San José-Santa Clara
Regional Wastewater Facility

CIP

CAPITAL IMPROVEMENT PROGRAM

Quarterly Status Report:
January – March 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 (KPI) 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 January to March 2022.

Managing a "Wave" of Construction Projects

By: Kerrie Romanow, ESD Director

The RWF is in the midst of a 10-year transformation, the first phase of a 30-year CIP. This first phase consists of the design and construction of more than 30 projects to replace aging infrastructure and upgrade existing equipment and facilities. All of this activity is taking place while the RWF and its hard-working operations and maintenance (O&M) staff continue to protect public health and the environment with high-quality wastewater treatment 24 hours a day, 365 days a year.

Key to the success of this transformation is construction management (CM), which focuses on the physical construction of the project solutions developed during planning and design. The CM team represents the owner (the City) in overseeing contractors who have been selected through a rigorous procurement process to construct each project. The CM team makes sure that projects are built according to design plans and specifications, and manages contractor claims and negotiations. The CM team handles changing conditions during construction and helps coordinate requests for information (RFI) from contractors concerning gaps in information or uncertainties in plans, specifications and other contract documents. CM staff also work with the CIP project management team to verify design details with the design engineer and coordinate the preparation of design change memoranda for issue to the contractor.

In 2019, the City recognized that construction activity would ramp up as CIP projects transitioned from design to construction. With the significant increase in construction activity on the horizon, staff initiated a CM readiness assessment. The objectives of this assessment were to evaluate CM staffing levels and review existing processes and procedures to determine if any changes were needed to meet the increased number of construction contracts and overall activity at the RWF.

The assessment was completed in the fall of 2019 and resulted in updated CM guidelines and standard operating procedures (SOPs), as well as a staffing and resource procurement strategy. This strategy led to the hiring of additional CM consultant and cost/schedule controls firms and the implementation of updated processes and SOPs. The CM team now consists of a mix of City staff from Public Works (PW) and consultants. This integrated team approach provides the best of both worlds: City staff are well versed in City processes and procedures; while consultants provide in-depth experience in wastewater facility construction, testing, startup and commissioning, and project controls. An added benefit is that, over time, City staff increase their knowledge and expertise by working with the consultant CM resources. "Managing multiple concurrent projects at an active wastewater treatment facility requires a focused and professional CM team, and we have been able to achieve this through our integrated team approach," said **Shelley Guo**, PW division manager, and principal construction manager.

Safety is of paramount importance to the CM team. In late 2020, staff initiated a CIP-wide safety review effort to identify and document existing construction health and safety practices at the RWF and provide recommendations for strengthening the program, including application of lessons learned and industry best practices. Overall findings indicate that the RWF construction safety program is working well, as evidenced by the CIP achieving more than 1 million hours of safe work with no reportable incidents to the Occupational Safety and Health Administration (OSHA). Opportunities for improvement were also identified and addressed over the last year, including increased staffing resources for safety enforcement and improved infrastructure to enhance pedestrian safety.

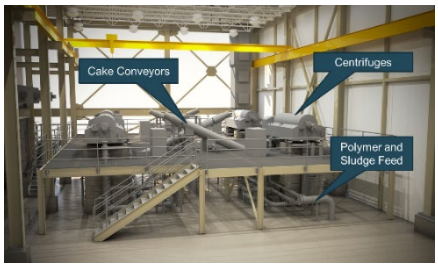
RWF Spotlight – Digested Sludge Dewatering Project on the path to construction

The new dewatering facility (rendering above) will use centrifuges to dry the digested sludge, and features a load-out facility to haul solids for additional processing and beneficial reuse application

Digesters are large tanks that use bacteria to break down wastewater solids (sludge), while also generating biogas, which is used to generate power for the RWF. The solids are currently stabilized in lagoons and dried in open-air drying beds for approximately four years. This time-consuming process is land-intensive, produces potential odors, and results in a product with very limited reuse options.

The 2013 Plant Master Plan and 2015 Biosolids Transition Strategy recommended the construction of an enclosed mechanical dewatering facility to allow the RWF to comply with new organic waste regulations; reduce potential odors in the community; produce a product with a variety of beneficial reuse options; and free up 750 acres of RWF land for alternative uses. A memorandum providing a further update on biosolids transition and confirming the need for the dewatering facility was presented to the Treatment Plant Advisory Committee (TPAC) in March 2018. In 2019 Council approved the award of a progressive design-build contract for the dewatering facility to Walsh for preliminary services including design and site preparation.

The Digested Sludge Dewatering Project will build a new mechanical dewatering facility and associated support facilities, showcasing the use of technology in improving the wastewater treatment process and compliance with emerging regulatory changes. The progressive design-build method being used to deliver this project has many benefits, including greater collaboration between City staff and the design-builder during equipment selection, design, and construction; more effective risk sharing; and greater price certainty.



