



San José-Santa Clara
Regional Wastewater Facility

CIP

CAPITAL IMPROVEMENT PROGRAM

Monthly Status Report:
January 2021

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






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 environment without interruption since 1956. The discharge of clean wastewater into the San Francisco South 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 for January 2021.

LEGEND

	On Target
	Alert
	At Risk





Continuing to Deliver the Program Through the COVID-19 Pandemic

By: Kerrie Romanow, ESD Director

In January, staff and contractors continued to make progress on CIP projects in design and construction despite the continued challenges of the COVID-19 pandemic. This has required CIP staff to be present at the RWF working closely with contractors and Operations and Maintenance (O&M) staff, to safely deliver projects – while observing COVID-19 social distancing and personal protective equipment protocols.

Early on in the COVID-19 pandemic, the CIP construction projects were designated as “essential,” enabling them to continue without interruption since March of last year. Over this period, up to the end of January, over 328,000 construction hours were worked, without a major safety incident. The City implemented screening of all on-site personnel at each RWF entrance, followed by additional screening questions at individual work sites. Workers became acclimated to wearing masks, maintaining physical distance, and frequently washing their hands.



Construction workers observing COVID safety protocols

One project that achieved a major milestone during this period was the Blower Improvements Project. This project will extend the useful life of the RWF’s aeration system, used in the secondary biological treatment process, by 30 years, while also significantly improving the system’s energy efficiency.

The scope of this project includes the removal of four gas engines and blowers and converting the two remaining blower engines to electric in the Secondary Blower Building (SBB); replacing gearboxes, electric engines, and associated electrical control equipment in the Process Air Building (PAB) and Tertiary Blower Building (TBB) blowers; adding a climate control system to the TBB electrical room; providing new discharge, blow off, and check valves to all blowers; and providing clean agent fire protection to the PAB electrical room.

The PAB blowers consist of three 80,000 standard cubic feet per minute blowers that are powered by 4,000 horsepower electric motors. The blowers themselves were constructed in 1982 and after 40 years of service, a condition assessment confirmed that they are still in good condition and only need to be refurbished. The electric motors are being replaced with the addition of variable frequency drives and new blower control panels.

PAB #2 is the first blower to have been completed. Extensive testing, startup, and commissioning began in August and ended in November 2020. The contractor has now commenced work on PAB #3 as well as continuing to make progress on the blowers in the SBB and TBB.



PAB #2 completed and ready for testing

CIP Spotlight – Condition Assessments Define Future Projects

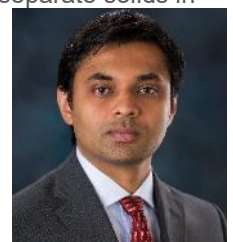
To understand the extent and urgency of needed RWF improvements, CIP staff must conduct condition assessments of existing facilities. These efforts usually involve engaging professional engineering consultants to identify the equipment to assess, determine the best assessment method, coordinate any required shutdowns with O&M staff, and produce a report with recommendations that will inform the scope and priority of future capital projects.



West Primary Clarifiers

In summer 2021, the CIP plans to perform a condition assessment of the east and west primary clarifiers and appurtenances, which were built in the 1950s and 1960s and are critical components of the RWF’s primary treatment process. The primary clarifier tanks settle and separate solids in wastewater, which are then pumped to digesters for further treatment.

The findings of the condition assessment will help provide an estimate of the remaining useful life of critical process, structural, mechanical, electrical, instrumentation and controls components, identify capital assets at risk of failure, and establish a timeline of recommended repairs and/or replacements required to keep the facilities in operation for the next 30 years. **“Working alongside passionate City and CIP colleagues to provide innovative capital planning solutions is an educational and rewarding experience”** says Dilip Gargeya, Stantec Project Manager.



