2022 Santa Rosa Water Infrastructure Report

SERVING OUR COMMUNITY

Santa Rosa Water protects public health and the environment by providing a safe and reliable water supply, wastewater collection and treatment, beneficial reuse of recycled water and biosolids, and storm water management.

By providing these critical services to households, businesses, schools, hospitals, and others, Santa Rosa Water takes steps each day to achieve its mission and uphold its values.

For more information about Santa Rosa Water, please visit srcity.org/water.

REPORT CARD PURPOSE AND PROCESS

The Santa Rosa Water Infrastructure Report Card summarizes the results of a high-level assessment of the condition of water infrastructure. The assessed infrastructure categories include Santa Rosa's Drinking Water System, Wastewater System (Local Sewer), and Regional Water Reuse System.

The purpose of the report is to inform the public and decision makers about the current condition of these systems and to identify recommendations for improving them over time.

The infrastructure assessment relied on interviews of system managers, review of reports and documents, analysis of system data, and financial projections. To assign grades, staff used an established scale from Exceptional (A) to Failing (F), based on the American Society of Civil Engineers (ASCE) guidelines and criteria. Appendix A provides more details and definitions for the ASCE grading scale and criteria.

OUR MISSION

Provide essential water services and invest in a sustainable future for our community.

OUR VALUES

Excellence - driving change through leadership, seeking improvement, and providing continuous professional development/training, with an emphasis on technical expertise, efficiency, and high-quality customer service.

Integrity - striving to meet the highest standards and produce the highest quality work by being accountable, honest, and transparent.

Teamwork - working toward a common goal with collaboration, participation, understanding, and respect.

Transparency - maintaining credibility and trust through participatory decision-making and timely communication.

Innovation - being open to new ways of doing business and encouraging out of the box thinking and leadership in change.

Inclusiveness - creating a culture of belonging, respect, and acceptance by putting yourself in someone else's shoes.

OUR FUTURE IN EVERY DROP

DRINKING WATER SYSTEM

GRADE: B (GOOD, ADEQUATE FOR NOW)

Installation of Water Distribution Main

Providing a Safe and Reliable Water Supply

Santa Rosa Water delivers approximately six billion gallons of drinking water each year to over 53,680 metered connections serving approximately 176,000 residents and thousands of commercial, industrial, institutional, and landscape irrigation customers.

The city's water supply relies on the Russian River for 95 percent of its drinking water in the form of wholesale deliveries from the Sonoma Water. The remaining 5 percent is produced by two city-owned groundwater wells that provide water in dry months (typically April to October) to assist with meeting peak demands. The city also provides recycled water for a small number of urban sites for irrigation purposes, offsetting demand for potable water by about 0.7 percent each year.

DRINKING WATER SYSTEM

53,100 services
627 miles of pipe
20 pump stations
6,500 fire hydrants
29,300 valves
51,500 meters
22 reservoirs

For over 30 years, Santa Rosa Water has implemented water use efficiency programs to help the community reduce demand. Combined with early adoption of State building codes and local ordinances, Santa Rosa's programs have achieved a significant decrease in water use despite a 57 percent increase in population from 1990 to 2020. Total water use in 2020 was 14 percent less than in 1990, and gross water use per capita decreased by 45 percent.

Santa Rosa's drinking water system is continually monitored to ensure that drinking water meets or exceeds safe drinking water requirements regulated by the U.S. Environmental Protection Agency and State Water Resources Control Board.

The city's water distribution system contains 627 miles of pipe, which is the backbone infrastructure of the water delivery system. Approximately 305 miles of water distribution mains were installed between 1960 and 1985 and will need to be replaced beginning in 2025.

In recent years, water system improvements have focused on public health and safety, addressing areas such as fire flow capacity, seismic upgrades, and system redundancy.

Capacity - Does the infrastructure meet current and future demands?

