Metal Solve Tanks

- Not anchored against sliding
- Anchored against overturning

PRELIMINARY

NaOH (Sodium Hydroxide) Storage Tanks

- Deformations in tank wall may lead to concentrated damage in an earthquake

PRELIMINARY

Seismic Performance Goals – 2016 LHMP

Table 7: Post Earthquake System Performance Goals for the SVCSD System

Service Category	Probable Earthquakes	Maximum Earthquake Rodgers Creek M7
Life Safety	Minimal life-safety risk	Minimal life-safety risk
Public Health	Maintain hydraulic flow and disinfection within 24 hours.	Maintain hydraulic flow and disinfection within 72 hours.
Protection of Receiving Waters (Dry Weather Conditions)	Provide primary treatment continually. Provide secondary treatment within 2 weeks. Provide tertiary treatment within 4 weeks.	Provide primary treatment within 2 weeks. Provide secondary treatment within 3 months. Provide tertiary treatment within 6 months.
Protection of Receiving Waters (Wet Weather Conditions)	Provide primary treatment within 2 weeks.	Provide primary treatment within 6 months.

Table 8: Structural Performance Objectives

Facilities	Probable Earthquake (60% of motions in Tables 3 to 5)	Maximum Earthquake (median motions in Tables 3 and 5)	Maximum Earthquake (84th motions in Tables 4 and 6)
Class I	No structural damage; superficial non-structural damage only. No environmental damage. No loss of facility use.	Minor structural damage; minor to moderate non-structural damage only. Minimum partial temporary shutdowns possible, but not probable.	Minor to some moderate damage locally. No major structural damage, partial collapse or threatening conditions. Moderate non-structural damage possible. Limited partial shutdowns possible. Structural and non-structural damage repairable within days.
Class II	Minimal structural damage. Minor non-structural damage. Minimal partial temporary shutdowns possible, but not probable.	Minor-moderate structural damage. Moderate non-structural damage only. Limited partial shutdowns possible. Repairable within days to weeks.	Moderate structural damage. Moderate-major non-structural damage. No partial collapse or life threatening conditions. Structural and non-structural damage repairable within weeks to months.

5-28-2021

Attendees

SCWA

- Parastou Hooshialsadat
- Carlos Diaz
- Kent Gylfe

InfraTerra

- Jenny Taing
- Ahmed Nisar
- Vladimir Calugaru
- Nick Doumbalski

MAY
28

SVCSD Bi-Weekly Call

9:58 AM - 115 min | ID: 782846717

Attendees

Diagnostics

Attendee	Join & leave times	Location
PA Parastou Hooshilasadat parastou.hooshialsadat@scwa.ca.gov	10:00 AM - 11:30 AM	Santa Rosa
AH Ahmed Nisar anisar@infraterra.com	9:59 AM - 11:53 AM	Walnut Creek
KE Kent Gylfe	10:06 AM - 11:02 AM	Napa
CA Carlos Diaz	10:02 AM - 11:30 AM	Sunnyvale
JE Jenny Taing jtaing@infraterra.com	9:59 AM - 11:53 AM	Oakland
NI Nick Doumbalski ndoumbalski@infraterra.com	9:59 AM - 11:02 AM	Walnut Creek
VL Vladimir Calugaru vcalugaru@infraterra.com	9:59 AM - 11:53 AM	San Rafael
KE Kent Gylfe	11:07 AM - 11:30 AM	Napa

PRELIMINARY

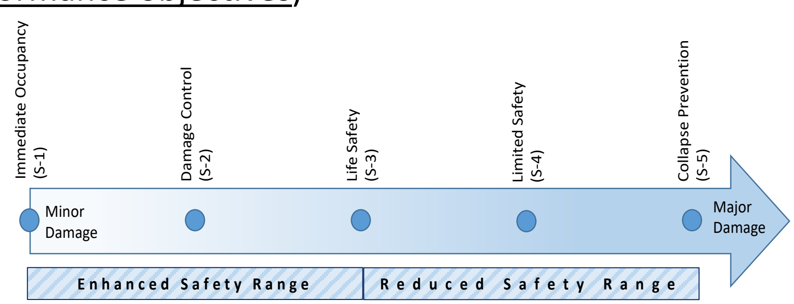
Sonoma Valley County Sanitation District

Seismic Design/Evaluation Criteria Discussion

PRELIMINARY

Performance Based Seismic Design Standard ASCE 41-17

- Rational method for performance-based design/evaluation
- Allows the owners to define acceptable performance objectives
- Pairing of seismic hazard levels and target performance levels (performance objectives)



PRELIMINARY

Performance Levels

- Immediate Occupancy (S-1)
  - Limited structural damage
  - Retains almost all of its pre-earthquake strength and stiffness
  - Very low risk of life-threatening injury
  - Some minor structural repairs appropriate, not be required for re-occupancy
- Damage Control (S-2)
  - Midway point between Life Safety and Immediate Occupancy
  - Greater reliability of resisting collapse
  - Less damaged than Immediate Occupancy Performance Level
  - Greater margin of safety against collapse than the Life Safety Performance Level

PRELIMINARY

Performance Levels

- Life Safety (S-3)
  - Significant damage to the structure
  - Some margin against either partial or total structural collapse
  - Some structural elements and components are severely damaged
  - No large falling debris hazards, either inside or outside the building
  - Injuries might occur but overall risk of life-threatening injury is low
  - Possible to repair but repair might not be practical or economical
  - Not an imminent collapse risk but repair prudent before re-occupancy

PRELIMINARY

Performance Levels

- Limited Safety (S-4)
  - Midway point between Life Safety and Collapse Prevention
  - More resistance to collapse compared Collapse Prevention Performance Level
- Collapse Prevention (S-5)
  - Building is on the verge of partial or total collapse
  - Significant degradation in the stiffness and strength of the structural system
  - Large permanent deformation of the structure
  - Limited degradation in the gravity load carrying capacity
  - Significant risk of injury from falling structural debris
  - Not practical to repair and not safe to reoccupy because aftershock activity could induce collapse

