



San José-Santa Clara
Regional Wastewater Facility

CIP

CAPITAL IMPROVEMENT PROGRAM

Quarterly Status Report:
April – June 2023

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



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. 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 April to June 2023.

LEGEND



On Target



Alert



At Risk





Completed Projects Move RWF Closer to the Goal

By Kerrie Romanow, ESD Director

Since 2014, the Capital Improvement Program (CIP) team at the Regional Wastewater Facility (RWF) has completed 26 projects successfully. Each finished project means the 10-year, \$1.4 billion upgrade plan is another step closer to its conclusion — and the RWF is better positioned to continue to treat wastewater for 1.4 million residents and more than 17,000 businesses.

The end of a project is also a good time to recognize the hard work of all the teams who made it happen — while maintaining the RWF’s continuous operation. The CIP requires complex coordination among numerous teams. In the past year, for example, the CIP and Operations & Maintenance (O&M) teams worked together to plan and execute 55 requests to shut down specific treatment processes during construction. And when a project ends, the newly upgraded system is turned over to the O&M team, which involves extensive documentation and training.

One project that is wrapping up: the \$138 million Headworks project, which upgraded the equipment for pre-treatment of raw wastewater to enhance and protect downstream treatment processes. The project replaced Headworks 1, the oldest RWF facility, with a new Headworks 3. It also modified Headworks 2, which serves as the wet-weather headworks that provides extra capacity during storms.

The Headworks project involved multiple teams, including CIP (an integrated team of San José Environmental Services Department and Public Works staff and program management consultant staff), O&M, the owner’s advisor (CDM Smith) and the design-builder (CH2M Hill Engineers).

These teams had to navigate technical challenges, such as coordinating the hydraulics of nine raw sewage influent pipes with the new and existing headworks, as well as routing a 96-inch pipe through over 200 utility conflicts. They also had to make sure the construction did not interfere with endangered species such as burrowing owls and nesting raptors. And they did all of this while working through COVID-19 restrictions. The new Headworks 3 was completed and turned over to O&M in June. Final project completion is expected in November.

Several other projects have also been completed recently:

* **Advanced Facility Control and Meter Replacement — Phase 1:** This project replaced or upgraded outdated and inaccurate flow meters, valves and actuators, and sensors to increase reliability and improve RWF’s overall efficiency. The \$7 million project was turned over to O&M in September 2022 and achieved final completion in June 2023.

* **Digester & Thickener Facilities Upgrade:** This project upgraded digesters, which are large tanks in which anaerobic bacteria break down wastewater solids, producing biogas that helps generate power for the RWF. The hugely complex project involved elevating gas lines from underground tunnels, designing and constructing multiple new facilities and retrofitting existing facilities. The \$178 million project was turned over to O&M in April 2022 and reached final completion in April 2023.

* **Switchgear M4 Replacement:** This \$5.5 million project replaced outdated switchgear equipment. The project was turned over to O&M in May and reached final completion in November 2022.

I am proud and grateful to have worked alongside the dedicated teams that brought these projects to fruition!

Updating Facility Water Systems is a Complex Task



The Facilitywide Water Systems Improvements project at the RWF is reaching a pivotal stage: the selection of a contractor and award of the construction contract. Bids from up to four pre-qualified contractors will be opened in August, and staff expect to bring a recommendation to the City Council to award the contract for this critical, complex project in November.

The RWF has five different water systems, and four of them — all but the newer recycled water system, which is still in good condition — date back to the 1950s. These water systems include piping in varying conditions, with some having significant cracks and/or corrosion. “This project replaces aging water systems to meet future water demands and pressure requirements,” said Dilip Gargeya, project manager.

The project will replace and upgrade nine miles of aging pipes used in four water systems: potable water, which is used in sinks and water fountains at the RWF; process water, which is treated water from plant effluent used throughout the facility; fire protection, which will be fed by potable water; and eliminate the use of groundwater. It will also upgrade the pump stations to provide more consistent access to high-pressure water that helps maintenance crews do their jobs more effectively.

