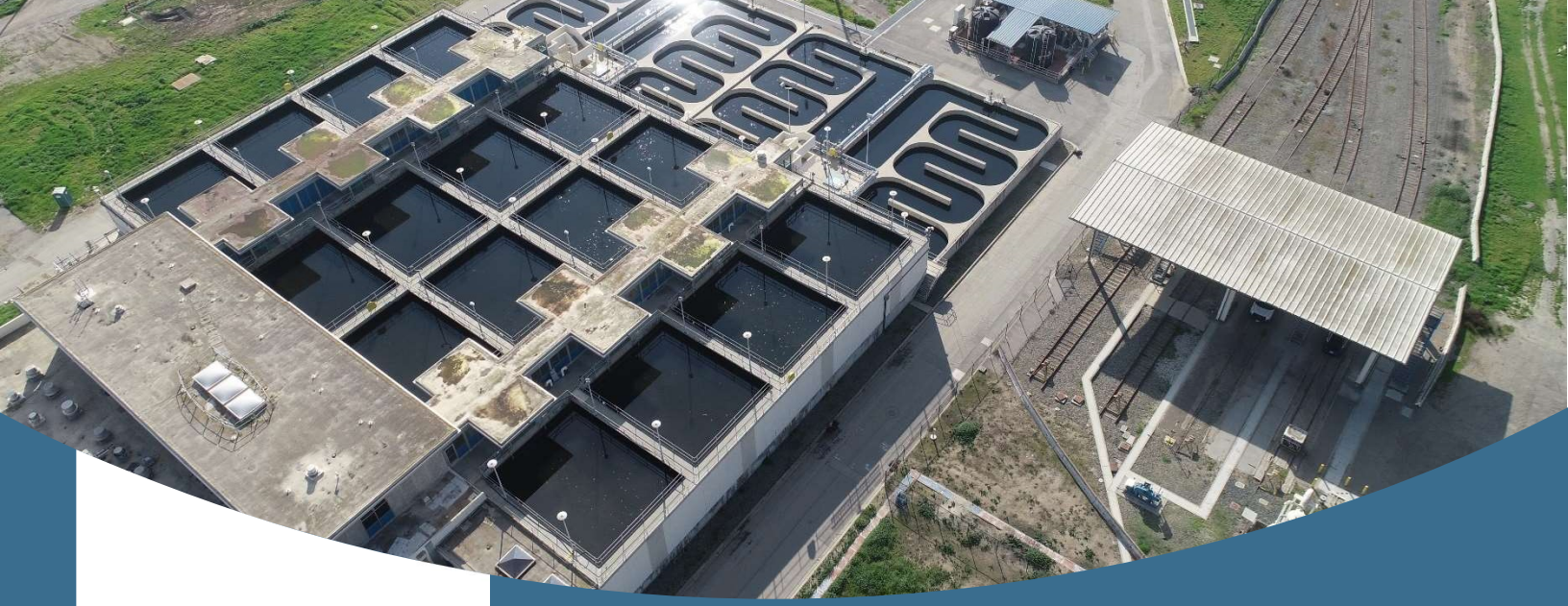
San José-Santa Clara
Regional Wastewater Facility

CIP

CAPITAL IMPROVEMENT PROGRAM

Quarterly Status Report:
October – December 2022

MISSION
Rebuild and revitalize the Regional Wastewater Facility and deliver the CIP on time and within budget.



CAPITAL IMPROVEMENT PROGRAM

HOW ARE WE DOING?

Key Performance Indicators (KPIs) Year-to-Date:

SAFETY
0 Incidents

EXPENDITURES
On Target

ENVIRONMENTAL
0 Permit Violations

LEGEND

●	On Target
▲	Alert
◆	At Risk

The San José-Santa Clara Regional Wastewater Facility (RWF) is the largest advanced wastewater treatment facility in the western United States. The RWF has been treating the South Bay's wastewater and protecting public health and the environment without interruption since 1956. The discharge of clean wastewater into the South San Francisco Bay contributes to diverse and thriving fish and wildlife ecosystems.

Much of the RWF's infrastructure is functioning well beyond its intended use. As a result of a long and thoughtful Master Plan process, a $2.1 billion, 30-year Capital Improvement Program (CIP) is modernizing and refurbishing the RWF so that its critical work can continue into the future. Homes and businesses in Silicon Valley need a modern, reliable, state-of-the-art treatment plant to ensure a high quality of life and thriving economy. The CIP is rebuilding RWF infrastructure and updating treatment processes with innovative, efficient new technologies. The first phase of the CIP is a 10-year plan that began in 2014, with a budget of $1.4 billion.

This report summarizes the CIP's progress and highlights accomplishments from October to December 2022.

Stage Gate Process Keeps Improvements on Track

By Kerrie Romanow, ESD Director

The 10-year, $1.4 billion upgrade to the RWF involves dozens of capital projects — all carried out while the facility continues to clean wastewater for 1.4 million residents and more than 17,000 businesses. How do we do it? The CIP relies on a robust governance framework and decision-making process, with clearly spelled-out steps and oversight.

At the heart of our governance framework is the stage gate process. Stage gates ensure that each of our projects aligns with the overall mission, vision, and goals of the program. They act as checkpoints as a project progresses through design and construction and enable us to control scope. They are also used to check that projects remain on schedule, make sure millions of dollars in costs are controlled and help manage risks.

Stage gates are decision points. The project team presents its progress to a panel of senior stakeholders representing the CIP and Operations & Maintenance (O&M). The panel confirms that the need for the project has not changed and that the scope can still meet this need. Project status is presented for a set of key criteria, and the panel determines whether the project has met these criteria and can proceed to the next stage.