Table C2-4. Structural Performance Levels and Illustrative Damage

Seismic-Force-Resisting System	Type	Structural Performance Levels: Collapse Prevention (S-5)	Life Safety (S-3)	Immediate Occupancy (S-1)
Concrete frames	Primary elements	Extensive cracking and hinge formation in ductile elements. Limited cracking or splice failure in some nonductile columns. Severe damage in short columns.	Extensive damage to beams. Spalling of cover and shear cracking in ductile columns. Minor spalling in nonductile columns. Joint cracks.	Minor cracking. Limited yielding possible at a few locations. Minor spalling of concrete cover.
	Secondary elements	Extensive spalling in columns and beams. Limited column shortening. Severe joint damage. Some reinforcing buckled.	Major cracking and hinge formation in ductile elements. Limited cracking or splice failure in some nonductile columns. Severe damage in short columns.	Minor spalling in a few places in ductile columns and beams. Flexural cracking in beams and columns. Shear cracking in joints.
	Drift	Transient drift sufficient to cause extensive nonstructural damage. Extensive permanent drift.	Transient drift sufficient to cause nonstructural damage. Noticeable permanent drift.	Transient drift that causes minor or no nonstructural damage. Negligible permanent drift.
Steel moment frames	Primary elements	Extensive distortion of beams and column panels. Many fractures at moment connections, but shear connections remain intact. A few elements might experience partial fracture.	Hinges form. Local buckling of some beam elements. Severe joint distortion; isolated moment connection fractures, but shear connections remain intact.	Minor local yielding at a few places. No fractures. Minor buckling or observable permanent distortion of members.
	Secondary elements	Same as for primary elements.	Extensive distortion of beams and column panels. Many fractures at moment connections, but shear connections remain intact.	Same as for primary elements.
	Drift	Transient drift sufficient to cause extensive nonstructural damage. Extensive permanent drift.	Transient drift sufficient to cause nonstructural damage. Noticeable permanent drift.	Transient drift that causes minor or no nonstructural damage. Negligible permanent drift.
Braced steel frames	Primary and secondary	Extensive yielding and buckling of	Many braces yield or buckle but do not	Minor yielding or buckling of braces.

Table C2-4 *(Continued)*. Structural Performance Levels and Illustrative Damage

Seismic-Force-Resisting System	Type	Structural Performance Levels: Collapse Prevention (S-5)	Life Safety (S-3)	Immediate Occupancy (S-1)
Concrete walls	Primary elements	Major flexural or shear cracks and voids. Sliding at joints. Extensive crushing and buckling of reinforcement. Severe boundary element damage. Coupling beams shattered and virtually disintegrated.	Some boundary element cracking and spalling and limited buckling of reinforcement. Some sliding at joints. Damage around openings. Some crushing and flexural cracking. Coupling beams: extensive shear and flexural cracks; some crushing, but concrete generally remains in place.	Minor diagonal cracking of walls. Coupling beams experience diagonal cracking.
	Secondary elements	Panels shattered and virtually disintegrated.	Major flexural and shear cracks. Sliding at construction joints. Extensive crushing. Severe boundary element damage. Coupling beams shattered and virtually disintegrated.	Minor cracking of walls. Some evidence of sliding at construction joints. Coupling beams experience x-cracks. Minor spalling.
	Drift	Transient drift sufficient to cause extensive nonstructural damage. Extensive permanent drift.	Transient drift sufficient to cause nonstructural damage. Noticeable permanent drift.	Transient drift that causes minor or no nonstructural damage. Negligible permanent drift.
Reinforced masonry walls	Primary elements	Crushing; extensive cracking. Damage around openings and at corners. Some fallen units.	Major cracking distributed throughout wall. Some isolated crushing.	Minor cracking. No out-of-plane offsets.
	Secondary elements	Panels shattered and virtually disintegrated.	Crushing; extensive cracking; damage around openings and at corners; some fallen units.	Same as for primary elements.
	Drift	Transient drift sufficient to cause extensive nonstructural damage. Extensive permanent drift.	Transient drift sufficient to cause nonstructural damage. Noticeable permanent drift.	Transient drift that causes minor or no nonstructural damage. Negligible permanent drift.

PRELIMINARY

$$\boldsymbol{m\kappa Q_C > Q_U}$$

- m = component capacity modification factor
  - accounts for ductility
  - brittle members m = 1
- κ = knowledge factor for uncertainty in as-built data
- Q_C = component capacity
  - Deformation controlled (expected strength with consideration to post yield behavior)
  - brittle members or members that should stay elastic to maintain water tightness (force controlled)
- Q_U = gravity and seismic loading (demand)

PRELIMINARY

Earthquake Levels

- Basic Safety Earthquakes
  - BSE-2N – 2% in 50 years (2,475 year return period)
  - BSE-1N – 2/3rd of 2% in 50 years
  - BSE-2E – 5% in 50 years (975 year return period)
  - BSE-1E – 20% in 50 years (225 year return period)
- For SVCWD we could consider:
  - BSE-2E – 84th percentile motions from M7 on Rodgers Creek
  - BSE-1E – 50th percentile motions from M7 on Rodgers Creek

PRELIMINARY

Performance Objectives

	Risk Category (per ASCE 7 16)	BSE-1N (ASCE 41 17) 2/3rd of 2,475 Year Return Period	BSE-2N (ASCE 41-17) 2,475 Year Return Period
New			
	Risk Category (per ASCE 7 16)	**BSE-1E (ASCE 41 17) 225 Year Return Period**	**BSE 2E (ASCE 41 17) 975 Year Return Period**
Existing			
		NS: Position Retention (N-B)	

Note: S = Structural, NS = Nonstructural, N = New, E = Existing

PRELIMINARY

2016 LHMP Criteria: Buildings

Table 8: Structural Performance Objectives

Facilities	Probable Earthquake (60% of motions in Tables 3 to 5)	Maximum Earthquake (median motions in Tables 3 and 5)	Maximum Earthquake (84th motions in Tables 4 and 6)
Class I	No structural damage; superficial non-structural damage only. No environmental damage. No loss of facility use.	Minor structural damage; minor to moderate non-structural damage only. Minimum partial temporary shutdowns possible, but not probable.	Minor to some moderate damage locally. No major structural damage, partial collapse or threatening conditions. Moderate non-structural damage possible. Limited partial shutdowns possible. Structural and non-structural damage repairable within days.
Class II	Minimal structural damage. Minor non-structural damage. Minimal partial temporary shutdowns possible, but not probable.	Minor-moderate structural damage. Moderate non-structural damage only. Limited partial shutdowns possible. Repairable within days to weeks.	Moderate structural damage. Moderate-major non-structural damage. No partial collapse or life threatening conditions. Structural and non-structural damage repairable within weeks to months.

PRELIMINARY

2016 LHMP Criteria: System

Table 7: Post Earthquake System Performance Goals for the SVCSD System

Service Category	Probable Earthquakes	Maximum Earthquake Rodgers Creek M7
Life Safety	Minimal life-safety risk	Minimal life-safety risk
Public Health	Maintain hydraulic flow and disinfection within 24 hours.	Maintain hydraulic flow and disinfection within 72 hours.
Protection of Receiving Waters (Dry Weather Conditions)	Provide primary treatment continually. Provide secondary treatment within 2 weeks. Provide tertiary treatment within 4 weeks.	Provide primary treatment within 2 weeks. Provide secondary treatment within 3 months. Provide tertiary treatment within 6 months.
Protection of Receiving Waters (Wet Weather Conditions)	Provide primary treatment within 2 weeks.	Provide primary treatment within 6 months.