The project will have to address a number of challenges during construction, since the contractor will need to work around miles of existing underground pipes and systems whose precise locations are not always clearly labeled on record drawings. “The contractor has to navigate and interface with a complex system while working in an operational treatment plant,” Gargeya said.

The project is expected to be substantially complete in September 2026.



How the CIP Delivers Projects

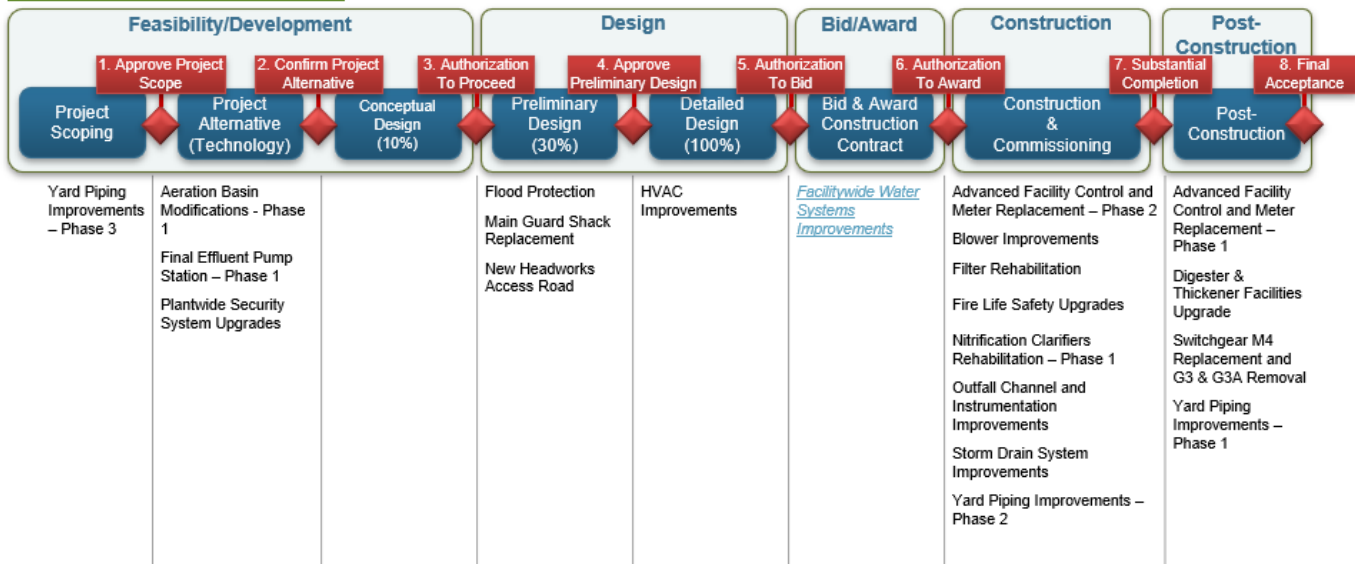
The CIP uses two project delivery methods:

- **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.

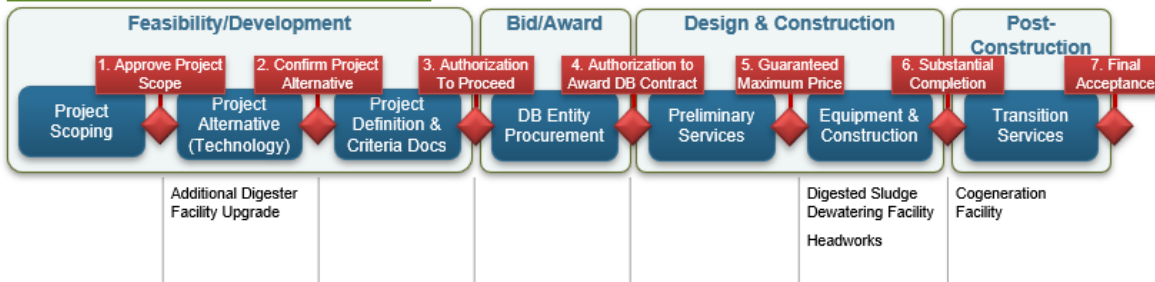
All CIP projects, regardless of project delivery method, follow a consistent process of consecutive delivery stages, each culminating in a stage gate, as presented in the project delivery models below. Stage gates are go/no-go points at which the project team must demonstrate that the project has met 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

Design-Bid-Build Active Projects



Progressive Design-Build Active Projects



*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 April through June, 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. 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**

In May, staff advertised the request for qualifications to procure owner's advisor services. Statements of qualifications are due in July.