Project Manager
Dilip Gargeya



How the CIP Delivers Projects

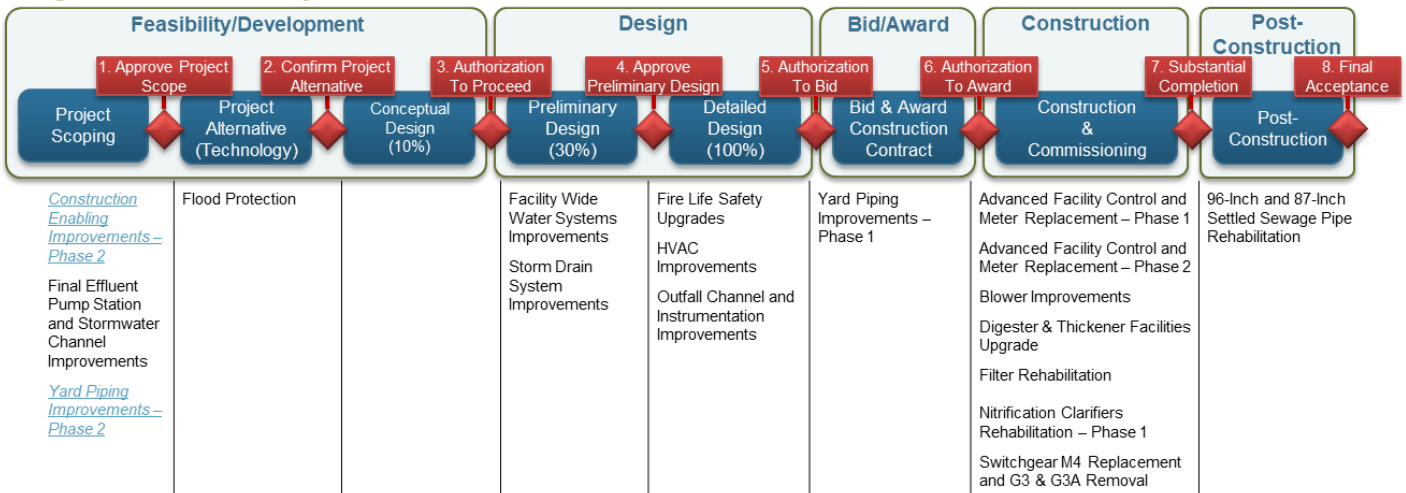
The CIP uses two project delivery methods:

- **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.

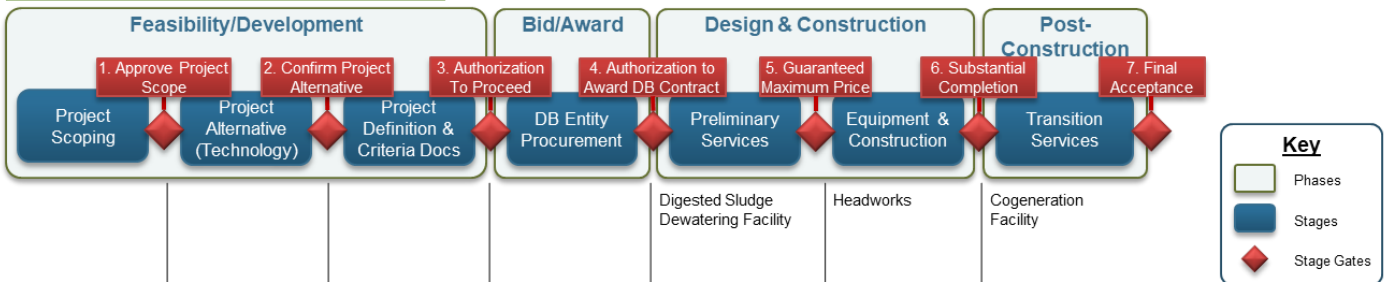
All CIP projects, regardless of project delivery method, follow a consistent process of consecutive delivery stages, each culminating in a stage gate, as presented in the project delivery models below. Stage gates are go/no-go points at which the project team must demonstrate that the project has met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

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 month 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.

COVID-19 update: In January, 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 at each RWF entrance, followed by screening questions at individual work sites. All other CIP staff continued to work remotely.

Projects in Design

- **Digested Sludge Dewatering Facility Project**

The project team returned comments to design-builder Walsh on the 30 percent design deliverables.