The city's water distribution system is appropriately sized and has the ability to meet current and anticipated future demands. Though there are some minor upgrades planned to improve water system capacity, and these upgrades are not considered urgent.

Due to drought conditions, Sonoma Water provided allocations to the city resulting in a 20 percent reduction in water supply in 2021 and 2022. The city implemented its Water Shortage Contingency Plan, and the community responded by reducing water use by 18 percent. Because climate change will likely increase the frequency and severity of droughts, Santa Rosa Water embarked on a study in 2022 to identify opportunities to reduce vulnerability to water shortages and enhance long-term supply reliability. The study will be completed in 2023, and the resulting Water Supply Alternatives Plan will include a long-range plan for diversifying (and increasing)

the city's water supply portfolio by 2045.

Condition - What is the existing and near-future physical condition?

Overall, the city's drinking water distribution system is in good condition and experiences minimal leaks when compared to the American Water Works Association's (AWWA) optimization goal of 15 pipe breaks per 100 miles of pipe per year. In 2022, the city had a total of 2 main breaks, which is a pipe break rate of 0.33 pipe breaks per 100 miles of pipe per year.

Though the existing condition of the drinking water system is good, the majority of the system consists of aging asbestos-concrete (AC) pipe which is due for replacement over the upcoming 25 years. While Santa Rosa has seen more years of service from AC pipe than anticipated (based on performance in other areas), these mains are reaching the end of their service lifespan. Without adequate replacement and rehabilitation, the pipe break rate will increase.

Funding Level - How does funding compare to needed improvements?

Significant funding must be allocated to support ongoing inspections, maintenance, rehabilitation, and replacement of the distribution system in order to maintain its good condition.

For fiscal year 2022-2023, the water system has a capital budget allocation of $14 million. However, the 10-year capital project priorities cost is estimated to be approximately $340 million. Therefore, the city should be allocating $34 million per year, 2.4 times the allocation for 2022-2023, to ensure the system's current condition and resilience.

Operations & Maintenance – Is the system operated & maintained in compliance with regulations?

The drinking water system is consistently operated and maintained in compliance with local, state, and federal regulations. System operators perform preventative maintenance on each of the city's 6,500 hydrants at least once every 10 years. Staff perform proactive leak detection, and Water crews respond promptly to repair leaks and water main breaks. In addition, staff conduct a Water Loss Audit each year in compliance with State regulations. On average, real water losses from the distribution system each year are approximately 16 gallons per connection, which makes the city one of the lead performers in meeting leak loss standards.

Public Safety – Is the public's safety jeopardized?

The California State Water Resources Control Board and the US Environmental Protection Agency (US EPA) set water quality standards and determine enforceable maximum levels of contaminants in drinking water. Before city drinking water reaches customers, Santa Rosa and its water wholesaler, Sonoma Water, take many steps to ensure its quality. This includes bacterial disinfection, pH treatment to prevent pipe corrosion, regular testing throughout the distribution system, and on-going maintenance to ensure water meets or exceeds state and federal drinking water requirements for primary (health-based) and secondary (taste and odor) standards. Each year Santa Rosa produces its Water Quality Report (also known as a Consumer Confidence Report) and provides it to all customers and the public at large, as required by the US EPA.

Resilience – Does the system have the ability to prevent or protect against multi-hazard threat, events? Could it quickly recover and reconstitute critical services?

The resilience of the drinking water system is currently considered to be adequate. The system has been designed with enough redundancy that unplanned outages are kept to a minimum and work is being conducted to incorporate seismic upgrades throughout the system where necessary. To ensure the system can continue to operate during power interruptions, Santa Rosa Water has invested in portable generators to power stations.