The first stage gate involves approving the scope of the project: Exactly what will be repaired, replaced or added? The next several stage gates evaluate project alternatives and focus on design, starting with a preliminary design and ending with the 100% detailed design.

Next comes bidding and awarding of the construction contract, then construction and commissioning. The substantial completion stage gate marks the end of construction. It serves as a check that the new facilities are operating as designed and that training, operation manuals and spare parts have been provided to O&M.

Teams prepare carefully for each stage gate presentation — detailed checklist templates are used to ensure that projects are evaluated against a consistent set of parameters. Of the more than 150 stage gates that have been held since the beginning of the program in 2014, almost 95% have been approved on their first attempt. Approval can have conditions attached, which allows a project to proceed provided specific actions are completed within a set time. And when the panel has concerns about a project, it's an opportunity for discussion and innovation.

The stage gate process is not a one-time stamp of approval for a project, but rather a continuous process of verification, providing opportunities for learning and improvement. The governance framework is a key part of our program delivery approach. I applaud the CIP team's commitment to this effective process.

Yard Piping Improvements - Phase 2 Project Set to Award Contract and Begin Construction

Project Site – Yard Piping Phase 2

Repairing critical pipes that carry gas, liquids and sludge between treatment areas at the RWF is a priority for the CIP. The RWF has about 300,000 linear feet of pipe. Some pipes are as large as 12 feet in diameter, and they vary in age, material and condition. To ensure that the facility could make needed repairs while continuing to treat wastewater, planners organized the pipe repair into three phases. Construction was completed on Yard Piping Improvements Phase 1 in January 2022. This summer, construction will begin on Phase 2 of the Yard Piping Improvements project.

When assessing the condition of the 96-inch raw sewage pipe and a few other similar pipes, the team found some crown corrosion and severe deterioration in the pipes' existing protective lining. The project was designed to repair these issues, and the San José City Council is expected to vote on awarding the contract in April.

This project has required careful planning: Because it will require diversion of plant influent flow to allow access to the pipes that are being repaired, it will be necessary to perform the work in the summer, when inflows are lower and not affected by wet weather. Consequently, the construction will happen during two consecutive dry seasons, from mid-May to mid-October 2023 and 2024. Temporary pipes will be installed to reroute the flow and isolate the pipes for rehabilitation.

"We know these pipes are critical to the operations at the RWF for the treatment process," said Tie Feng, the senior engineer on the project. "The challenge with this project is to be able to do the construction while keeping the plant operational." Phase 2 of the Yard Piping project is expected to reach substantial completion in October 2024.

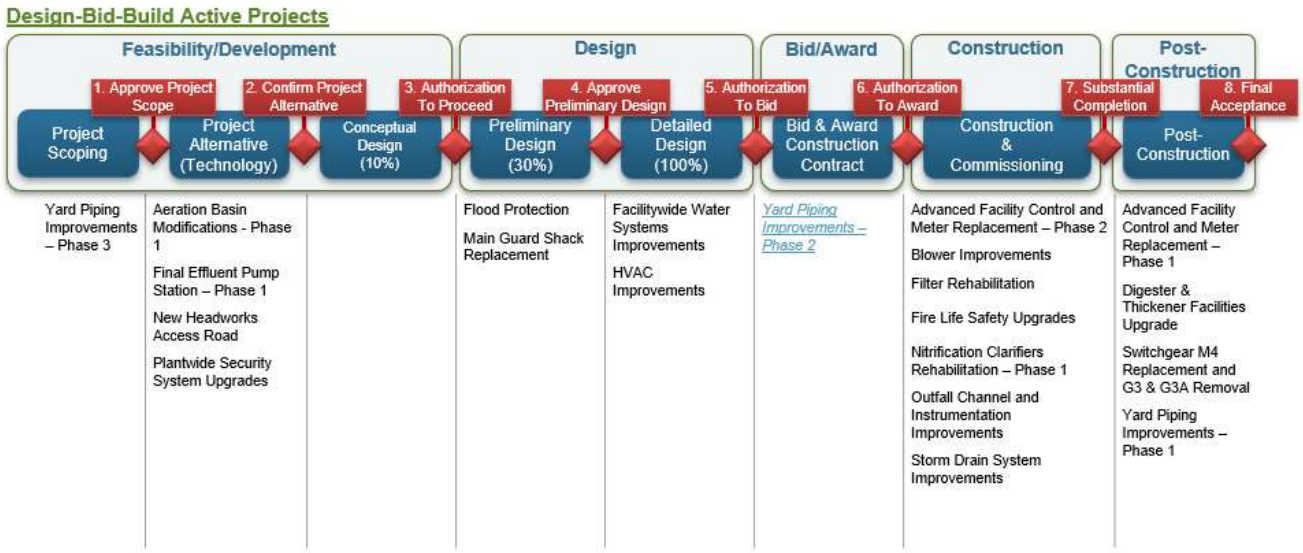
How the CIP Delivers Projects

The CIP uses two project delivery methods:

- **Design-bid-build** is a commonly used delivery method in which an owner first procures a professional engineering firm to prepare detailed design plans and specifications for a project. The owner then gets bids for the project and procures a general contractor to construct the project based on the design completed by the engineer.
- **Progressive design-build** is a two-phase delivery method contracted with a single design-build firm in which the project's design, cost estimating, construction schedule and final guaranteed maximum price (GMP) are developed during the first phase. If the owner and design-builder agree on the schedule and the GMP during the first phase, the final design, construction, and commissioning are completed during the second phase.