- **Facility Wide Water Systems Improvements Project**

The City issued the Notice to Proceed (NTP) to the exploratory trenching contractor, Westland Contractors, Inc., on January 22. Construction will begin in February and is anticipated to finish in July.

- **Outfall Channel and Instrumentation Improvements Project**

Consultant AECOM submitted the 50 percent design documents for City review and held a review workshop with O&M and CIP staff.

AECOM also submitted a draft report for the diver inspection of the bridge and weir structure, as well as a draft report for the preliminary hazardous materials assessment work.

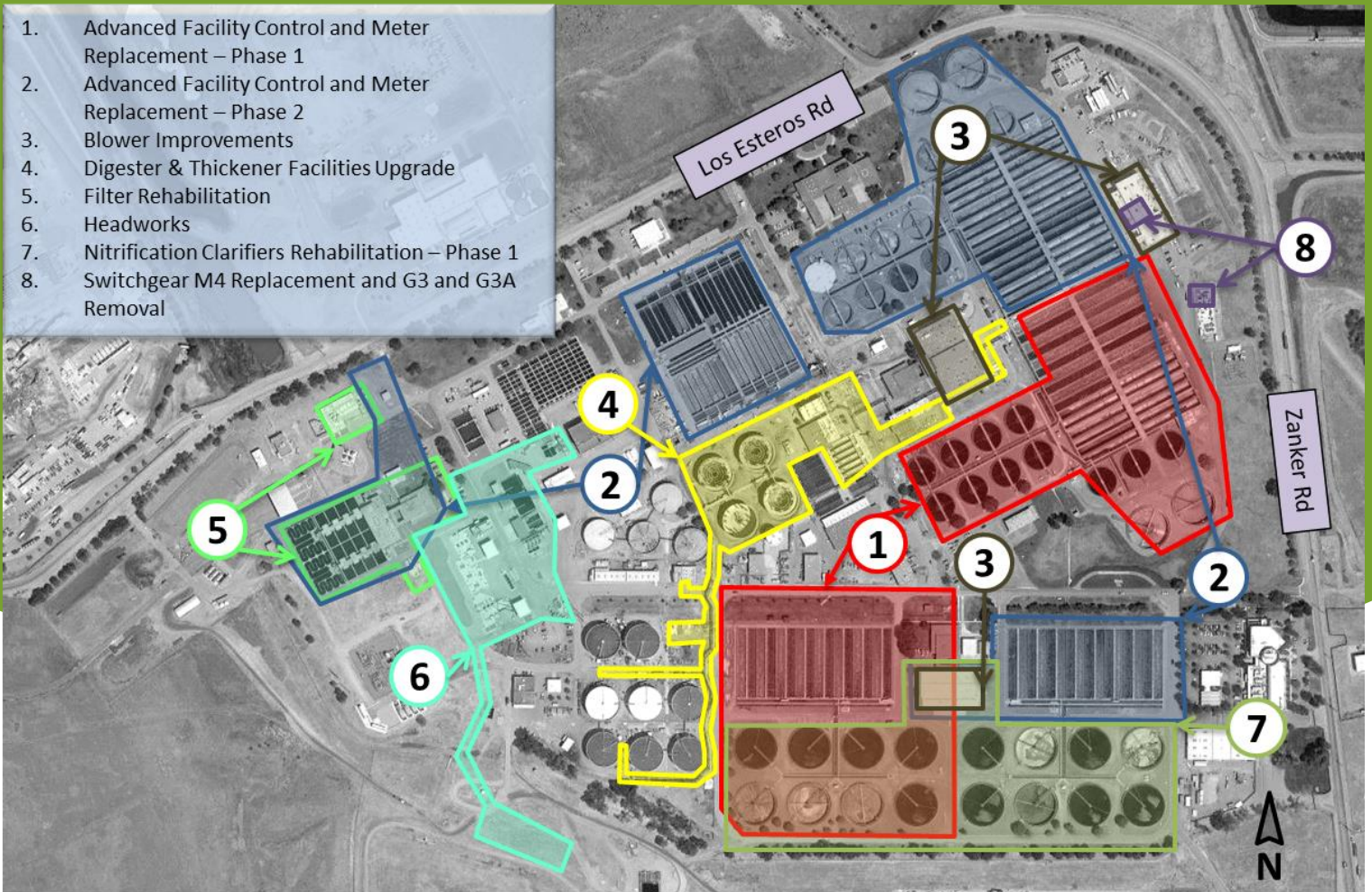
- **Yard Piping Improvements - Phase 1 Project**

The City received two bids and will recommend award of the construction contract to TPAC and Council in March.