PRELIMINARY

2016 LHMP Ground Motion Criteria

Table 2: Probabilistic Ground Motions (Horizontal PGA for NEHRP Class B)

Facility Name	PGA 475 Years	PGA 975 Years	PGA 2475 Years
Sonoma Valley WWTP	0.45	0.57	0.72

Table 3: Deterministic Motions, Median, Vs30 = 450 m/sec, Median

Seismic Parameter	ASK13	I13	CY13	CB13	BSSA13	Average
PGA (g)	0.31	0.60	0.42	0.41	0.38	**0.42**
PGV (cm/sec)	48.78	52.34	67.71	51.52	43.92	**52.85**

Table 4: Deterministic Motions, Median, Vs30 = 450 m/sec, 84th

Seismic Parameter	ASK13	I13	CY13	CB13	BSSA13	Average
PGA (g)	0.56	1.16	0.61	0.68	0.71	**0.74**
PGV (cm/sec)	92.13	111.91	79.03	91.69	84.25	**91.80**

Table 5: Deterministic Motions, Median, Vs30 = 250 m/sec, Median

Seismic Parameter	ASK13	I13	CY13	CB13	BSSA13	Average
PGA (g)	0.29	N.A.	0.42	0.35	0.37	**0.36**
PGV (cm/sec)	70.51	N.A.	106.15	57.29	52.40	**71.59**

Table 6: Deterministic Motions, Median, Vs30 = 250 m/sec, 84th

Seismic Parameter	ASK13	I13	CY13	CB13	BSSA13	Average
PGA (g)	0.49	N.A.	0.57	0.54	0.65	**0.56**
PGV (cm/sec)	131.94	N.A.	165.18	96.97	96.95	**122.76**

PRELIMINARY

2016 LHMP Ground Motion Criteria

For purposes of evaluating system performance, it is recommended to use the average values (right most columns of Tables 3 through 6). Responses should be determined for both median and 84th percentile levels, in order to get the best estimate for emergency planning purposes.

Lacking site-specific subsurface data, it is recommended to use the Vs30 = 250 m/sec values for pipes at creek crossings and suspected deeper soil sites, and the Vs30 = 450 m/sec values at all other sites.

In a few locations along the boundaries of Sonoma Valley, the local soils near the surface are best characterized as volcanic. For these locations, the ground motions in Table 2 are applicable.

For design of future SVCSD facilities (including buildings, vaults, pump stations, tanks and small (under 5 MG) reservoirs), it is recommended that the seismic motions be based on the rightmost column of either Table 5 (firm soil sites) or Table 6 (deeper soft soil site). For sites underlain by rock (Vs30 of 760 m/sec or higher), the PGA values will be higher and the PGV values will be smaller than those in Table 5.

For design of future new buried pipelines, it is recommended that the 475-year (all pipe 12" and smaller) or 975-year motions (all pipe 15" or larger) be used, coupled with the provisions of ALA (2005).

6-11-2021

Attendees

SCWA

- Parastou Hooshialsadat
- Mollie Asay
- Carlos Diaz

InfraTerra

- Jenny Taing
- Ahmed Nisar
- Vladimir Calugaru

JUN
11

SVCSD Bi-Weekly Call

9:58 AM - 95 min | ID: 782846717

Attendees

Diagnostics

Attendee	Join & leave times	Location
Parastou Hooshialsadat parastou.hooshialsadat@scwa.ca.gov	10:00 AM - 11:33 AM	Santa Rosa
Vladimir Calugaru vcalugaru@infraterra.com	9:59 AM - 11:33 AM	San Rafael
Jenny Taing jtaing@infraterra.com	9:58 AM - 11:33 AM	Oakland
Mollie Asay	10:15 AM - 11:33 AM	Windsor
Ahmed Nisar anisar@infraterra.com	10:01 AM - 11:33 AM	Walnut Creek
Carlos Diaz	10:01 AM - 11:33 AM	Sunnyvale
+17074814858	10:07 AM - 10:15 AM	-

Agenda

- Introduction
- Seismic Criteria
- Vulnerability Assessment
- Goals, Objectives, and Actions
- Next Steps

Seismic Criteria

Existing Structure Type	Risk Category (ASCE 7 16)	BSE 1E Rodgers Creek Median	BSE 2E Rodgers Creek 84th Percentile
Non essential structures	I and II	S: Life Safety (S-3) NS: Life Safety (N-C)	S: Collapse Prevention (S-5) NS: Hazards Reduced (N-D)
Essential structures (WWTP buildings and water retaining structures)			

Vulnerability Assessment

- Recycled Water
  - Reservoirs
  - Pipelines
- Collection System
- Wastewater Treatment Plant Facilities