All CIP projects, regardless of project delivery method, follow a consistent process of consecutive delivery stages, each culminating in a stage gate, as presented in the project delivery models below. Stage gates are go/no-go points at which the project team must demonstrate that the project has met set evaluation criteria before advancing to the next delivery stage. The benefits of the stage gate process include consistency, quality, ensuring that the scope continues to address existing needs, budget/schedule control and Operations & Maintenance team engagement.

Active Projects by Delivery Model



*Projects shown *underlined and in blue and italics* have either been initiated or advanced this reporting period.

CIP PROJECTS

The CIP includes projects in both design and construction. CIP accomplishments for this quarter are outlined in two sections: Projects in Design and Projects in Construction. The CIP's projects in the construction and post-construction phases have cost and schedule baselines that are monitored using the City's Capital Project Management System. Project performance information can be found in the link below:

Project Performance Information

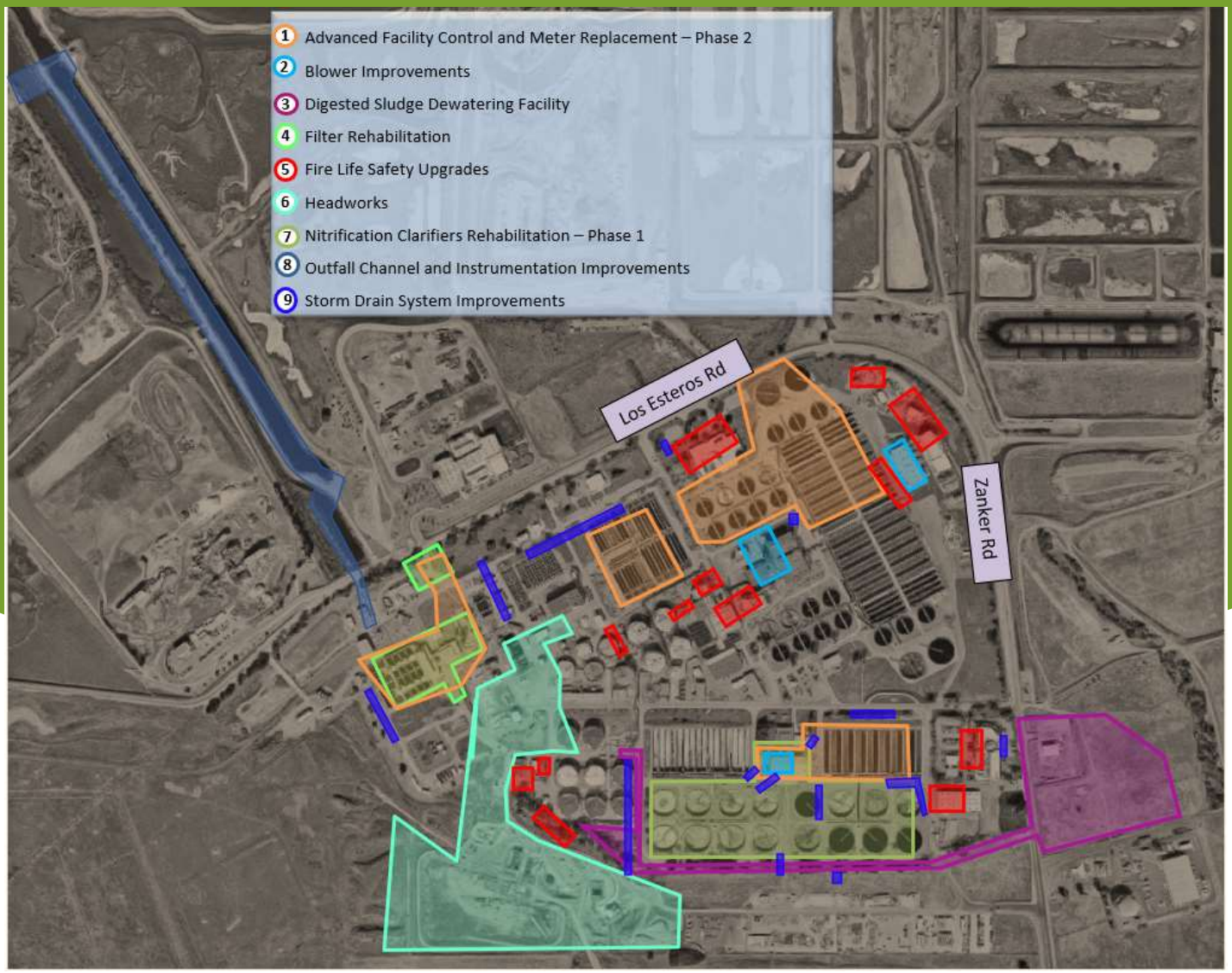
COVID-19 update: From October through December, CIP projects continued to progress despite COVID-19 pandemic impacts. Projects in construction continued with all contractors and construction management staff following the latest guidance from the Santa Clara County Health Officer and Public Health Director. The City continued to screen all City, consultant and contractor staff using an online form. During this period, CIP staff continued to work both in office and remotely. Environmental Services Department and Public Works staff continue to work with the City Attorney's office to address pandemic-related impacts to construction schedules and costs to ensure a consistent approach to resolving COVID-19-related claims across the City.