Rendering of the new centrifuges, cake conveyors, and polymer and sludge feed for the new dewatering facility.

In March, TPAC and Council approved the definitive contract amendment with Walsh, paving the way for project construction to begin this summer.

The $131 million project has an expected completion date in late 2025. "I love working with the team to brainstorm and evaluate ideas that will lead us to the best blend of functionality, maintainability, low operating cost and overall cost efficiency for the project," said **Marc Nakamoto**, project manager.

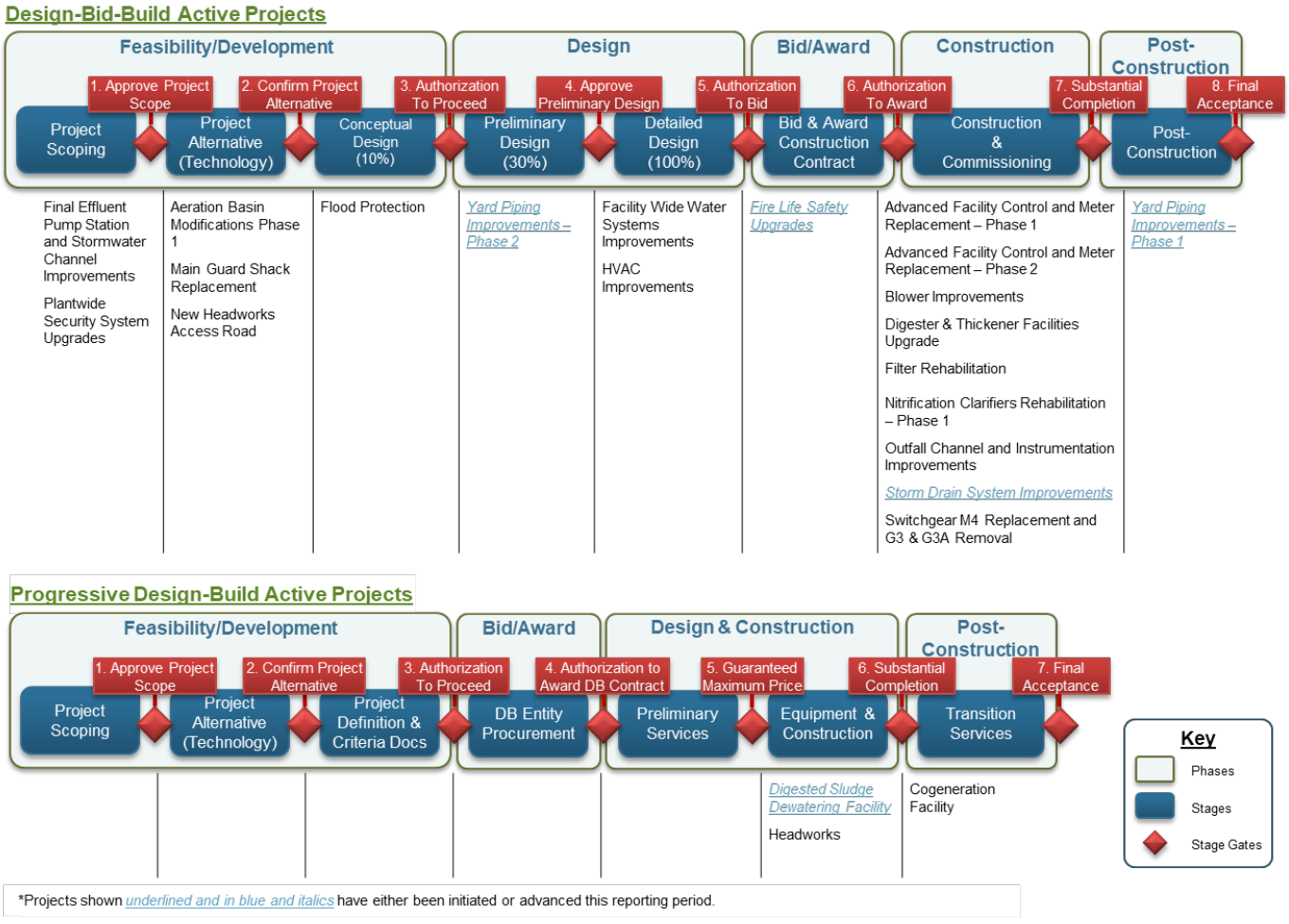
How the CIP Delivers Projects

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 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 O&M team engagement.