- **Facilitywide Water Systems Improvements**

In April, consultant Kennedy Jenks submitted the final 100% design for City review. In June, the City advertised the construction contract. Bid opening is anticipated in August.

- **Flood Protection**

In May, the environmental consultant performed subsurface geotechnical investigations to verify the structural and chemical properties of soils. In June, consultant HDR Inc. submitted the draft 50% Preliminary Design and held a workshop with City staff to gather comments.

- **Main Guard Shack Replacement**

In April, consultant Jacobs completed potholing and utility location efforts and collected soil samples for hazardous materials (hazmat) testing. In May and June, Jacobs submitted the draft 50% Preliminary Design and held a workshop with City staff to gather comments to develop the final Preliminary Design Report. The project team also completed hazmat testing on soil samples.

- **New Headworks Access Road**

During this period, consultant Brown and Caldwell completed geotechnical investigations to verify the structural and chemical properties of soils in the roadway area and continued to develop the 50% Preliminary Design.

- **Plantwide Security System Upgrades**

In May, consultant Jacobs submitted the draft security guidance criteria document and held a workshop with the City team to gather feedback. In June, Jacobs finalized the security guidance document and submitted the draft Conceptual Design Report.

- **Yard Piping Improvements – Phase 3**

During this period, the project team continued to plan condition assessments for two 84" Raw Sewage (RS) pipes, a 66" RS pipe and a 102" RS pipe, expected to occur this summer.



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



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

Achieved Beneficial Use: June 2023

Update:

- In April, contractor Kiewit installed three chainwheels in Nitrification Battery A Gallery.
- In May, Kiewit installed instrument tagging.
- In June, Kiewit achieved substantial completion. Closeout activities continued in all work areas.

2

Blower Improvements: Oxygenating wastewater with greater energy efficiency



New motor installed on Secondary Blower #2

RWF's aeration blower systems, which supply oxygen for breaking down organic material in wastewater, 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: August 2023

Update:

- In April, contractor Monterey Mechanical completed a fire life safety inspection in the Building 40 locker room and completed pipe insulation patching in the Tertiary Blower Building basement.
- In May and June, Monterey Mechanical completed asbestos and lead remediation, as well as demolition and removal of old blower equipment and piping in the A-side of the Secondary Blower Building.

3

Digested Sludge Dewatering Facility: Drying biosolids more efficiently and effectively



Overhead view of Dewatering Building

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 April, design-builder Walsh continued to install rebar and embedment and placed concrete wall segments and slabs for the Dewatering Building. Walsh also installed stone columns for ground improvement in the sludge storage and pump station area, as well as electrical conduits in the truck load-out facility area.
- In May and June, Walsh completed tank foundations in the sludge storage and pump station area; installed elevator wall rebar, forms and concrete, false work and rebar for overhead concrete beam, and conduits for electrical duct banks in the Dewatering facility area; and completed piping in the east section of G Street.

4

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



Fitting Spool on backwash piping

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 instrumental elements of the system.

Project Budget: \$59.6 million

Expected Beneficial Use: July 2024

Update:

- In April, contractor Walsh completed the installation of conduits for the new valves in filter gallery A and worked on switchgear S12 to prepare it for witness testing. Additional potholing and excavation work was completed at the switchgear S6 location, and abandoned duct banks and other facilities were removed.
- In May and June, Walsh continued to demolish existing valves, motor control centers (MCC) and light poles around filter gallery A. New pipe spools, flanges and switchboards were installed.