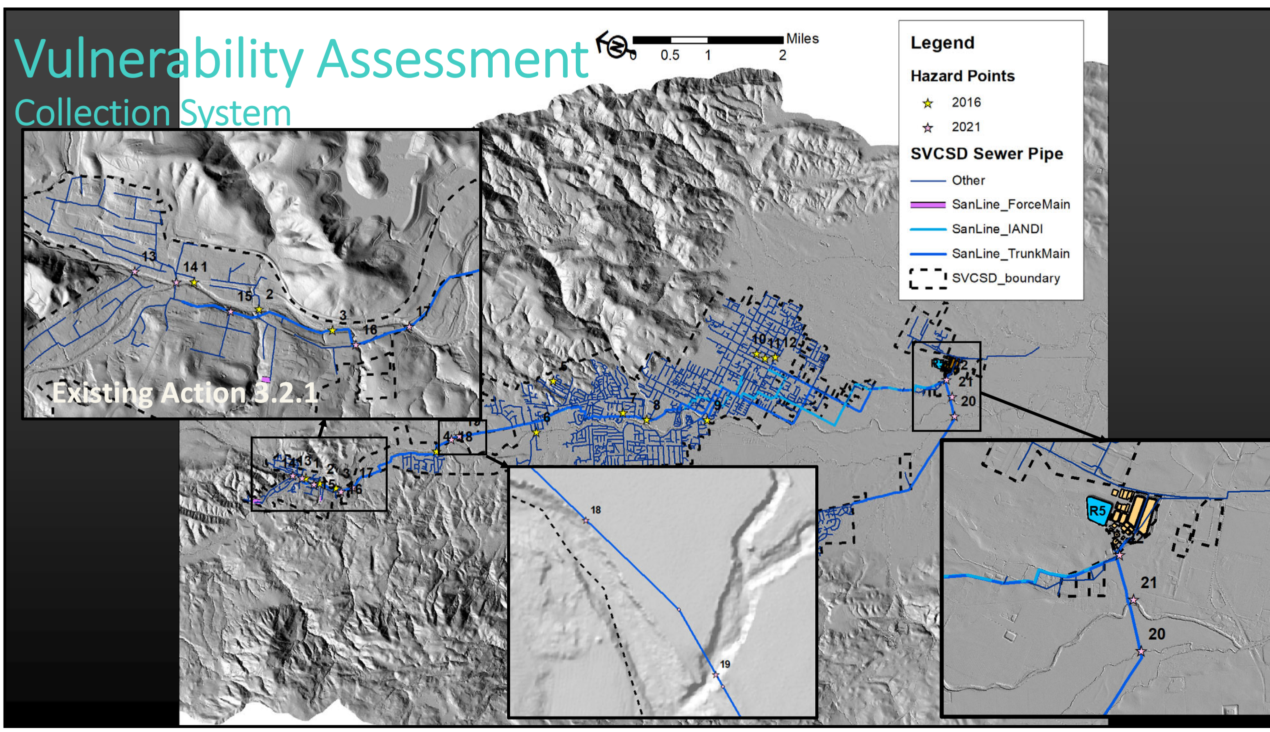
Vulnerability Assessment

Recycled Water

Component	Result
Reservoirs (R-1, R-2, R-4, R-5)	• Reservoirs would not experience significant displacements during median and 84th percentile RC M7 event. • Some minor cracking may be possible, but reservoir breach is unlikely.
Pump stations (R-1, R-2, R-4, R-5, and Schell Creek Slough outfall)	• Structures expected to meet LS and IO performance objectives for median and 84th percentile M7 Rogers Creek scenario earthquake
Recycled Water Pipelines	• 4 repairs due to PGD (between WWTP and Watmaugh Rd) • 4 repairs due to PGV (distributed)

Vulnerability Assessment

Collection System



Vulnerability Assessment

Collection System

	PGD Repairs	TGD Repairs		Total	
Pipe Type	Total	RC M 7 Median	RC M 7 84th	RC M 7 Median	RC M 7 84th
Distribution	72 – 100	20 – 51	36 – 211	**92 – 150**	**108 – 311**
Trunk Main	23 – 28	2 – 4	4 – 11	**25 – 32**	**27 – 39**
I&I Line	7	1 – 2	2 – 5	**8 – 9**	**9 – 12**
Total	102 - 136	23 – 56	42 – 227	**125 – 191**	**144 – 363**

M6.0 Napa Comparison:

- Average TGD repair rate, City of Napa water distribution:
  - 0.7 repairs/mi (*240 repairs / 337 miles*)
- Assuming same rate of 0.7 repairs/mi → 93 repairs in Sonoma's 133 miles of pipes

Vulnerability Assessment

WWTP Facilities

- Calculations completed using structural drawings and field measurements, using:
  - ASCE 41-17 Tier 1 for buildings and building-type structures
  - ACI 350.3-06 for circular water-retaining structures
- Structures expected to meet LS and IO performance objectives for median and 84th percentile M7 Rogers Creek scenario earthquake
- Potential issues identified for
  - Dewatering Utility & Storage Building
  - EQ-2 and EQ-3 Buildings
  - Floc Metal Solve Tanks

Goals, Objectives, and Actions

Goals

No.	Name
1	Increase organizational efficiencies and effectiveness when responding to natural disasters.
2	Increase reliability of the treatment system capabilities during and after natural disasters.
3	Increase reliability of the wastewater collection system and disposal facilities to maintain conveyance capabilities during and after natural disasters.
4	**Increase reliability of the recycled water system to maintain conveyance and containment capabilities during and after natural disasters.**

Goal 1 Actions

Goal 1: Increase organizational efficiencies and effectiveness when responding to natural disasters

Objective 1.1: Develop an emergency response and recovery plan that addresses widespread damage and limited sanitation functions including a damage assessment process and restoration of collection and treatment capabilities.

Mitigation Actions:
1.1.1 Develop SVCSD-specific measures to include in an integrated Sonoma County Water Agency emergency response and recovery plan for sanitation operations.

1.1.2 Establish emergency on-call contracts with contractors and suppliers for rapid response and delivery in an emergency

1.1.3 Develop formal mutual aid contracts with other municipalities in the region and state.

Note: SVCSD is part of CalWARN, but it is not a formal mutual aid system, and contract, etc. would still need to be established. CalWARN only puts agencies in contact with each other.

Goal 2 Actions

Goal 2: Increase reliability of the treatment system capabilities during and after natural disasters

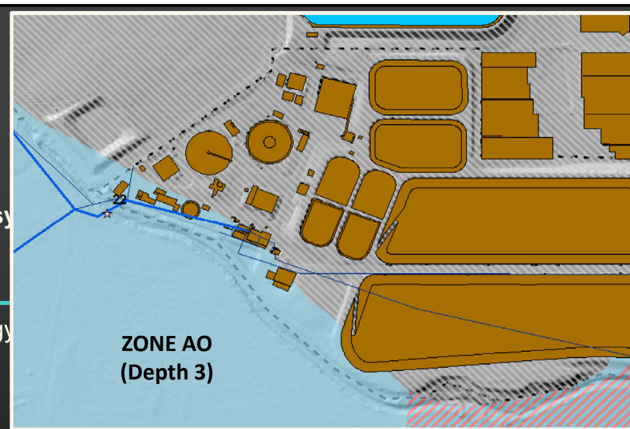
Objective 2.1: Seismically retrofit vulnerable equipment, structures, treatment elements, and piping at the treatment plant.

2.1.3 Complete an ASCE 41-17 Tier 3 assessment of the Dewatering Utility & Storage Building and retrofit as needed to meet Life Safety performance.

2.1.4 Assess the source of water damage to EQ-2 and EQ-3 and repair as needed.

2.1.5 Provide sliding restraints to Floc Metal Solve polymer tanks.

Goal 2 Actions



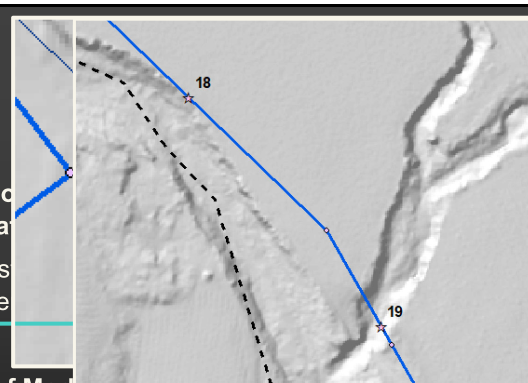
**Goal 2: Increase reliability of the treatment sy
disasters**

Objective 2.2: Develop and implement a strategy

Mitigation Actions:

2.2.1 Develop an operational strategy to mitigate flood hazard wastewater treatment plant facilities located in the 100-year floodplain.