Projects in Design

- Additional Digester Facility Upgrade
  During this period, the project team developed the scope and determined that progressive design-build was the preferred project delivery method. In November, the project passed the Approve Project Scope stage gate, and the team started to prepare a request for qualifications (RFQ), to procure an owner's advisor, which is expected to be advertised in March.
- Aeration Basin Modifications – Phase 1
  In November, the project team completed a triple bottom line plus assessment of project alternatives.
- Facility-wide Water Systems Improvements
  In October, consultant Kennedy Jenks submitted the draft 90% design for City review. Final 100% design is expected to be completed in February.
- New Headworks Access Road
  In November, consultant Brown and Caldwell finalized the Design Alternative Analysis Report and started to develop the Conceptual Design Report.
- Plantwide Security System Upgrades
  In December, consultant Jacobs submitted the draft Project Definition Memorandum for City review.
- Yard Piping Improvements – Phase 2
  In October, consultant Black & Veatch submitted the final 100% design. In November, the City advertised the construction contract for bid. Bids will be opened in January.
- Yard Piping Improvements – Phase 3
  In November, consultant Black & Veatch performed inspection on the 108-inch filter influent pipe. The project team continued to plan condition assessments for various other pipes.

Projects in Construction

This aerial map of the RWF shows the CIP's active construction projects.



1 Advanced Facility Control and Meter Replacement - Phase 2: Reliably controlling processes

Measurements being taken at Secondary Battery A.

This second part of a two-phase project will replace aging and outdated RWF control equipment such as flow meters, valves, actuators and sensors. Original manufacturers no longer provide support for the existing equipment.
Project Budget: $15.1 million
Expected Beneficial Use: March 2023

Update:

- In December, contractor Kiewit completed the 28-day operational test of the equipment installed in the Secondary Battery A area and installed density meters in the East Primaries area.
- Closeout activities continued in the Nitrification Battery A area.

2 Blower Improvements: Oxygenating wastewater with greater energy efficiency

New motor installed on Secondary Blower #2.

RWF's aeration blower systems supply oxygen for breaking down organic material in wastewater. The blower systems are more than 30 years old. This project will replace blower engines, gearboxes and associated control equipment, extending the system's life and enhancing its energy efficiency.
Project Budget: $50.9 million
Expected Beneficial Use: January 2023

Update:

- In October, contractor Monterey Mechanical completed functional testing on Secondary Blower Building (SBB) Blowers #2 and #3.
- In November, the 28-day operational testing on Tertiary Blower Building Blower #1 was completed.
- In December, operational testing was completed for SBB Blower #2 and started for SBB Blower #3.

3 Digested Sludge Dewatering Facility: Drying biosolids more efficiently and effectively

Dewatering Building Sewer and Process Drainpipe.

The RWF currently uses an open-air lagoon and drying bed process to stabilize biosolids before landfill disposal. The 2013 Plant Master Plan recommended moving to an enclosed mechanical dewatering process. This project will build a mechanical dewatering facility and support facilities.
Project Budget: $167 million
Expected Beneficial Use: October 2025

Update:

- In October, design-builder Walsh began rebar placement for elevator base slab/sump and walls at the Dewatering Building. Excavation began for Sludge Tanks 1 and 2 ground improvements.
- In November, temporary power installation was completed in the construction trailers. Tests were performed for sections of underground pipe in the dewatering building area. Relocation and pressure testing of water and irrigation lines was completed.
- In December, Walsh performed potholing activities to locate existing utilities and conducted load tests on the soils around the new sludge tanks area to produce stone column requirements and details.

4 Filter Rehabilitation: Protecting health and the environment, increasing reliability and capacity

Excavation for electrical duct banks near the Filtration Building.

The filtration process is one of the final steps in wastewater treatment. The RWF's tertiary filtration unit process consists of 16 granular media filters and ancillary equipment. Built in the 1970s and 1980s, these components are near the end of their useful lives. The project will rehabilitate structural, mechanical, electrical and instrumentational elements of the system.
Project Budget: $59.5 million
Expected Beneficial Use: July 2024

Update:

- In October, contractor Walsh removed media from filters A5-A8, tested the underdrains, installed new media and air scour piping and tested each filter.
- In November, installation of the air header for filters B1-B4 was completed and tested. Walsh also installed two transformers and a switchgear and continued conduit installation around the filter building.
- In December, electricians continued installation of conduit throughout the filter building. Also, sidewalks were placed around the new S12 location.

5 Fire Life Safety Upgrade: Improving worker health and safety and the environment

Typical Fire Alarm Control Panel

Some RWF buildings do not currently have automated fire alarm systems to monitor and send out a notification in the event of a fire. Fire life safety upgrades are needed to bring the RWF into compliance with current building safety and fire codes.
Project Budget: $7.1 million
Expected Beneficial Use: February 2024

Update:

- In October, staff held a pre-construction meeting with contractor Blocka Construction.
- In November and December, staff continued to review contractor submittals.

6 Headworks: Offering better performance and reliability with new wastewater pre-treatment system

Aerial view of the new Raw Sewage Pump Station and Grit Facility.

Headworks pre-treatment of raw wastewater enhances and protects downstream treatment processes. This project will replace Headworks 1, the oldest RWF facility, with a new Headworks 3, and also modify Headworks 2. The new system will be more reliable and will be able to treat projected wet-weather wastewater flows.
Project Budget: $200.2 million
Expected Beneficial Use: June 2023

Update:

- In October, design-builder CH2M installed odor control piping and supports in the grit basin, influent screening, and odor control area; completed trenching, conduit and lighting pole installations and backfilling; and completed pre-operational testing and started functional testing of various equipment.
- In November and December, CH2M completed road paving and striping in several areas; performed conduit and CCTV installation around the power and energy building; provided training on the distributed controls system to O&M staff; and continued functional testing.

7 Nitrification Clarifiers Rehabilitation – Phase 1: Improving secondary treatment infrastructure and efficiency

Contractor assembling the clarifier mechanism at nitrification clarifier B6.