5

Fire Life Safety Upgrades: Improving worker health and safety and the environment



New fire panel for fiber connection

Several 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 April and May, contractor Blocka Construction submitted fire alarm shop drawings to the San José Fire Department (SJFD) for permit approval. SJFD issued four permits to allow work to commence in four buildings.
- In June, SJFD issued three additional permits and continued to review three other permit applications. Blocka started fire alarm installations in the Sludge Control and Power & Air Operations buildings.

6

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



Milpitas Diversion Structure

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 will 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: November 2023

Update:

- In April, design-builder CH2M completed construction, testing and startup of the 54" plant drain (PD) and tie-ins for the 54" PD and Milpitas A-Line force main. CH2M also installed and tested air supply boosters and pumps and piping in the north meter vault and west primary draining area. CH2M continued to address various minor work and punch list items in the new headworks (Headworks 3) area.
- In June, CH2M achieved beneficial use on Headworks 3 and continued the decommissioning of Headworks 1 and other work around Headworks 2.

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: September 2023

Update:

- In April, contractor Overaa completed the installation of the clarifier mechanism and associated parts in clarifiers A3 and A4.
- In May, Overaa completed the 28-day operational testing on clarifier A4 and completed the demolition of floor grout in clarifier B7.
- In June, Overaa completed the installation of mechanisms, weir baffles and deflectors in clarifiers B3 and B5, repaired underground conduits, poured a concrete pad and installed a new MCC.

8

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



New ABB electrical panels under the canopy near the daylight station

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: \$10 million

Expected Beneficial Use: November 2023

Update:

- In May and June, contractor Anvil Builders installed control panels, electrical conduits, piping and lights at the daylight station and Sulfur Dioxide (SO₂) Building. Anvil also completed a new vault at the SO₂ Building and installed flow meters, sump pumps and drainage pipes in the vault.



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



Storm Drain warehouse pump station

The RWF experiences localized flooding caused by runoff during heavy rainfall events. The existing storm drain system 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: \$13.9 million

Expected Beneficial Use: December 2023

Update:

- In April and May, contractor Ranger Pipelines drained, washed, sandblasted and applied prime coat and epoxy inside the wet wells at the Stores, Los Esteros and Zanker pump stations. Ranger also installed concrete light pole footings at four pump stations; connected a catch basin to a manhole; constructed concrete slab and ramp at Tunnel Entry 3; installed all necessary bollards and painted them; and constructed the access road to the Outfall pump station.
- In June, Ranger drained, washed, sandblasted and applied prime coat and epoxy inside the wet wells at the RSM and Lagoon pump stations; and painted the wet wells at the Stores, Los Esteros and Zanker pump stations.

10 Yard Piping Improvements – Phase 2: Repairing and replacing critical pipelines at the RWF



Existing condition of the pipe to be rehabilitated

The RWF has 67,000 linear feet of process pipes that carry gas, liquids, sludge, air, steam and other process streams to and from the various treatment areas.

These networks of pipeline are critical to RWF operations. Seventy percent of the pipes are more than 25 years old, and 10 percent are more than 50 years of age. This is the second of a multi-phase project to repair or replace pipe systems that have been identified as high priority or at high risk of failure.

Project Budget: \$21.6 million

Expected Beneficial Use: January 2025

Update:

- In April, the City Council awarded the construction contract to Michels Trenchless, Inc.
- In May, staff held a pre-construction meeting and issued the notice to proceed to Michels.



Outfall channel and wetlands

What’s Ahead?

In July – September 2023:

- Open construction contract bids for the Facilitywide Water Systems Improvements project.
- Evaluate proposals for the owner’s advisor master services agreement for the Additional Digester Facility Upgrade project.
- Achieve beneficial use on the Blower Improvements and Nitrification Clarifiers Rehabilitation – Phase 1 projects.