Should a short-term loss of water supply from Sonoma Water occur, water storage would provide approximately 94 hours (3.9 days) of water supply. In addition, Santa Rosa's production wells can provide up to 2.5 million gallons of drinking water per day during emergencies. The city also has three emergency wells which are currently being assessed and prepared for rehabilitation (Carley, Peters Springs, and Leete wells) and one new emergency well (at Place to Play Park) slated for completion in 2023. Completion of the emergency well projects will add about 2.7 million gallons of drinking water per day for emergency supply. Combined with production wells, Santa Rosa Water will have a capacity to produce 5.2 million gallons per day during emergencies. As mentioned previously, the Water Supply Alternatives Plan project is underway and will provide a path forward for increasing and diversifying the city's water supply production capacity to further enhance resiliency and reliability.

Operations infrastructure improvement efforts have also focused on increasing pumping capacity from aqueduct turnouts at several pump stations to move more water when needed to increase fire flow capacity during major fire events. The fire flow needs of other areas served by other pump stations are being assessed to consider if greater pumping capacity would be warranted.

All of these efforts have positioned the city to be competitive for infrastructure resiliency grants.

Innovation – What innovated techniques, materials, technologies are being implemented?

Systemwide upgrades are being installed to optimize communications of SCADA data to improve system operations. All generators have been updated to models that use cleaner burning diesel to increase reliability and include "belly tanks" to contain any potential spills more easily. As stations are rebuilt, they are being constructed to be as fire-safe and fire-resistant as possible. In addition, pump motors throughout the system have been updated to be controlled by variable frequency drive technology to optimize pumping efficiency.

Recommendations for Raising the Grade

The grade for the Water System could be improved by continuing fire flow improvements and initiate a program to replace the water transmission and distribution pipe segments that cross the Rodgers Creek fault with an earthquake resistant design and materials.

WASTEWATER SYSTEM (LOCAL SEWER)

GRADE: C+ (MEDIOCRE TO GOOD, REQUIRES ATTENTION)

Sewer Pipe Replacement Project

Protecting Public Health & the Environment

Well-managed sanitary sewer systems are essential to sustaining a community's quality of life and long-term economic vitality. Protecting public health, the environment, and extending the useful life of our wastewater management infrastructure must remain a top priority.

The city's sanitary sewer system serves 49,000 customer accounts in Santa Rosa, serving approximately 176,000 residents and thousands of commercial, industrial, institutional, and landscape irrigation customers.

WASTEWATER SYSTEM

49,000 services
600 miles of main
12,300 manholes
17 pump stations

The infrastructure includes 600 miles of main, with 72 miles of trunks. Approximately 220 miles of collection system piping were installed between 1960 and 1985 and will need to be replaced beginning in 2025. The rehabilitation of sewer trunks (which do not need upsizing) will comprise most of the sanitary sewer system work over the next 10 years. Significant additional funds for the capital improvement program are necessary to continue replacing and rehabilitating aging mains.

Sections of the sanitary sewer system built over sixty years ago have reached the end of their original design service life. As their condition deteriorates, these older sections are more prone to root intrusion, offset joints, debris, grease build-up, and site-specific failures that can result in sewer spills. For these reasons, sustained funding must be continued to support ongoing inspections, maintenance, rehabilitation, and replacement of the collection facilities.

Capacity - Does the infrastructure meet current and future demands?

The city's sanitary sewer system is generally adequately sized for current and future development under normal weather conditions. During an intense rain event, defined as a 10-year 24-hour storm, there is the potential for sewer overflows in limited locations. This potential will likely increase due to the higher frequency and intensity of rain events due to climate change. In new high-density development areas (other than downtown), existing main sizes may prove to be inadequate and require upsizing.

Condition - What is the existing and near-future physical condition?

In 2022, the city's sanitary sewer system experienced just 0.17 overflows per 100 miles of pipe per year, compared to the industry average of 25 overflows per 100 miles of pipe per year (the city's five-year average was 0.44). However, the backbone of the system is experiencing degradation due to interior corrosion. Of the city's 12.6 miles of large diameter reinforced concrete trunk mains, nearly 5 miles have been identified as "priority" or "near priority" for rehabilitation as determined through condition assessments. Additionally, of the city's 33 sewer siphons, 14 have been identified as needing rehabilitation in the next five years and another 9 will need to be rehabilitated in the next ten years.