Central to the RWF's biological nutrient removal process, clarifiers separate sludge from effluent. The 16 existing clarifiers were constructed in the 1970s and 1980s and are near the end of their useful lives. This project will make cost-effective improvements to enhance the clarifiers' efficiency and minimize unscheduled maintenance on them for the next 30 years.
Project Budget: $51.1 million
Expected Beneficial Use: July 2023

Update:

- In December, contractor Overaa completed the 28-day operational testing on Clarifiers B6 and B7.
- Overaa energized the new motor control center and started operational testing of the A-side clarifiers.

8 Outfall Channel and Instrumentation Improvements: Reliable water quality reporting at the edge of the Bay

The weir structure and Sulfur Dioxide building at the outfall channel.

The end product of the wastewater treatment process travels through the outfall channel to the Artesian Slough and South San Francisco Bay. This project will replace older technology with a fiber optic system; install new instruments; construct a large vault structure to install new flow meter technology, making the meters accessible to staff; and improve the integrity of the weir structure.
Project Budget: $9.9 million
Expected Beneficial Use: August 2023

Update:

- In October, contractor Anvil Builders installed drainage piping and restored the grading around the Sulfur Dioxide Building, placed concrete collars around electrical handholes and boxes and installed a transformer pad.

9 Storm Drain System Improvements: Protecting critical infrastructure during 10-year through 100-year storm events

CCTV of Storm Drain

The RWF experiences localized flooding caused by runoff during heavy rainfall events. The existing storm drain system Is deficient and needs to be improved to protect the operational area from floods. This project will improve the existing storm drain system by rehabilitating storm water pump stations, pipes, manholes, catch basins and other components. The upgrades made by this project will protect RWF's critical structures and equipment during 10-year through 100-year storm events.

Project Budget: $13.8 million

Expected Beneficial Use: December 2023

Update:

- During this period, contractor Ranger Pipelines removed and replaced several pipes on G St., 1st St., 2nd St., 3rd St., 5th St., and F St.; and poured and paved trenches.

Aerial view of the Emergency Overflow Basin of Headworks Project.

What's Ahead?

In January - March 2023:

- Open bids for Yard Piping Improvements – Phase 2.
- Achieve Beneficial Use on Blower Improvements and Advanced Facility Control and Meter Replacement – Phase 2.
- Advertise the RFQ to procure an owner's advisor for Additional Digester Facility Upgrade.

Fiscal Year 2022-2023 Program Performance Summary

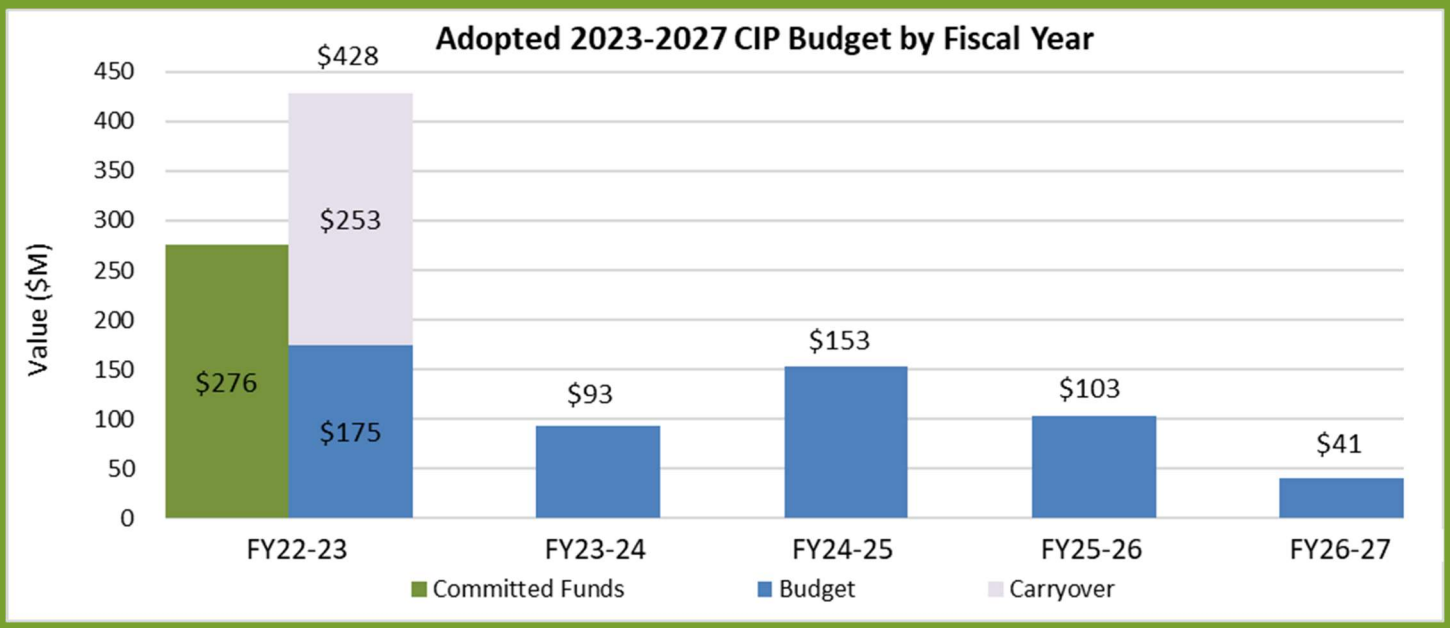
KPI	Target	Fiscal Year to Date			Fiscal Year End		
		Actual	Status	Trend	Forecast	Status	Trend
Stage Gates	90%	100% 12/12[1]			100% 21/21[2]		
Measurement: Percentage of initiated projects and studies that successfully pass each stage gate on their first attempt. Target: Green: >= 90%; Amber: 75% to 90%; Red: < 75%							
Schedule	90%	0% 0/1[4]			50% 2/4 [5]		
Measurement: Percentage of CIP projects delivered within 2 months of approved baseline Beneficial Use Milestone.[3] Target: Green: >= 90%; Amber: 75% to 90%; Red: < 75%							
Budget	90%	100% 1/1[6]			67% 4/6[7]		
Measurement: Percentage of CIP projects that are accepted by the City within the approved baseline budget.[3] Target: Green: >= 90%; Amber: 75% to 90%; Red: < 75%							
Expenditures	$299M	$276M			$304M		
Measurement: CIP FY22-23 committed costs. Target: Committed costs meet or exceed 70% of planned budget. 70% of $428M = $299M. Therefore Fiscal Year End Green: >=$299M; Red: < $299M							
Safety	0	0			0		
Measurement: OSHA reportable incidents associated with CIP Delivery for the fiscal year. Criteria: Green: zero injuries requiring hospitalization, zero fatalities; Amber: 1 to 2 injuries requiring hospitalization, zero fatality; Red: >2 injuries requiring hospitalization, any fatality							
Environmental	0	0			0		
Measurement: Number of permit violations caused by CIP delivery for the fiscal year. Target: Green: zero incidents; Amber: 1 to 2; Red: > 2							
Vacancy Rate[8]	10%	13% 10/79			13% 10/79		
Measurement: Ratio of the number of vacant approved positions to approved positions. Target: Green: <= 10%; Amber: 10% to 20%; Red: > 20%							