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% 17/17 ¹			100% 17/17		
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% 0/2			0% 0/2 ²		
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%	50% 1/2			50% 1/2 ⁴		
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%							
Expenditures	\$296M	\$313M			\$313M ⁵		
Measurement: CIP FY22-23 committed costs. Target: Committed costs meet or exceed 70% of planned budget. 70% of \$423M = \$296M. Therefore Fiscal Year End Green: >=\$296M; Red: < \$296M							
Safety	0	0			0		
Measurement: OSHA reportable incidents associated with CIP Delivery for the fiscal year. Criteria: Green: 0 injuries requiring hospitalization, 0 fatalities; Amber: 1 to 2 injuries requiring hospitalization, 0 fatalities; 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: 0 incidents; Amber: 1 to 2; Red: > 2							
Vacancy Rate⁶	10%	15% 12/78			15% 12/78		
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

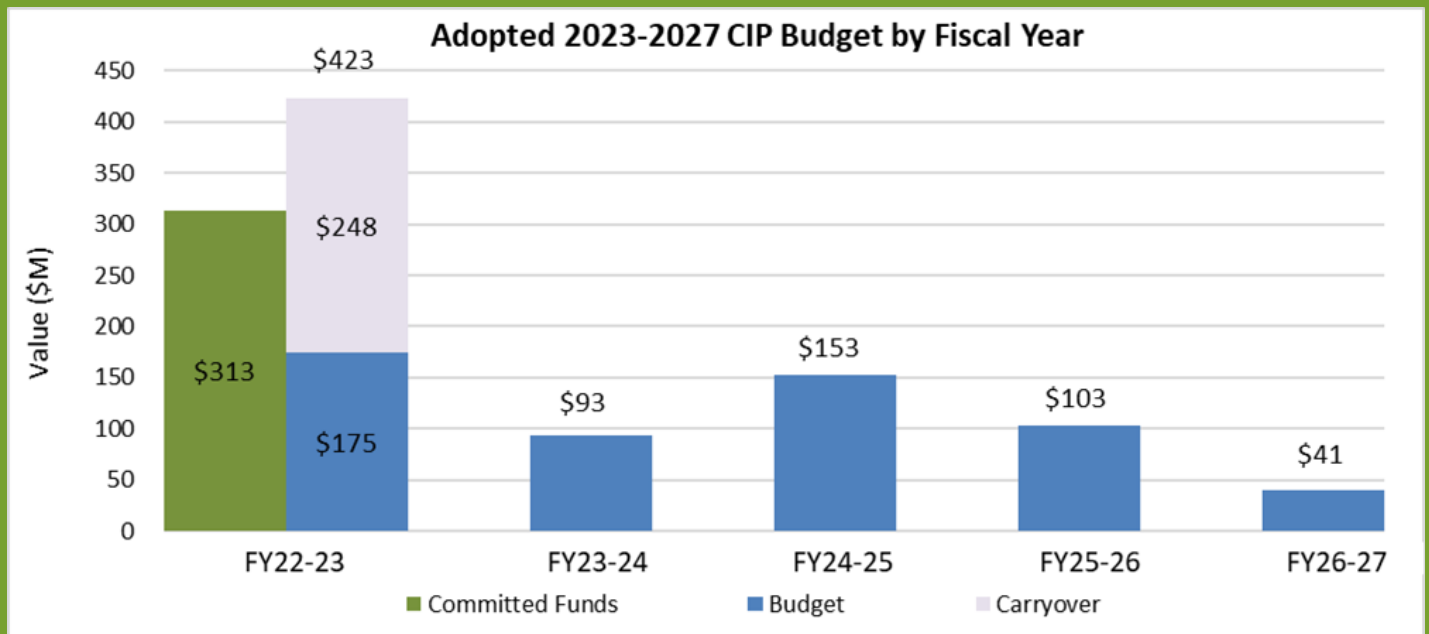




Program Budget Performance

This section summarizes the cumulative monthly budget performance for FY 2022-23 based on the Adopted 2023-2027 CIP Budget.