Funding Level - How does funding compare to needed improvements?

Significant funding must be allocated to support ongoing inspections, maintenance, rehabilitation, and replacement of the wastewater collection system in order to improve its condition.

For the fiscal year 2022-2023, the sanitary sewer system has a capital budget allocation of $13 million. However, the 10-year capital project priorities cost is estimated to be approximately $422 million. Therefore, the city should be allocating $42 million per year, which is three times more than the allocation for 2022-2023, to ensure the system's current condition and resilience.

Operations & Maintenance – Is the system operated & maintained in compliance with regulations?

The sanitary sewer system is consistently operated and maintained in compliance with local, state, and federal regulations. Operations staff perform visual assessments through the deployment of closed-circuit television cameras in all 600 miles of the collection system every seven years. Cleaning of the system occurs on a five-year cycle, and problem areas are targeted for more frequent cleanings. The system's 33 siphons undergo preventative maintenance monthly. Despite this level of service and high operability, the operations team has experienced challenges such as staff turnover and supply chain issues for parts and equipment which could negatively impact operations in the future.

Public Safety – Is the public's safety jeopardized?

The most significant areas of risk to public safety include failures of trunk lines and siphons. Areas of highest concern have been identified (e.g., trunks running under creeks) and are slated for replacement and/or lining. The worst-case scenario risks include collapse or blockages in sewer mains that could cause backups (in homes, businesses, etc.) for a short period of time and/or major spills that surface above ground and/or discharge to local water ways. Fortunately, emergency plans have been developed to respond quickly should infrastructure failures occur in the sanitary sewer system.

Resilience – Does the system have the ability to prevent or protect against multi-hazard threat events? Could it quickly recover and reconstitute critical services?

The city's sanitary sewer system is vulnerable to catastrophic events. Wildfire poses a risk to nine of the city's 17 sewer pump stations. Four of the sewer trunks cross the Rodgers Creek fault line, and a 2020 Catastrophic Reserve Study of the system indicated that a major earthquake would likely result in damage to 600+ pipes as well as 15 pump stations. However, the city has submersible pumps to operate failed stations under emergency conditions as needed.

Innovation – What innovated techniques, materials, technologies are being implemented?

Santa Rosa Water has focused on modernizing SCADA and communications equipment and technology, as well as upgrading pumps for increased reliability and reduced susceptibility to clogging. In addition, Operations teams use data to analyze and ensure effective pump operation and optimize system capacity to prevent overflow risk.

Recommendations for Raising the Grade

The grade for the Wastewater System could be improved by hardening pump stations located in wildfire urban interface areas, continuing to rehabilitate the aging trunk lines and initiate a program to replace the trunk and collection pipeline segments that cross the Rodgers Creek fault with an earthquake resistant design and materials.

REGIONAL WATER REUSE SYSTEM

GRADE: D+ (POOR TO MEDIOCRE, AT RISK)

Wastewater Treatment & Beneficial Reuse

Santa Rosa Water owns and operates the Santa Rosa Regional Water Reuse System (Water Reuse System), which includes wastewater treatment, water reuse (irrigation for agricultural and urban sites and recharge of the Geysers steam fields), and beneficial reuse of biosolids. Santa Rosa Water has four additional partners, the Cities of Cotati, Rohnert Park, Sebastopol and the South Park County Sanitation District (Regional Partners) that have purchased capacity in the system.

Regional Wastewater Treatment

WATER REUSE SYSTEM

Treatment facilities
Seasonal storage ponds
Geysers conveyance
Recycled water distribution system
Biosolid Storage Facilities

The hub of these operations is the Laguna Treatment Plant (Plant). The Plant serves a regional population of 236,000 and thousands of commercial, industrial, and institutional customers in the communities of Santa Rosa, Rohnert Park, Sebastopol, Cotati, the South Park County Sanitation District, and some unincorporated parts of Sonoma County. An update to the 2018 Water Reuse System Master Plan is under development and will guide essential infrastructure improvements over the next 20 years.