Goal 3 Actions



**Goal 3: Increase reliability of the wastewater co
maintain conveyance capabilities during and a**

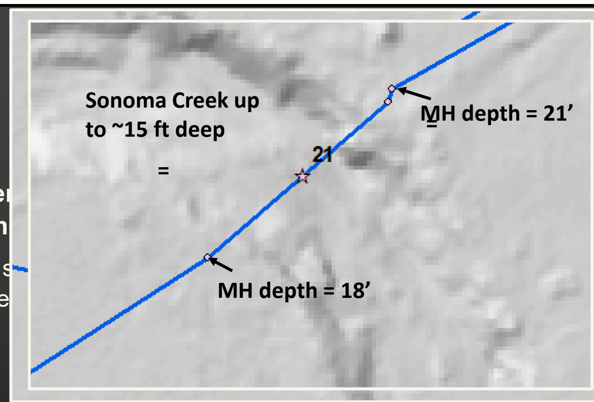
Objective 3.1: Develop and implement a design s
in areas of potential liquefaction or significant diffe

**3.1.13 Quantify liquefaction hazards in areas of Mod
liquefaction susceptibility along the collection system pipelines.**

3.1.14 Evaluate and, if needed, design and mitigate the liquefaction hazard to the trunk main at the Schell Creek crossing.

3.1.15 Evaluate and, if needed, design and mitigate the seismic/flood-related damage to the trunk main at Hooker Creek.

Goal 3 Actions



Goal 3: Increase reliability of the wastewate
maintain conveyance capabilities during an

Objective 3.1: Develop and implement a design s
areas of potential liquefaction or significant differe

3.1.16 Evaluate and, if needed, design and mitigate the liquefaction and/or high stream flow hazard to the trunk main at the Fowler Creek crossing west of the WWTP.

3.1.17 Evaluate and, if needed, design and mitigate the liquefaction hazard to the trunk main at the Sonoma Creek crossing west of the WWTP.

Question for Sonoma: leak detection, monitoring, and isolation within the collection

Goal 3 Actions

Objective 3.4: Develop and implement a design strategy to minimize the potential effects of wild-land fire.

Mitigation Actions:

3.4.1 Develop and Implement a design strategy to mitigate the effects of wild-land fire on critical facilities.

3.4.2 Develop and implement a post-fire inspection plan systemwide.

Goal 3 Actions

Goal 3: Increase reliability of the wastewater collection system and disposal facilities to maintain conveyance capabilities during and after natural disasters

Objective 3.1: Develop and implement a design strategy to mitigate the effects of earthquakes in areas of potential liquefaction or significant differential movement.

3.1.6 Update construction standards to address liquefaction potential along the collection system.

(Leave current Action as is)

Goal 4 Actions

Goal 4: Increase reliability of the recycled water system to maintain conveyance and containment capabilities during and after natural disasters

Objective 4.1: Develop and implement a design strategy to minimize the potential effects of climate change.

Mitigation Actions:

4.1.1 Develop and implement an operational strategy to mitigate the effects of sea level rise to the outfall pipe.

4.1.2 Develop and implement an operational strategy to mitigate the effects of sea level rise to reservoir discharge pipes.

Objective 4.2: Develop and implement a design strategy to mitigate the effects of earthquakes in areas of potential liquefaction or significant differential movement.

4.2.1 Evaluate and, if needed, mitigate the liquefaction hazard to the recycled water pipeline at the western Sonoma Creek crossing at the WWTP.

Next Steps

7-09-2021

JUL
9

SVCSD Bi-Weekly Call

8:59 AM - 30 min | ID: 782846717

Attendees

SCWA

- Parastou Hooshialsadat
- Mollie Asay

InfraTerra

- Jenny Taing
- Ahmed Nisar
- Vladimir Calugaru

Attendees

Diagnostics

Attendee	Join & leave times	Location
PA Parastou Hooshialsadat parastou.hooshialsadat@scwa.ca.gov	9:00 AM - 9:28 AM	Santa Rosa
VL Vladimir Calugaru vcalugaru@infraterra.com	8:59 AM - 9:28 AM	San Rafael
JE Jenny Taing jtaing@infraterra.com	8:59 AM - 9:28 AM	Oakland
AH Ahmed Nisar anisar@infraterra.com	9:03 AM - 9:28 AM	Walnut Creek
MO Mollie Asay	9:00 AM - 9:28 AM	Windsor

7-14-2021

Attendees

SCWA

- Parastou Hooshialsadat
- Mollie Asay
- Carlos Diaz

InfraTerra

- Jenny Taing
- Ahmed Nisar

JUL 14

SVCSD Mitigation Actions Revision Discussion

2:28 PM - 54 min | ID: 809817837

Attendees

Diagnostics

Attendee	Join & leave times	Location
PA Parastou Hooshialsadat parastou.hooshialsadat@scwa.ca.gov	2:30 PM - 3:22 PM	Santa Rosa
MO Mollie Asay	2:28 PM - 3:22 PM	Windsor
JE Jenny Taing jtaing@infraterra.com	2:28 PM - 3:22 PM	Oakland
CA Carlos Diaz carlos.diaz@scwa.ca.gov	2:31 PM - 3:01 PM	Windsor
AH Ahmed Nisar anisar@infraterra.com	2:30 PM - 3:22 PM	Walnut Creek

7-23-2021

Attendees

SCWA

- Parastou Hooshialsadat
- Mollie Asay

InfraTerra

- Jenny Taing
- Ahmed Nisar
- Vladimir Calugaru

JUL
23

SVCSD Bi-Weekly Call

9:00 AM - 14 min | ID: 782846717

Attendees

Diagnostics

Attendee	Join & leave times	Location
VL Vladimir Calugaru vcalugaru@infraterra.com	9:00 AM - 9:13 AM	San Rafael
AH Ahmed Nisar anisar@infraterra.com	9:09 AM - 9:13 AM	Walnut Creek
MO Mollie Asay	9:00 AM - 9:13 AM	Windsor
PA Parastou Hooshialsadat parastou.hooshialsadat@scwa.ca.gov	9:00 AM - 9:13 AM	Santa Rosa
JE Jenny Taing jtaing@infraterra.com	9:00 AM - 9:13 AM	Oakland