[Program KPI – Fiscal Year 2022-2023 information]

Program Budget Performance

This section summarizes the cumulative monthly budget performance for FY22-23 based on the Adopted 2023-2027 CIP Budget.

Adopted 2023-2027 CIP Expenditures and Encumbrances

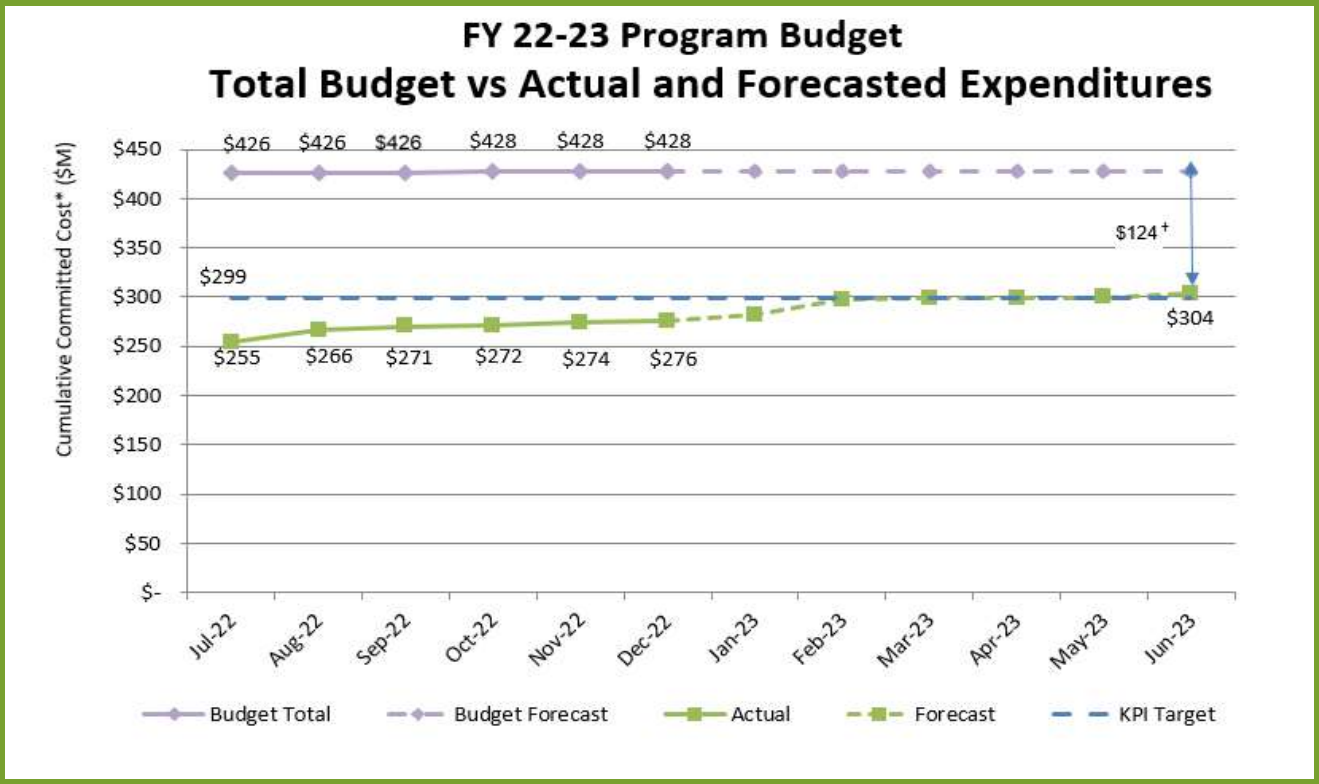


[Budget performance information]

Fiscal Year 2022-2023 Program Budget Performance

The FY22-23 CIP budget is composed of approximately $175 million in new and re-budgeted funds, plus encumbered carryover of $253 million, for a total of $428 million.