Adopted 2023-2027 CIP Expenditures and Encumbrances



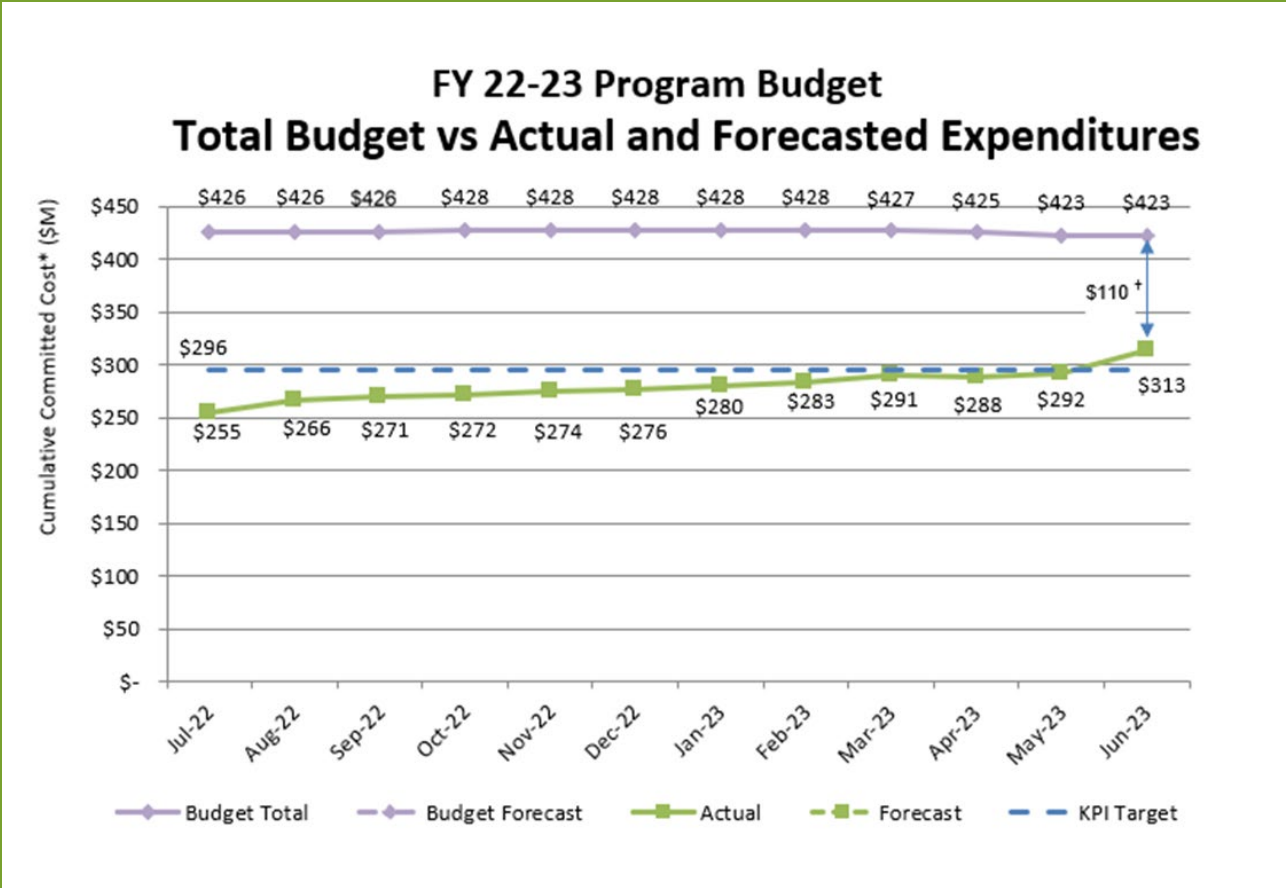
[Budget performance information](#)



Fiscal Year 2022-2023 Program Budget Performance

The FY 2022-23 CIP budget is composed of approximately \$175 million in new and re-budgeted funds, plus encumbered carryover of \$248 million, for a total of \$423 million.

FY 2022-23 Program Budget



[CIP Program Budget Information](#)



Improving Performance and Reliability at the Wastewater Facility



Credit: Robert Dawson. Photo courtesy of the San José Public Library

The Nitrification Clarifiers Rehabilitation project, featured in this [video](#), will upgrade infrastructure that is more than 40 years old and ensure continued reliability.