Project Delivery Models



*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 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

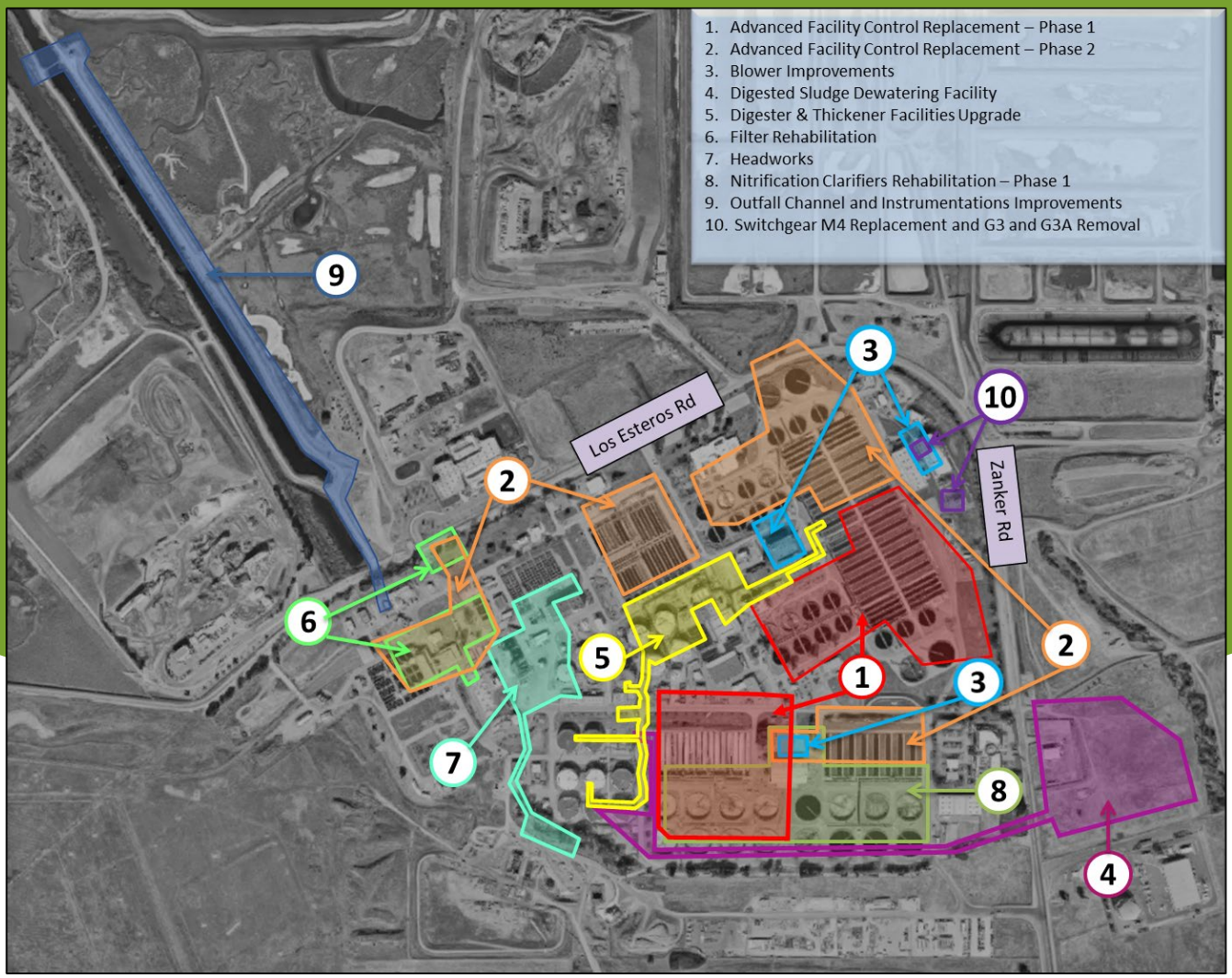
COVID-19 update: From January to March, CIP projects continued to progress despite COVID-19 pandemic impacts. Projects in construction continued with all contractors and construction management (CM) staff following the latest guidance from the Santa Clara County Public Health Officer. The City continued to screen all City, consultant and contractor staff using an online form. During this period CIP staff began to work both in office and remotely. ESD and PW 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

- Fire Life Safety Upgrades
  In March, the 100 percent design plans and specifications were completed and the project received authorization to bid. The bid opening is anticipated in May, with the construction award expected in August.
- HVAC Improvements
  In February, consultant Kennedy/Jenks completed the 90 percent design and began 100 percent design, which is expected to be completed in May.
- Flood Protection
  In February, consultant HDR began working on the conceptual design, which is expected to be completed in June.
- Main Guard Shack Replacement Project
  In February, consultant Jacobs held the first alternatives analysis workshop. In March, a second workshop was held to present the proposed alternatives and begin the alternatives selection.
- Storm Drain System Improvements Project
  In March, Council approved award of the construction contract to Ranger Pipelines Inc. The Contractor is expected to begin construction in May.
- Yard Piping Improvements – Phase 2
  In March, the alternative analysis and conceptual design were completed and the project team started preliminary design.