FY22-23 Program Budget



CIP program budget information

Improving Energy Efficiency at the Wastewater Facility

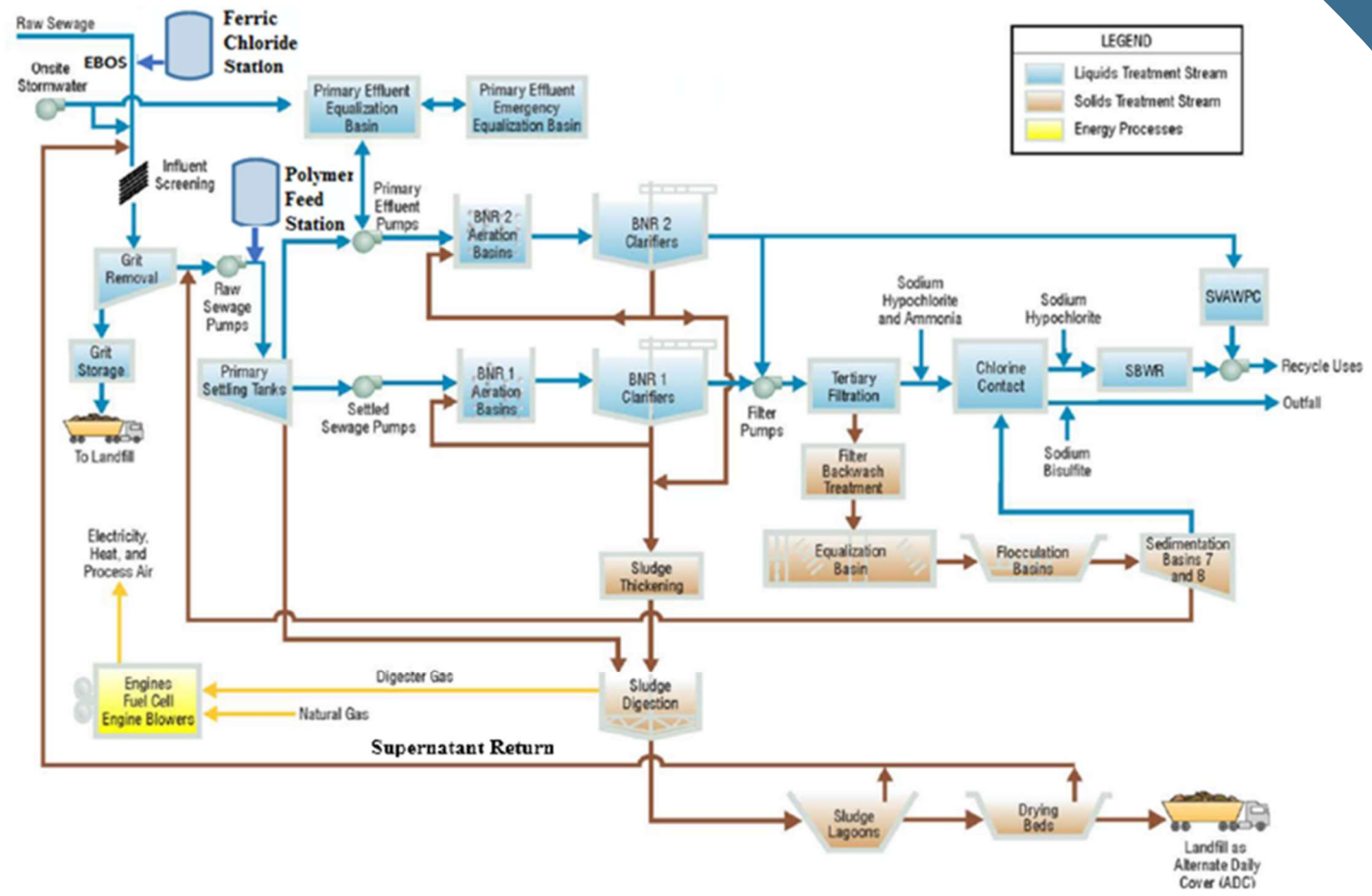
The award-winning Cogeneration Facility is featured in this video describing how it works to improve the overall resiliency and efficiency of the wastewater facility.

Want to learn more?