7-29-2021

Attendees

SCWA

- Parastou Hooshialsadat
- Scott Carter

InfraTerra

- Jenny Taing

JUL 29

SVCSD LHMP Update - Discuss Comments

2:58 PM - 63 min | ID: 995579445

Attendees

Diagnostics

Attendee	Join & leave times	Location
JE Jenny Taing jtaing@infraterra.com	2:58 PM - 4:01 PM	Oakland
PA Parastou Hooshialsadat parastou.hooshialsadat@scwa.ca.gov	3:00 PM - 3:54 PM	Santa Rosa
SC Scott Carter	2:59 PM - 4:01 PM	Napa
PA Parastou Hooshialsadat parastou.hooshialsadat@scwa.ca.gov	3:54 PM - 4:01 PM	Santa Rosa

8-6-2021

Attendees

SCWA

- Parastou Hooshialsadat
- Mollie Asay
- Carlos Diaz

InfraTerra

- Jenny Taing
- Ahmed Nisar

AUG
6

SVCSD Bi-Weekly Call

1:29 PM - 38 min | ID: 782846717

Attendees

Diagnostics

Attendee	Join & leave times	Location
CA Carlos Diaz carlos.diaz@scwa.ca.gov	1:30 PM - 2:07 PM	Windsor
MO Mollie Asay	1:29 PM - 2:00 PM	Windsor
JE Jenny Taing jtaing@infraterra.com	1:29 PM - 2:07 PM	Oakland
AH Ahmed Nisar anisar@infraterra.com	1:33 PM - 2:07 PM	Walnut Creek
PA Parastou Hooshialsadat parastou.hooshialsadat@scwa.ca.gov	1:31 PM - 2:07 PM	Santa Rosa

Appendix E

2016 LHMP Progress

2016 LHMP MITIGATION ACTIONS (Table 10 in 2016 LHMP) STATUS UPDATE				
Tier	Priority	2016 LHMP Action #	2016 LHMP Action Description	Status Update
Tier 1	A1	2.1.1	Seismically restrain/anchor miscellaneous equipment at the treatment plant	In progress. Maintained in 2021 LHMP. SVCSD Mitigation Action List.
		3.1.7	Conduct site-specific studies to better evaluate seismic related vulnerabilities and further define the scope of capital project mitigation actions.	In progress. Maintained in 2021 LHMP. SVCSD Mitigation Action List.
		1.1.1	Develop District-specific emergency response measures to include in an integrated Sonoma County Water Agency emergency response and recovery plan for sanitation operations.	In progress. Maintained in 2021 LHMP. SVCSD Mitigation Action List.
		3.1.6	Update construction standards to address liquefaction potential along the collection system	In progress. Maintained in 2021 LHMP. SVCSD Mitigation Action List.
		1.3.1	Obtain flexible hoses, emergency pumps, generators, and related emergency response equipment to enhance the District's ability to restore service in the collection system after a natural disaster.	In progress. Maintained in 2021 LHMP. SVCSD Mitigation Action List.
		1.2.1	Enhance the reliability of SCADA operations by upgrading network hardware, computer hardware, and radio hardware.	In progress. Maintained in 2021 LHMP. SVCSD Mitigation Action List.
		3.1.1	Replace trunk main in the Maxwell Park vicinity to mitigate the effects of liquefaction.	Completed. Removed from 2021 LHMP.
		2.1.2	Seismically retrofit clarifiers	In progress. Maintained in 2021 LHMP. SVCSD Mitigation Action List.
		3.2.1	Develop and implement a design strategy to mitigate the effects of landslides, high stream flows, and liquefaction on portions of the collection system along Sonoma Creek in the vicinity of Arnold Drive in Glen Ellen.*	In progress. Maintained in 2021 LHMP. SVCSD Mitigation Action List.
		3.3.1	Replace the Trunk Main at the Agua Caliente Creek crossing to mitigate the effects of high stream flows and liquefaction.*	Completed. Removed from 2021 LHMP.
		3.3.3	Develop and implement a design strategy to mitigate the effects of high stream flows on the collection system for the Nathanson Creek crossings at France Street, Chase Street, and MacArthur Street*	In progress. Maintained in 2021 LHMP. SVCSD Mitigation Action List.
		3.4.1	Develop and Implement a design strategy to mitigate the effects of wild-land fire on critical facilities.	No progress. Maintained in 2021 LHMP. SVCSD Mitigation Action List.

Tier 1	B1	3.1.3	Develop and implement a design strategy to mitigate the effects of liquefaction on the collection system (non-trunk) in areas that have very high to high liquefaction potential	No progress. Maintained in 2021 LHMP. SVCSD Mitigation Action List.
		3.2.3	Develop and implement a design strategy to mitigate the effects of a landslide on the trunk main at the Sonoma Creek crossing near Riverside Road/ W. Napa Street	No progress. Maintained in 2021 LHMP. SVCSD Mitigation Action List.
		3.1.8	Develop and implement a design strategy for the Sonoma Creek crossing at Madrone Road to protect the trunk main from significant damage during a seismic event	No progress. Maintained in 2021 LHMP. SVCSD Mitigation Action List.
		3.1.9	Develop and implement a design strategy for Sonoma Creek crossing at Agua Caliente Road to protect the collection system from significant damage during a seismic event	No progress. Maintained in 2021 LHMP. SVCSD Mitigation Action List.
		3.1.2	Develop and implement a design strategy to mitigate the effects of liquefaction on the trunk main in areas that have very high to high liquefaction potential	No progress. Maintained in 2021 LHMP. SVCSD Mitigation Action List.
		3.3.2	Develop and implement a design strategy to mitigate the effects of high stream flows on the collection system for the Lilley Creek crossing at West Thompson Avenue	No progress. Maintained in 2021 LHMP. SVCSD Mitigation Action List.
		3.2.2	Develop and implement a design strategy to mitigate the effects of a landslide along Buena Vista Avenue	No progress. Maintained in 2021 LHMP. SVCSD Mitigation Action List.
		3.3.4	Develop and implement a strategy to mitigate the effects of storm water inflow and infiltration on the collection system during significant rain storms	In progress. Maintained in 2021 LHMP. SVCSD Mitigation Action List.
Tier 2	A2	3.1.11	Seismically retrofit suspended ceiling over office area and water quality lab.	No progress. Maintained in 2021 LHMP. SVCSD Mitigation Action List.
		3.1.4	Develop and implement a design strategy to mitigate the effects of liquefaction on the trunk main in areas that have moderate liquefaction potential	No progress. Maintained in 2021 LHMP. SVCSD Mitigation Action List.
	B2	3.1.10	Seismically retrofit chlorine building including chlorinators, piping, and rail system.	No progress. Maintained in 2021 LHMP. SVCSD Mitigation Action List.
		3.1.5	Develop and implement a design strategy to mitigate the effects of liquefaction on the collection system (non-trunk) in areas that have moderate liquefaction potential	No progress. Maintained in 2021 LHMP. SVCSD Mitigation Action List.