Projects in Construction

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



1 Advanced Facility Control & Meter Replacement - Phase 1 Project: Reliably controlling processes

Contractors on a final walkthrough of Nitrification B side.

This is the first of a two-phased project. The 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. New, reliable controls are vital to maintain effective process control and will ensure that the RWF continues to meet the requirements of the National Pollutant Discharge Elimination System (NPDES) permit.

Project Budget: $12.4 million
Expected Beneficial Use: May 2022

Update:

- In February, contractor Overaa completed the 28-day functional testing of Nitrification B aeration tanks.
- In March, Overaa began operational testing of the Nitrification B aeration tank equipment, which is anticipated to be completed in April.

2 Advanced Facility Control & Meter Replacement - Phase 2 Project: Reliably controlling processes

Measurements being taken at Secondary Battery A.

The second part of a two-phased project, this 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: $15.0 million
Expected Beneficial Use: March 2023

Update:

- In March, contractor Kiewit completed the electrical conduit installation and pulled wires for the new sludge flow meters and density meters in the east primary area. Kiewit also began to preassemble piping, valves, and meters to be installed in April.

3 Blower Improvements Project: Oxygenating wastewater with greater energy efficiency

New motor installed on Secondary Blower #2

RWF's aeration blower systems supply the oxygen needed for breaking down organic material in wastewater. The existing blower systems are more than 30 years old and need rehabilitation. This project will replace blower engines, gearboxes, and associated control equipment, extending the system's useful life and enhancing its energy efficiency.

Project Budget: $51.5 million
Expected Beneficial Use: January 2023

Update:

- In January, contractor Monterey Mechanical competed functional testing and began operational testing for Tertiary Building Blower #5.
- In March, Monterey Mechanical completed demolition and modifications for the new skids on Secondary Blower Building Blowers #2 and #3.

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

Stone columns being installed for the new dewatering facility.

The RWF currently uses an open-air lagoon and drying bed process to stabilize biosolids before landfill disposal. The 2013 Plant Master Plan recommended transitioning to an enclosed mechanical dewatering process. This project will build a new mechanical dewatering facility and associated support facilities.

Project Budget: $164 million
Expected Beneficial Use: October 2025

Update:

- In February, design-builder Walsh completed the relocation of the South Bay Water Recycling pipeline which ran through the future footprint of the main dewatering building.
- In March, Council approved the amended and restated design-build contract with Walsh Construction, and the design-builder began stone column installation.

5 Digester and Thickener Facilities Upgrade Project: Producing energy, improving treatment

Gas compressors, left, will help mix gas in the digesters.

The RWF's 16 digesters use anaerobic digestion to break down sludge. This project will upgrade four of the digesters to improve gas production, reduce sludge volume and reduce the number of digesters required. A new sludge screening building will allow primary sludge to be thickened with secondary sludge before it reaches these upgraded digesters. Six thickening tanks will be renovated to improve efficiency, allowing the RWF to retire 10 older tanks.

Project Budget: $200.1 million
Expected Beneficial Use: April 2022

Update:

- In January, contractor Walsh inspected and aligned the six new gas compressors.
- In March, City O&M staff began seeding digested sludge and started up associated mechanical equipment for Digester 5. Seeding for all four digesters is anticipated to be complete in April.

6 Filter Rehabilitation Project: 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: $58.3 million
Expected Beneficial Use: July 2024

Update:

- In January, contractor Walsh mobilized to the project site and began installation of electrical duct banks.
- In March, filter media, blowers, and electrical components were delivered to the project site and Walsh began structural work within the Filtration Building.

7 Headworks Project: New wastewater pretreatment system offers better performance and reliability

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

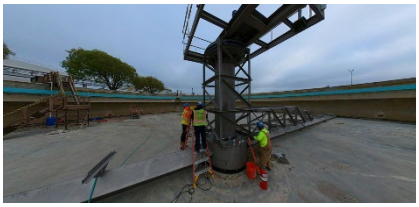
Headworks pretreatment of raw wastewater enhances and protects downstream treatment processes. This project will replace Headworks 1, the oldest facility in the RWF, with a new Headworks 3, and also modify Headworks 2. The new pretreatment system will be more reliable and will be able to treat projected wet-weather wastewater flows.