Many of the Water Reuse facilities were built over 60 years ago and have reached the end of their original design service life. Assets of concern include aging structures, mechanical and electrical equipment, and many miles of buried pipes. As their condition deteriorates, the performance of these older assets decline, and their potential for failure may increase. These assets will need major rehabilitation or replacement to ensure the Water Reuse system continues to meet the community's needs. Significant funding is needed for ongoing inspections, maintenance, rehabilitation, and replacement of the Water Reuse system.

Capacity - Does the infrastructure meet current and future demands?

Currently, the Plant has a maximum flow capacity of 48.5 million gallons per day due to limitation of the existing ultraviolet light (UV) disinfection system, which is currently being replaced. Once the new UV disinfection system comes online, the Plant is projected to have a nominal maximum flow capacity of approximately 70 million gallons per day. Modeling shows this capacity to be sufficient for the foreseeable future. The reclaimed water distribution system is adequately sized for ongoing operations. The volume of recycled water supply, however, has been limited in recent years due to drought conditions. Climate change models anticipate that droughts will occur with greater frequency and/or severity in the future, which will impact recycled water supply.

Condition - What is the existing and near-future physical condition?

Many of the Plant's processes are significantly deteriorated. Various critical assets have failed or are in poor condition. For example, the headworks, which is the foundation and first step of the treatment process, is considered highly vulnerable to seismic events. The primary sludge pumping gallery has substantial leaks, the aeration header has failed, and the plant's electrical system lacks redundancy and is considered fragile.

Due to the age of several assets at the Plant, a higher level of maintenance is required to keep systems up and running. Availability of parts has been impacted by supply chain issues and outdated equipment (parts no longer supported by manufacturers) so that operations staff have had to design and manufacture custom repair parts. The fragile nature of the plant's electrical system limits the level of preventative maintenance that can be performed without risking an electrical system failure. Without adequate funding and staff for capital improvement program implementation, this infrastructure will continue to degrade.

Funding Level - How does funding compare to needed improvements?

In the last several years, significant projects such as the headworks replacement of major structural and mechanical equipment replacement have been delayed due to funding and staffing shortfalls. These delays have increased the risk of system failure.

For fiscal year 2022-2023, the regional water reuse system has a capital budget allocation of $9 million, with agreement by the Regional Partners to increase the capital budget by $1 million per year. However, the 10-year capital project priorities cost is estimated to be approximately $260 million. Therefore, the city should be allocating $26 million per year, which is nearly three times more than the allocation for 2022-2023, to ensure the system's current condition and resilience.

Operations & Maintenance – Is the system operated & maintained in compliance with regulations?

In general, the system was largely compliant in 2022. There were occasional National Pollution Discharge Elimination System permit violations in 2022 due to human error (monitoring violations and UV violations) and infrastructure issues (recycled water distribution pipe breaks and end-user irrigation pipe breaks). Due to supply chain issues, some air quality violations occurred related to the combined heat and power facility.

Public Safety – Is the public's safety jeopardized?

Given the remote location of most of the Regional System components, risk to human health and safety remains fairly low despite infrastructure needs. The greatest risk of failure would be to aquatic life and waters of the state.

Resilience – Does the system have the ability to prevent or protect against multi-hazard threat events? Could it quickly recover and reconstitute critical services?

Efforts have been made in recent years to mitigate risk at the Plant. A temporary flood wall surrounding vulnerable sections of the Plant was constructed to mitigate the impact of relatively frequent flooding events but does not protect the Plant from a 100-year storm event.

The Plant has developed a comprehensive backup power system, making operations resilient to loss of utility provided electricity. However, several of the Plant's systems, including its electrical grid, are vulnerable to natural hazards and typically do not have redundancy.