* Indicates priority elevated due to current efforts on this action.

Appendix F

InfraTerra Technical Memorandum

InfraTerra

MEMORANDUM

InfraTerra, Inc.
5 Third St, Suite 420
San Francisco, CA 94103

From:	InfraTerra, Inc.
To:	Parastou Hooshialsadat
Subject:	SVCSD LHMP Update Task 1: Wastewater System Data Collection Summary Rev 2
Date:	August 9, 2021

This memorandum describes information collected and reviewed as part of Task 1: Wastewater System Data Collection for the LHMP Update Project for the Sonoma Valley County Sanitation District ("District"). As part of this task, InfraTerra conducted a site visit at District facilities and reviewed available geographic information system (GIS) data, drawings, and reports.

1. Site Visit:

The site visit was conducted on March 8, 2021 by Ahmed Nisar, PE and Nikolay Doumbalski, PE. The facilities visited include:

- Facilities at the Wastewater Treatment Plant (WWTP) such as: clarifiers, aeration basins, equalization basins, chlorine contact basins, chemical storage facility, pump stations, sludge thickener, screw press building, flow control structures etc.
- Reclamation Ponds
- Pump Stations

Conclusion: We request to schedule an additional site visit to collect structure properties. This site visit will also need access to under the roof space to verify the roof to wall connections for the buildings.

The additional site visit at the WWTP was conducted on May 4, 2021 Nikolay Doumbalski, PE; Vladimir Calugaru, PhD, PE; and Wen-Yi Yen.

2. GIS Data

InfraTerra received access to the District's Sewer Map and Recycled Water Map. The Sewer Map contains downloadable record documents for select facilities. Additionally, InfraTerra requested and received the following GIS Shapefiles:

- SVCSD_RW_Ponds
- SVCSD_SewerMH
- SVCSD_SewerPipe
- SVCSD_WTP_Features
- SVCSD_Recycled
- SVCSD_Boundary

These shapefiles include locations of the District's facilities as well as pipeline properties.

Conclusion: At this time, no additional GIS data is needed.

3. Drawings

Drawings (downloaded from District's One Drive and District GIS Map) include:

- Reservoir R1 Pipeline Extension (set of 9 drawings)
- Reservoir R1 Emergency Repair Project (set of 22 drawings)
- R1 Reservoir Capacity Table (1 page)
- Reservoir R2 Emergency Repair Project (set of 18 drawings)
- Reservoir R2 Pipeline to Manzoni Property (set of 12 drawings)
- R2 Reservoir Capacity Table (1 page)
- Effluent Storage Reservoir R4 (set of 35 drawings)
- Effluent Reservoir R4 & Pump Station
- Effluent Reservoir R5 (set of 31 drawings)
- Pump Station G1 (set of 2 drawings)
- Pumping and Piping Upgrades (set of 32 drawings)
- Napa Salt Marsh Restoration Pipeline (set of 60 drawings)
- T-4b Irrigation Pipeline Extension (set of 6 drawings)
- Fifth Street East Recycled Water Pipeline (set of 23 drawings)
- Sonoma Valley Treatment Plant. Electrical Resiliency (set of 22 drawings)
- Sonoma Valley Treatment Plant. Electrical Site Plan and PLC Plan (set of 4 drawings)
- SV Wastewater Reclamation Facilities (set of 78 drawings)
- SV Wastewater Reclamation Facilities – 1978 (set of 188 drawings)
- Fifth Street East Recycled Water Pipeline (set of 23 drawings)
- Biosolids Management Upgrade (set of 61 drawings)
- Aeration System Improvements, Phase III and Decant Tank Removal (set of 30 drawings)
- Tertiary Treatment Plant Upgrade (set of 63 drawings)
- Treatment Plant Aboveground Diesel Fuel Tank Project (set of 18 drawings)
- Chlorine Contact Tank Upgrade (Set of 12 drawings)
- Secondary Clarifiers Upgrade (Set of 51 drawings)
- Headworks and Grit Chamber Upgrade (set of 106 drawings)
- Plant Electrical Service and Generator Replacement Project (set of 29 drawings)
- Emergency Gas Scrubbing System (set of 6 drawings)
- Sewer Trunk Main Replacement Phase 4C (Agua Caliente Creek Crossing to Happy Lane) (set of 21 drawings)
- Sonoma Valley Trunk Main Replacement Phase 4 & 5 (1 page)
- Sonoma Valley Trunk Replacement Phase 4 (1 page)

Conclusion: At this time, we do not have additional drawing requests.

4. Reports

Geotechnical reports received from the District include:

- Reclamation Facilities, Subsurface Investigation, September 1977
- Retention Reservoirs, Geotechnical Investigation and Remedial Options, March 1993
- Carneros Business Park, Soils Investigation, January 1998
- Second Clarifier Upgrade Project, Subsurface Investigation, October 1998
- Biosolids Management Upgrade Project, Geotechnical Engineering Investigation Report, July 2007
- Sonoma Valley Treatment Plant, Bore Pits, October 2007
- Proposed Aboveground Diesel Fuel Tank, Geotechnical Reconnaissance and Recommendation, February 2009
- Sonoma Valley Effluent Reservoir R5, Geotechnical Report, January 2011
- Napa-Sonoma Salt Marsh Restoration Pipeline, Geotechnical Recommendations Report, April 2011
- Fifth Street East Recycled Water Pipeline, Proposed Nathanson Creek Crossing, Geotechnical Investigation Report, December 2014.
- Sewer Trunk Replacement Project – Reach A, Ramon Street and Sonoma Highway Area, Geotechnical Investigation Report, June 2015
- Sewer Trunk Replacement Project – Reach B, Ramon Street and Maxwell Park Area, Geotechnical Investigation Report, June 2015
- Planned Floating Photovoltaic Power Plant over Effluent Reservoir R5, Geotechnical Investigation, June 2017
- Sewer Trunk Main Replacement Project, Geotechnical Investigation Report, March 2020
- Seismically Retrofitted Clarifier Equipment, Seismic Hazards and Geotechnical Report, April 2021

Subsurface explorations have been geospatially compiled and were generally located within the vicinity of the wastewater treatment facility, along the trunk mains and recycled water pipelines, and within the R1 and R2 vicinity.