Project Budget: $172.6 million
Expected Beneficial Use: June 2023

Update:

- In January, design-builder CH2M installed five raw sewage pumps along with screening and grit handling equipment, and successfully completed the software factory acceptance test.
- In March, CH2M completed mechanical installation of all major equipment, including the odor control system.

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



Contractor assembling the clarifier mechanism at nitrification clarifier B6.

Central to the RWF's biological nutrient removal (BNR) 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: $62.7 million
Expected Beneficial Use: August 2023

Update:

- In January, contractor Overaa completed functional testing of new equipment on the nitrification Battery B clarifiers. Operational testing began in February and is anticipated to be completed in April.
- In February, Overaa began installation of the clarifier mechanisms in nitrification clarifiers B6 and B7.

9 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 RWF's final effluent is the end product of the wastewater treatment process and travels through the outfall channel before it reaches Artesian Slough and South San Francisco Bay. This project will replace older, radio transmitter technology with a fiber optic system; replace and install new instruments, including new electrical hubs and communications panels; construct a large vault structure to install new flow meter technology, making the meters more accessible to staff; and improve the integrity of the weir structure. The instrumentation and equipment replaced under this project support monitoring of RWF compliance with it's NPDES permit.

Project Budget: $9.9 million
Expected Beneficial Use: March 2023

Update:

- In January, the City issued the Notice to Proceed (NTP) to contractor Anvil Builders Inc.
- The project team along with the City land use planning team continued coordination efforts with resource agencies to finalize permit applications for compensatory mitigation and silt curtain design and installation.

10 Switchgear M4 Replacement and G3 & G3A Removal Project: Upgrading systems, enhancing safety

One of two newly installed spare breakers for the S40 switchgear.

For the last 10 years, the RWF has been implementing a series of electrical reliability projects to strengthen the RWF electrical distribution system. This project will replace the aging M4 switchgear with a new switchgear with 3,000-amp breakers. The M4 switchgear replacement will have protective relays to lower arc flash levels, enhancing employee safety. Removal of the existing G3 and G3A switchgears is also in the project scope.

Project Budget: $9.6 million
Expected Beneficial Use: July 2022

Update:

- In February, contractor Blocka completed the demolition of existing conduits and wires from engine generators #1 through #3 and completed the demolition of the G3A switchgear footing.
- In March, Blocka installed two spare breakers for the S40 switchgear.

January 2022 aerial view of the Outfall Channel and Instrumentation Improvements Project.

What's Ahead?

In April - June 2022:

- Achieve Beneficial Use for the Digester and Thickener Facilities Upgrade and Advanced Facility Control and Meter Replacement Phase 1 projects;
- Open construction contract bids for the Fire Life Safety Upgrades Project;
- Issue NTP to the contractor for the Storm Drain System Improvements Project; and
- Advertise contractor prequalification packet for the Facility Wide Water Systems Improvement Project.