Innovation – What innovated techniques, materials, technologies are being implemented?

The new UV system being installed will have a diversion system to automatically return incompletely disinfected water back to the beginning of the treatment process. In addition, the Plant receives high-strength waste which produces more biogas to fuel onsite power production. This benefits the Plant as well as reducing the carbon footprint by reducing the vehicle miles driven by waste haulers. Finally, in most years, 100 percent of the recycled water is used beneficially. Two-thirds of the recycled water is delivered to the Geysers to recharge steam fields used by Calpine to generate clean electricity for the region. The balance of recycled water is used by agriculture and urban customer for irrigation, reducing the amount of groundwater and potable water used.

Recommendations for Raising the Grade

Two key measures are needed to raise the grade, including increasing capital improvement program staffing levels to implement projects and increasing capital improvement funding levels to meet current and anticipated needs.

APPENDIX A

American Society of Civil Engineers

Infrastructure Report Card Grading Scale

https://infrastructurereportcard.org/making-the-grade/

EXCEPTIONAL, FIT FOR THE FUTURE

The infrastructure in the system or network is generally in excellent condition, typically new or recently rehabilitated, and meets capacity needs for the future. A few elements show signs of general deterioration that require attention. Facilities meet modern standards for functionality and are resilient to withstand most disasters and severe weather events.

GOOD, ADEQUATE FOR NOW

The infrastructure in the system or network is in good to excellent condition; some elements show signs of general deterioration that require attention. A few elements exhibit significant deficiencies. Safe and reliable, with minimal capacity issues and minimal risk.

MEDIOCRE, REQUIRES ATTENTION

The infrastructure in the system or network is in fair to good condition; it shows general signs of deterioration and requires attention. Some elements exhibit significant deficiencies in conditions and functionality, with increasing vulnerability to risk.

POOR, AT RISK

The infrastructure is in poor to fair condition and mostly below standard, with many elements approaching the end of their service life. A large portion of the system exhibits significant deterioration. Condition and capacity are of serious concern with strong risk of failure.

FAILING/CRITICAL, UNFIT FOR PURPOSE

The infrastructure in the system is in unacceptable condition with widespread advanced signs of deterioration. Many of the components of the system exhibit signs of imminent failure.

About The Report Card for America's Infrastructure

Every four years, America's civil engineers provide a comprehensive assessment of the nation's 17 major infrastructure categories in ASCE's Report Card for America's Infrastructure. Using a simple A to F school report card format, the Report Card examines current infrastructure conditions and needs, assigning grades and making recommendations to raise them.

The ASCE Committee on America's Infrastructure, made up of 31 dedicated civil engineers from across the country with decades of expertise in all categories, volunteers their time to work with ASCE Infrastructure Initiatives staff to prepare the Report Card. The Committee assesses all relevant data and reports, consults with technical and industry experts, and assigns grades using the following criteria:

Methodology

CAPACITY
Does the infrastructure's capacity meet current and future demands?

CONDITION
What is the infrastructure's existing and near-future physical condition?

FUNDING
What is the current level of funding from all levels of government for the infrastructure category as compared to the estimated funding need?

FUTURE NEED
What is the cost to improve the infrastructure? Will future funding prospects address the need?

OPERATION AND MAINTENANCE
What is the owners' ability to operate and maintain the infrastructure properly? Is the infrastructure in compliance with government regulations?

PUBLIC SAFETY
To what extent is the public's safety jeopardized by the condition of the infrastructure and what could be the consequences of failure?

RESILIENCE
What is the infrastructure system's capability to prevent or protect against significant multi-hazard threats and incidents? How able is it to quickly recover and reconstitute critical services with minimum consequences for public safety and health, the economy, and national security?

INNOVATION
What new and innovative techniques, materials, technologies, and delivery methods are being implemented to improve the infrastructure?