Additional reports received from the District include:

- Sanitary Sewer Capacity Assessment and Master Plan, April 2016
- 2020-2025 Capital Improvement Plan, 2020
- Reclamation Pond 1 Inundation Study, September 2020
- Reclamation Pond 2 Inundation Study, September 2020
- Draft Strategic Plan, Sonoma County Water Agency, 2017
- Natural Hazard Reliability Assessment, June 2015
- 2016 Local Hazard Mitigation Plan, September 2016
- Emergency Response Plan, AWIA Update, September 2020
- Sonoma Valley County Sanitation District, Recycled Water System Plan, August 2018

5. Other

Other data received from the District include:

- Permit documentation for R2 (2019)
- SVCSD LHMP 2016 Actions and Status Update (Excel spreadsheet format)
- Photos from the Hooker Creek crossing

Conclusion: At this time, we do not have any specific report requests. If additional geotechnical or other applicable reports are made available during the duration of this project, we request that they are shared with us.

Appendix G

Water Agency Organizational Chart

Sonoma County Water Agency
Position Allocations: 247

Updated: November, 2021

Water Agency General Manager

- 1 - Administrative Aide - Confidential

Environmental Resources Division

Environmental Resources
- 2 – WA Environmental Resources Manager
- 4 – WA Principal Environmental Specialist
- 7 – WA Senior Environmental Specialist
- 6 – WA Environmental Specialist
- 3 – WA Resource Programs Technician

1 - WA Assistant General Manager

Community and Government Affairs Division
1 – WA Community Affairs Manager and Ground Water Administrator

Water Education
- 1 – WA Principal Programs Specialist
- 2 – WA Senior Programs Specialist
- 2 – WA Programs Specialist

Community Affairs
- 1 – WA Government Affairs Manager
- 1 – WA Principal Programs Specialist
- 2 – WA Senior Programs Specialist
- 2 – WA Programs Specialist

Administrative Services
1 - WA Division Manager

Risk Management
- 1 – Risk Management Analyst III
- 1 – Risk Management Analyst II

Human Resources & Administration
- 1 – Administrative Services Officer II

Recruiting, Training & Payroll
- 1 – Administrative Services Officer I
- 1 – Department Analyst
- 1 – Payroll Clerk
- 1 – Senior Office Assistant

Records Management/Clerical
- 1 – Department Analyst
- 1 – Administrative Aide
- 6 – Senior Office Assistant

Budgets/Accounting/Long Range Financial Planning
- 1 – Administrative Services Officer II

Grants and Funded Projects
- 2 – Administrative Service Officer I
- 1 – Department Analyst
- 1 – Accountant II
- 4 – WA Technical Writing Specialist
- 1 – Accounting Technician

Budgeting
- 1 – Administrative Services Officer I
- 1 – Accounting Technician

Accounting
- 1 – Accountant III
- 1 – Administrative Aide
- 1 – Accounting Technician
- 1 – Senior Account Clerk
- 2 – Account Clerk II

Engineering and Resource Planning
1 - WA Chief Engineer/Director of Groundwater Management

Engineering
1 – WA Deputy Chief Engineer

Energy Resources
- 1 – WA Principal Engineer
- 1 – WA Engineer

Survey/Right-of-Way
- 1 – WA Land Surveyor
- 1 – Licensed Land Surveyor
- 4 – WA Engineering Technician
- 1 – Supervising Right of Way Agent
- 1 – Right of Way Agent

Construction Management Contract Administration/ Inspection
- 1 – WA Principal Engineer
- 1 – WA Engineer
- 2 – WA Engineering Technician
- 2 – Project Specialist

Design Engineering
- 1 – WA Principal Engineer
- 6 – WA Engineer
- 1 – Project Specialist

Drafting/GIS
- 1 – WA GIS/CAD Coordinator
- 3 – WA GIS Analyst
- 2 – WA Engineering Technician

Resource Planning
- 1 – WA Principal Engineer
- 5 – WA Engineer
- 1 – WA Hydrogeologist

Groundwater Resources
- 1 – WA Principal Hydrogeologist
- 2 – WA Hydrogeologist

Technical Writing
- 1 – Technical Writing Manager
- 2 – WA Senior Technical Writing Specialist
- 4 – WA Technical Writing Specialist

Water Use Efficiency
- 1 – WA Principal Programs Specialist
- 2 – WA Senior Programs Specialist
- 1 – WA Program Specialist
- 1 – WA Resource Programs Technician

Emergency Response
- 1 - Administrative Service Officer II
- 1 - Department Analyst
- 1 - Secretary

Water/Wastewater Operations
1 - WA Assistant General Manager

1 – WA Operations & Maintenance Mgr.

Operations Engineering
- 1 – WA Principal Engineer
- 5 – WA Engineer
- 1 – WA Engineering Technician

Laboratory
- 1 – WA Coordinator
- 4 – WA Chemist
- 1 – WA Engineering Technician

Water/Wastewater Operations
- 3 – WA Coordinator
- 16 – WA Senior Plant Operator

Instrumentation/Electrician
- 1 – WA Principal Engineer
- 3 – WA SR Electrician/Instrumentation Technician
- 4 – WA Electrician/Instrumentation Technician II

Computer Instrumentation / Applications Support
- 1 – Engineering Programming Manager
- 1 – Dept. Information Systems Manager
- 3 – WA SCADA Tech. Analyst
- 1 – Systems Software Analyst
- 1 – Senior Business Systems Analyst
- 2 – HS Systems and Programming Analyst
- 1 – Dept. Information Systems Coordinator
- 2 – Dept. Information Systems Specialist

Maintenance
1 - WA Assistant General Manager

1 – WA Operations & Maintenance Mgr.

Maintenance Mechanic Services
- 1 – WA Operations & Maintenance Mgr.
- 3 – WA Coordinator
- 6 – WA Lead Mechanic
- 21 – WA Mechanic
- 1 – Material/Equipment Specialist
- 1 – Sr. Heavy Equipment Technician
- 1 – Heavy Equipment Technician
- 1 – Automotive Technician

Environmental Services Maintenance/Facilities
- 1 – WA Coordinator
- 2 – WA Lead Maintenance Worker
- 5 – WA Senior Maintenance Worker
- 3 – WA Maintenance Worker II
- 2 – Environmental Compliance Inspector
- 1 – Environmental Compliance Technician

Field Operations
- 1 – WA Coordinator
- 1 – WA Engineer
- 2 – WA Lead Maintenance Worker
- 1 – WA Vegetation Control Advisor
- 9 – WA Senior Maintenance Worker
- 1 – WA Maintenance Worker II