Program Performance Summary

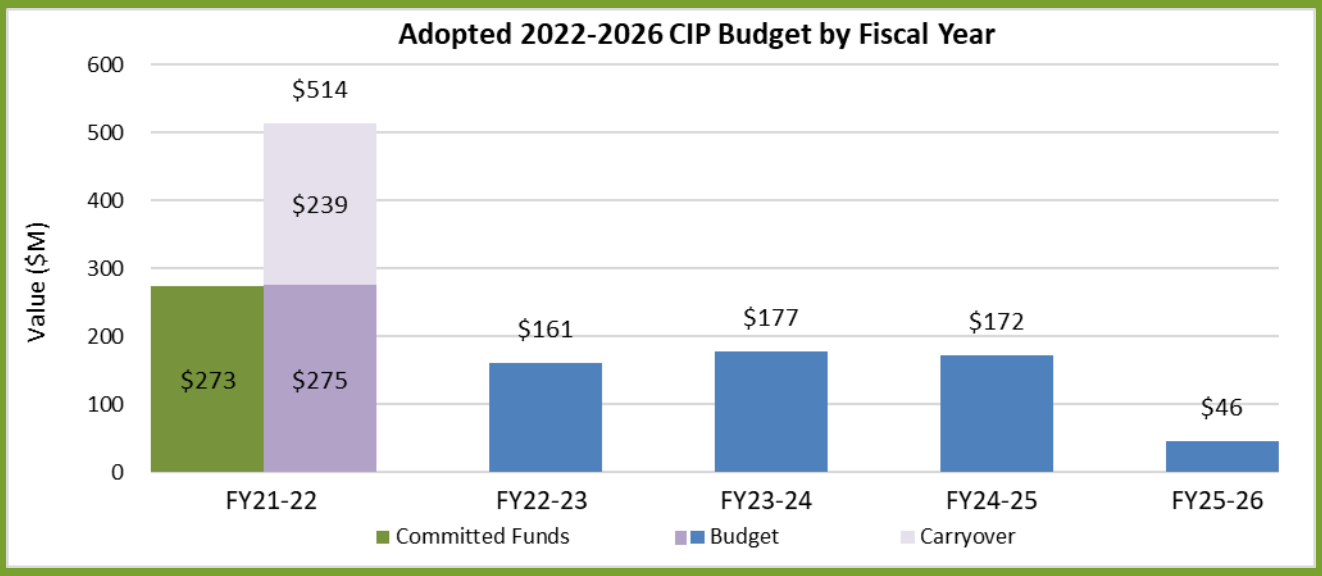
KPI	Target	Fiscal Year to Date			Fiscal Year End		
		Actual	Status	Trend	Forecast	Status	Trend
Stage Gates	90%	100% 13/13 [2]			100% 20/20 [3]		
Measurement: Percentage of initiated projects and studies that successfully pass each stage gate on their first attempt. Target: Green: >= 90%; Amber: 75% to 90%; Red: < 75%							
Schedule	90%	0% 0/1 [4]			0% 0/3		
Measurement: Percentage of CIP projects delivered within 2 months of approved baseline Beneficial Use Milestone.[1] Target: Green: >= 90%; Amber: 75% to 90%; Red: < 75%							
Budget	90%	N/A 0/0			50% 1/2		
Measurement: Percentage of CIP projects that are accepted by the City within the approved baseline budget.[1] Target: Green: >= 90%; Amber: 75% to 90%; Red: < 75%							
Expenditure	$360M	$273M			$426M [5]		
Measurement: CIP FY21-22 committed costs. Target: Committed costs meets or exceeds 70% of planned budget. 70% of $514M = $360M. Therefore Fiscal Year End Green: >=$360M; Red: < $360M							
Safety	0	0			0		
Measurement: Number of OSHA reportable incidents associated with CIP delivery for the fiscal year. Criteria: Green: zero incidents; Amber: 1 to 2; Red: > 2							
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[6]	10%	15% 13/84[7]			10% 8/84		
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 2021-2022 information

Program Budget Performance

This section summarizes the cumulative monthly budget performance for FY21-22 based on the Adopted 2022-2026 CIP Budget.