Want to learn more?

[@sjenvironment](#)



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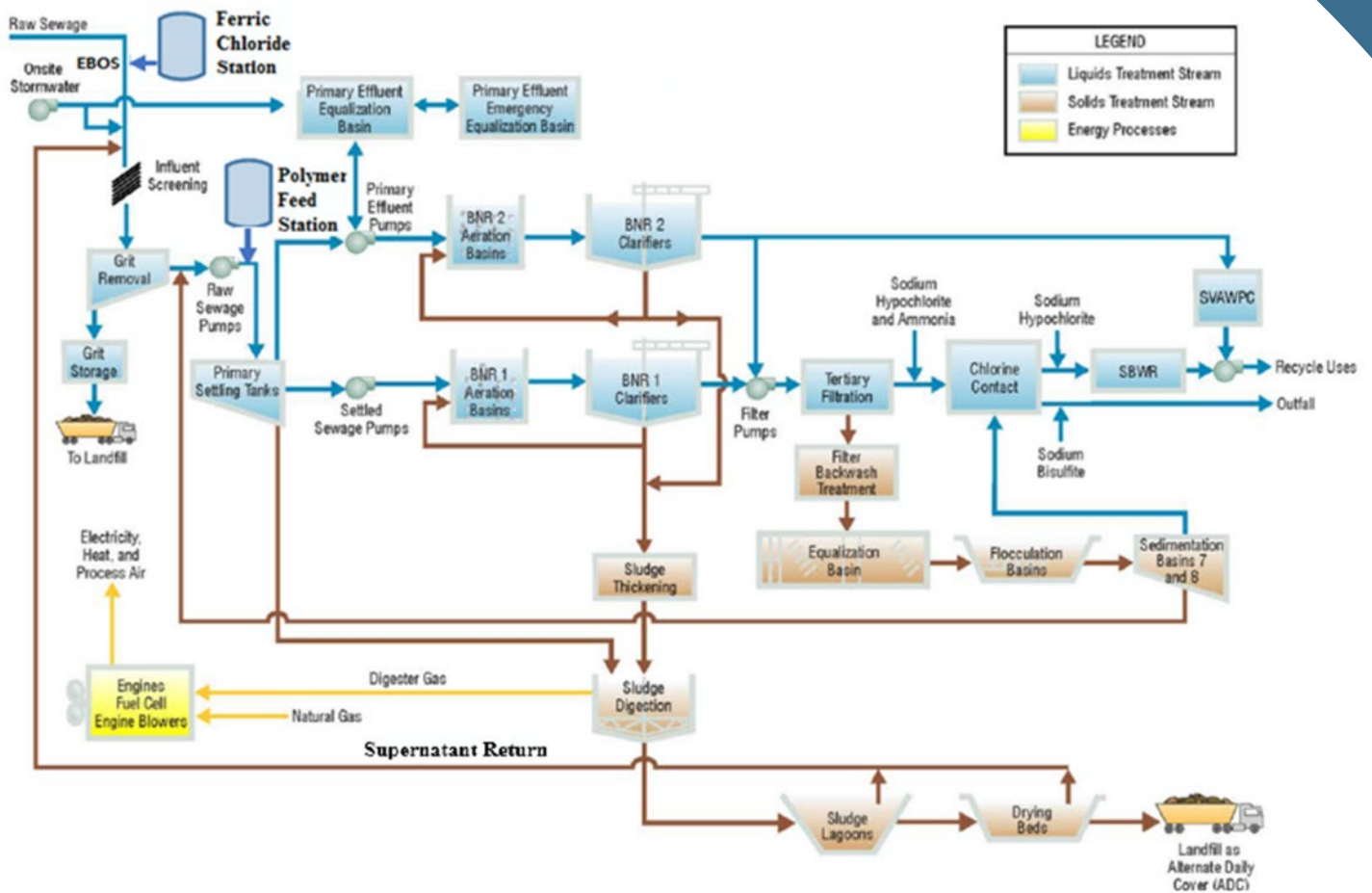