@sjenvironment @sjenvironment @sjenvironment

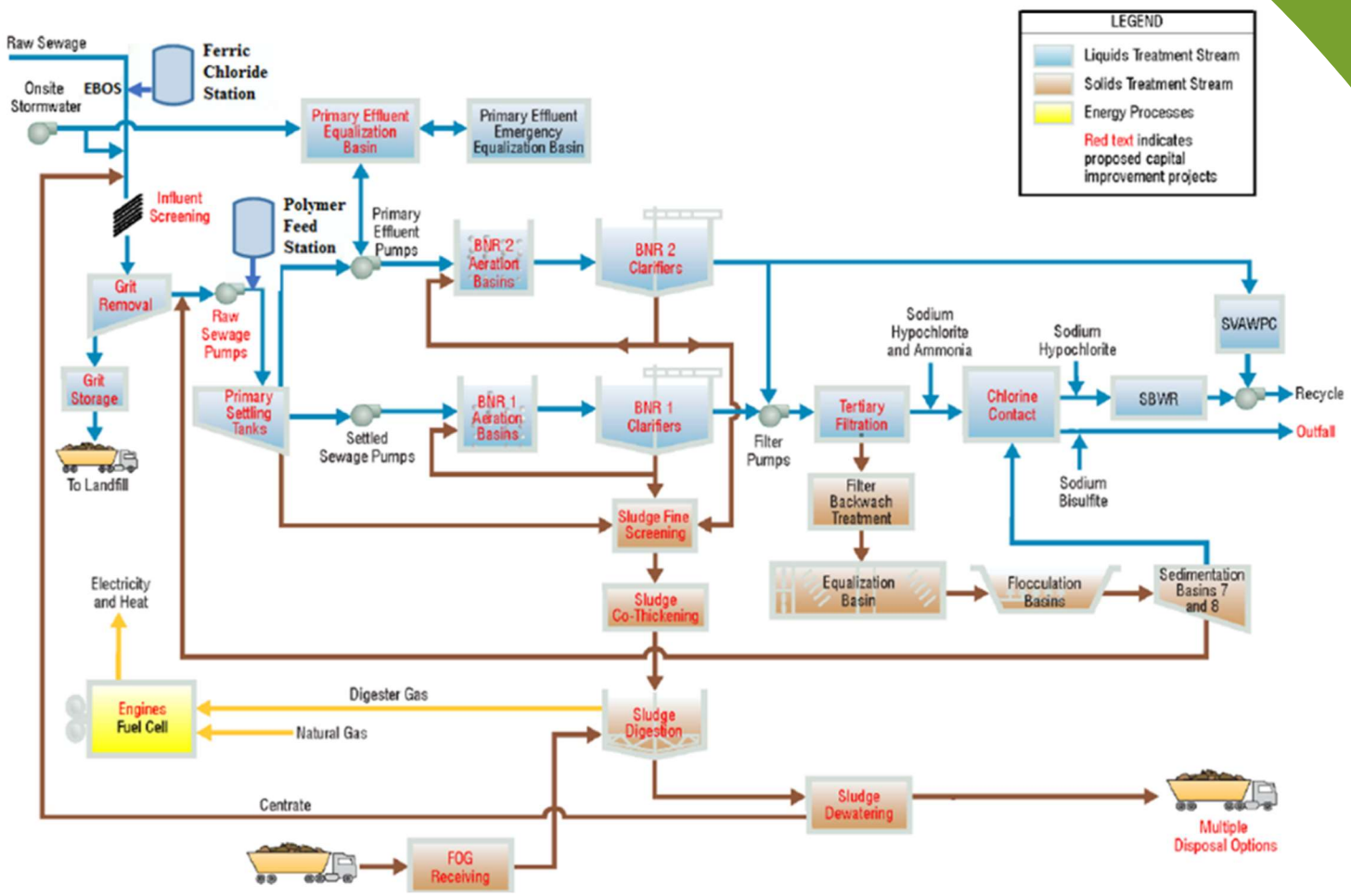
Regional Wastewater Facility Treatment

Current Treatment Process Flow Diagram



Regional Wastewater Facility Treatment

Proposed Treatment Process Flow Diagram



Glossary

Beneficial Use	When a CIP project is complete in accordance with contract documents and can be used or occupied by the City, it has achieved Beneficial Use.
Biogas	A renewable energy source produced by the breakdown of sewage waste in the absence of oxygen. Biogas is composed of methane, carbon dioxide and small amounts of hydrogen sulfide.
Biosolids	Treated sewage sludge.
Bufferlands	Open acreage used by wastewater treatment plants as a buffer between plant operations and nearby communities. Bufferlands minimize odor and operational impacts on plant neighbors and often serve as wildlife habitat.
Commissioning	The process of assuring that all systems and components of a facility, building or plant are designed, installed, tested, operated and maintained according to the owner's requirements.
DAFT	Dissolved air flotation thickener tanks. Dissolved air flotation, or DAF, is a treatment process that clarifies wastewater by removing suspended matter.
DCS	Distributed control system. A computerized system that allows treatment plant staff to remotely monitor and control treatment processes.
EIR	Environmental Impact Report. A public document required under the California Environmental Quality Act to describe potential environmental impacts associated with a project. An EIR also describes measures to mitigate the impacts.
Effluent	Treated wastewater that is discharged from a treatment plant.
Influent	Raw or untreated wastewater that flows into a treatment plant.
FOG	The Fats, Oils and Grease program administered by the City of San José's Environmental Services Department.
Headworks	Facilities that first receive influent at a wastewater treatment plant. The headworks screen and remove sticks, grit and other solid material from influent to protect downstream equipment in the treatment process.
NPDES permit	Under the federal Clean Water Act, the National Pollutant Discharge Elimination System (NPDES) permit program regulates point sources such as pipes and other conveyances that discharge pollutants into water. In California, NPDES permits for the discharge of treated wastewater are issued by the Regional Water Quality Control Boards.
Polymer	Primarily used to help manage the process of drying and consolidating sludge.
Preliminary treatment	The preparatory wastewater treatment stage, in which influent passes through headworks, which screen and remove sticks, rocks and debris; and grit chambers, which remove sand and gravel.
Primary treatment	The initial treatment for incoming wastewater, in which gravity settles solid material and rotating bars skim floating fats, oil and grease from influent.
Secondary treatment	The second stage of wastewater treatment, in which aeration tanks pump air into wastewater to promote the growth of naturally occurring bacteria that remove organic pollutants.
Stormwater	Water from rain that does not seep into the ground but instead flows into storm drains as runoff.
Tertiary treatment	The final stage in advanced wastewater treatment, in which wastewater flows through filter beds, then through chlorinated tanks to become 99 percent clean.
Wastewater	Water that enters the sanitary sewer system for treatment at a pollution control plant.
Wastewater Cake	Sludge that is compressed after dewatering.
WAS	Waste-activated sludge, or the excess quantity of bacteria and microbes removed from the secondary wastewater treatment process.