Adopted 2022-2026 CIP Expenditures and Encumbrances

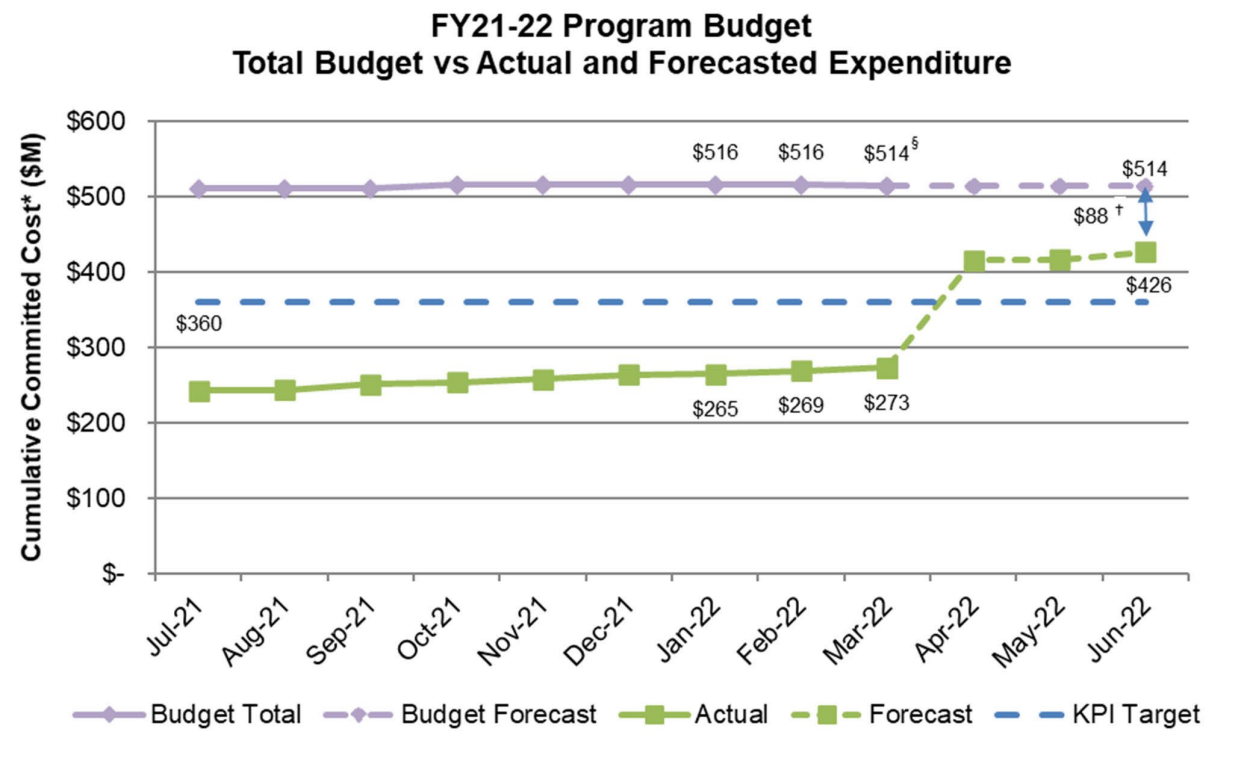


Budget performance information

Fiscal Year 2021-2022 Program Budget Performance

The FY21-22 CIP budget is comprised of approximately $275 million in new and re-budgeted funds, plus encumbered carryover of $239 million, for a total of $514 million.

FY21-22 Program Budget



CIP program budget information

How does the wastewater facility clean wastewater?

An ongoing series about our wastewater process

First Step: [Headworks (Video)]

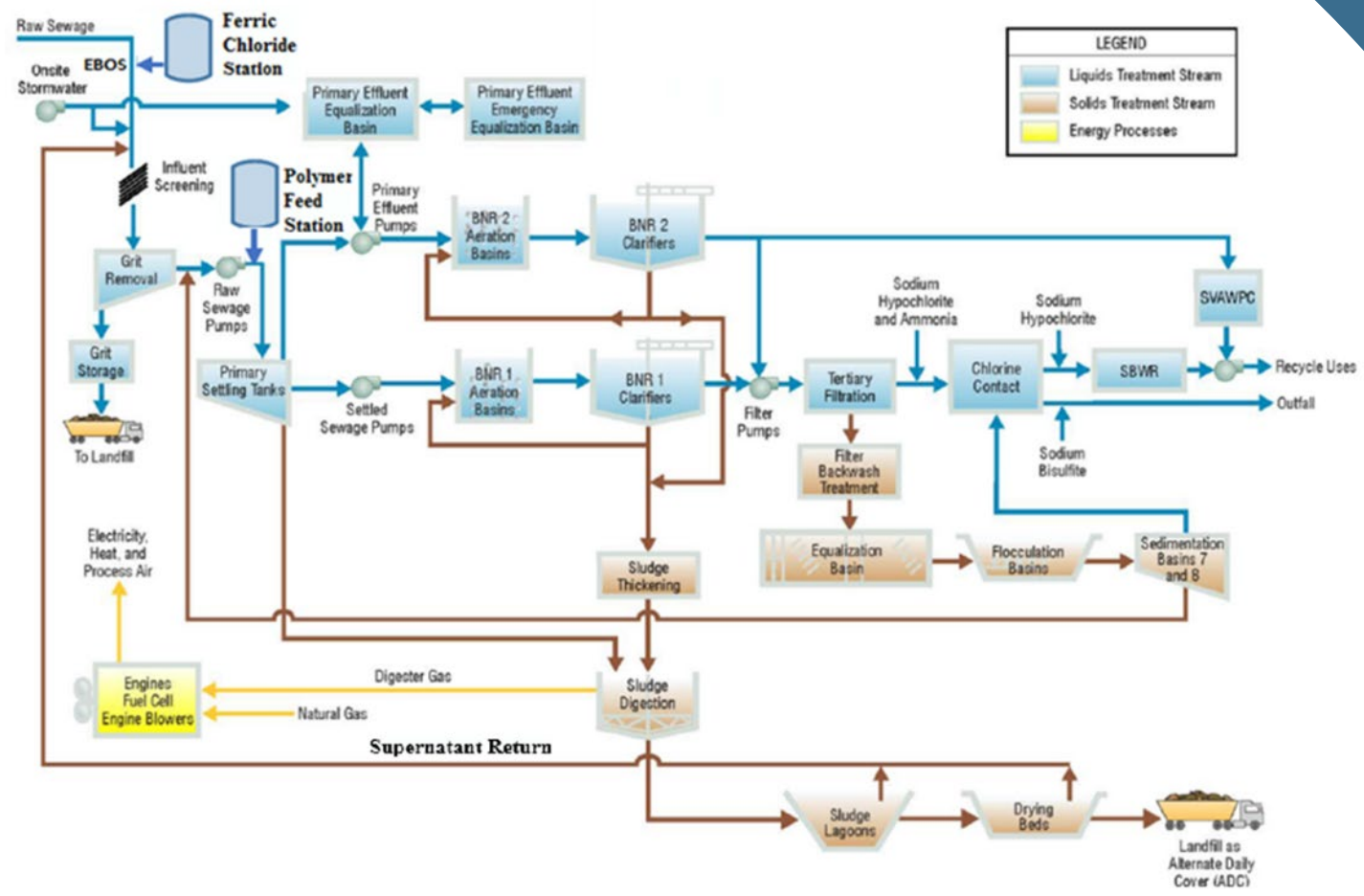
This award-winning video describes the process and equipment used to treat wastewater and protect public health and the environment.