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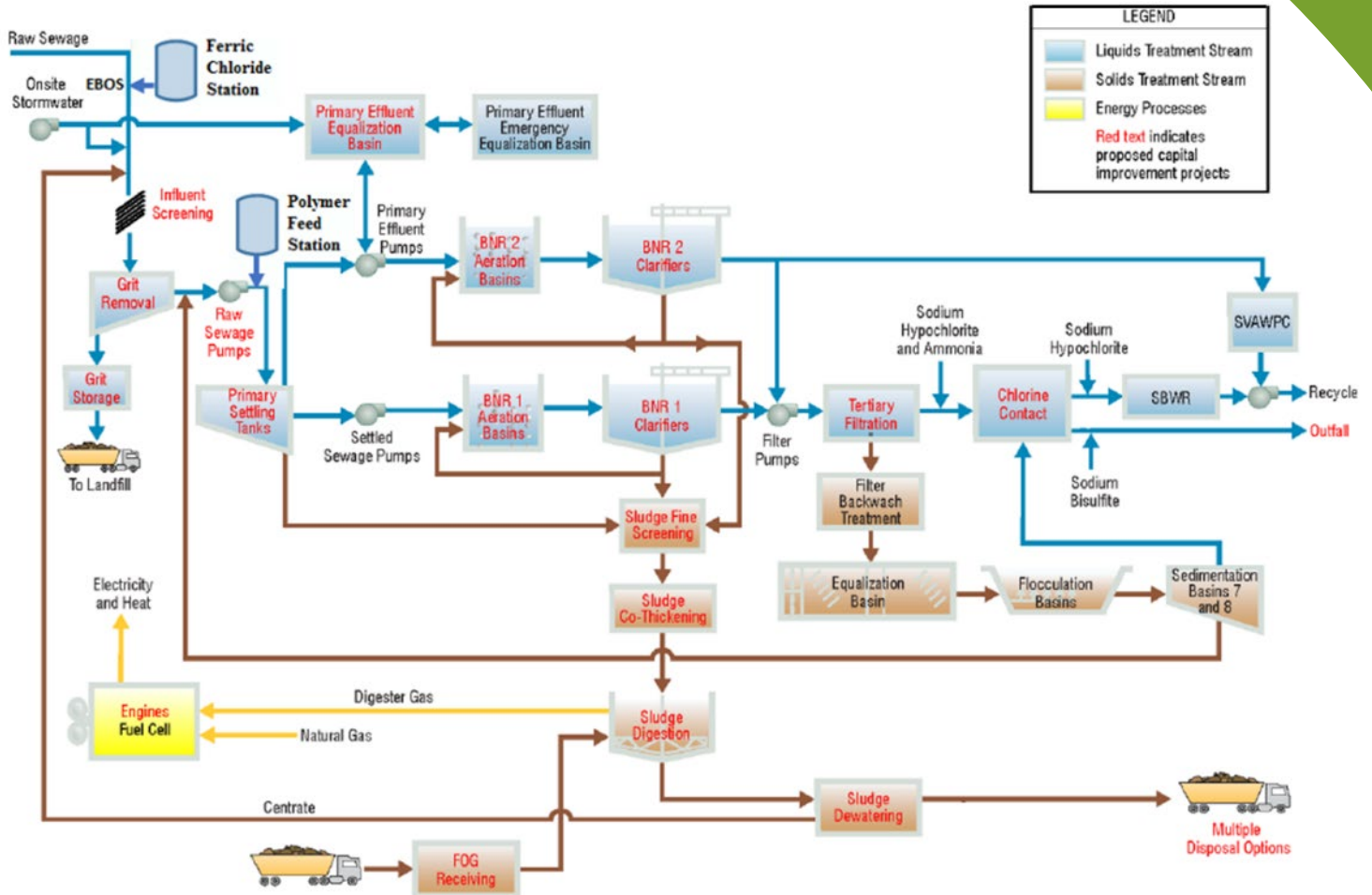
Regional Wastewater Facility Treatment

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.