Want to learn more?

@sjenvironment @sjenvironment @sjenvironment

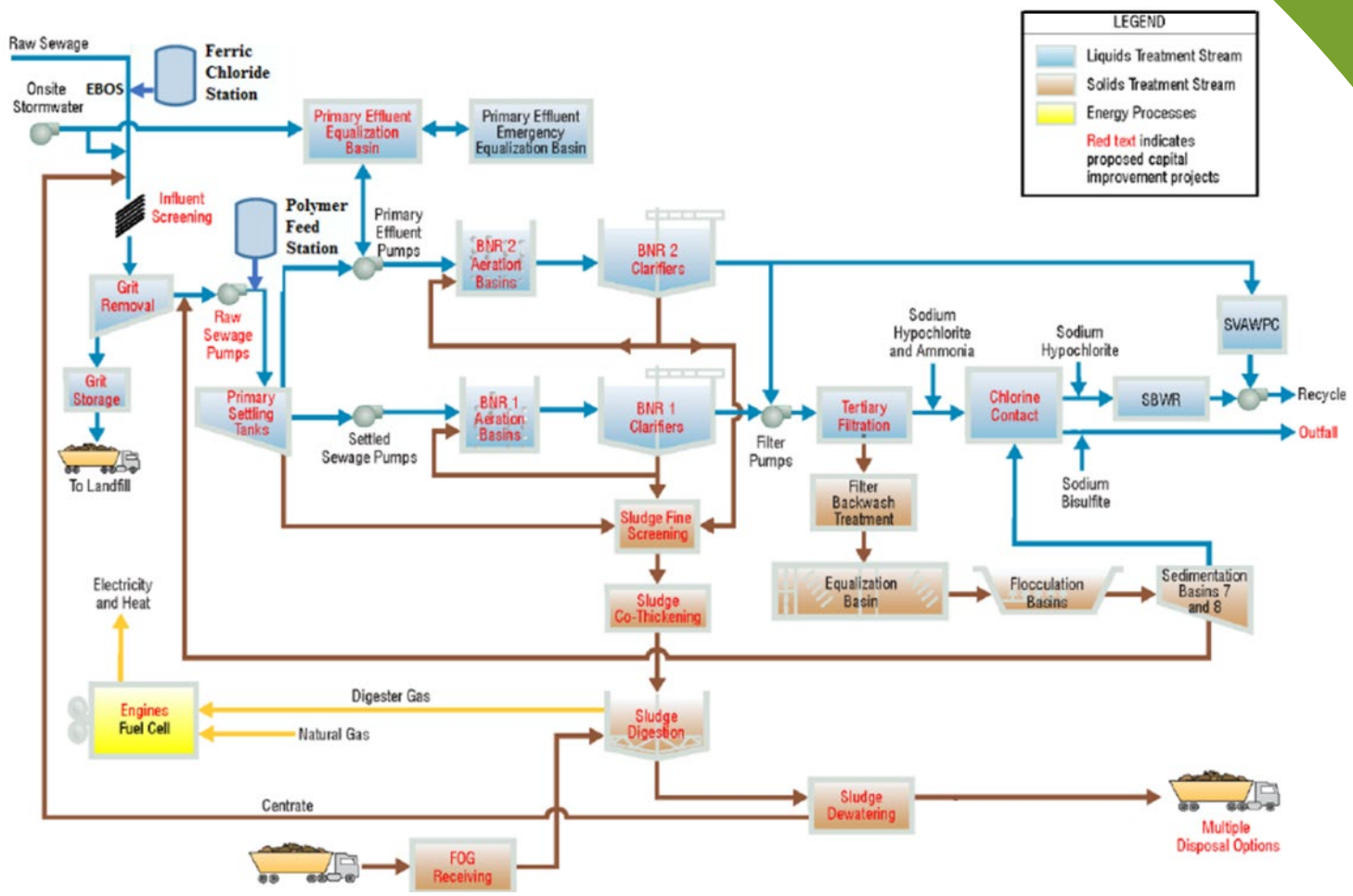
Regional Wastewater Facility Treatment

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 comprised 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	A distributed control system (DCS) is a computerized system that allows treatment plant staff to remotely monitor and control treatment processes.
EIR	An Environmental Impact Report (EIR) is 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.