Projects in Construction

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



1

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



Contractors testing new flow meters.

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: June 2021

Update:

- Contractor Overaa installed 16 new dissolved oxygen meters for the nitrification tanks.
- Overaa began the 28-day operational testing of eight new flow meters installed at the secondary clarifiers. The contractor anticipates testing completion in February.

2

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



Contractor performing a test on a turbidity meter.

The second 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:

- Contractor Kiewit completed the turbidity meter replacement work in the filter galleries as well as pre-operational testing of the meters.

3

Blower Improvements Project: Oxygenating wastewater with greater energy efficiency



Contractors at the new Tertiary Blower Building electrical room.

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:

- Contractor Monterey Mechanical resolved a minor oil leak in Building 40 Blower #2 that was identified last month.
- Monterey Mechanical began Tertiary Blower Building duct bank installation outside of the building.

4

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



Contractor welding a digester gas line on top of Digester 7.

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: November 2021

Update:

- Contractor Walsh hydraulic-tested the hot water supply and return piping between the new sludge screening building and the upgraded digester area.
- Walsh completed pre-operational and functional testing of the HVAC and fire protection systems at the east and west electrical buildings.

5

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



Aerial view of the current filtration area.

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: \$58.3 million

Expected Beneficial Use: July 2024

Update:

- Council approved an amendment to the master consultant agreement with Kennedy/Jenks Consultants for additional compensation and time to perform engineering services during construction.
- The project team began reviewing submittals for major equipment and requests for information from contractor Walsh.

6

Headworks Project: Pretreating wastewater with better performance and reliability



Excavation for the installation of the 96-inch pipe

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:

- Design-builder CH2M began constructing the new Headworks 3 electrical building in addition to continuing wall and deck construction of the Headworks 3 screenings, pump station and grit handling facilities.
- CH2M installed a complex shoring system to allow construction of the new 96-inch pipe sections within the congested areas of the RWF.

7

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



Contractors installing CIPP lining for the RAS B7 pipeline.

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 life. 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: January 2023

Update:

- Contractor Overaa completed cured-in-place pipe work for the return activated sludge pipelines, as well as a post-installation closed circuit TV inspection.

8

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



Aerial view of the current Switchgear M4.

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: January 2023

Update:

- Contractor Blocka sent the structural switchgear calculation report to the State of California for review, with approval anticipated in February.



Nitrification Clarifiers Rehabilitation – Phase 1 Project: before (top) and after (bottom) CIPP lining of the 24-inch Nitrification Clarifier RAS lines.

What's Ahead?

In February and March 2021:

- Staff will recommend award of the construction contract for the Yard Piping Improvements – Phase 1 Project to TPAC and Council in March;
- City staff and consultant AECOM will begin work on the Primary Clarifiers and PEPS Condition Assessment Study;
- The Fire Life Safety Upgrades Project will complete detailed design. Staff will advertise the construction contract; and
- The Storm Drain System Improvements Project will complete preliminary design and begin detailed design.

Program Performance Summary

KPI	Target	Fiscal Year to Date			Fiscal Year End		
		Actual	Status	Trend	Forecast	Status	Trend
Stage Gates	90%	83%			94%		
		5/6 ²			15/16		
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%	50%			67%		
		1/2			2/3		
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			50%		
		0/0			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	\$393M	\$308M			\$403M ³		
Measurement: CIP FY20-21 committed costs. Target: Committed costs meets or exceeds 70% of planned budget. 70% of \$562M = \$393M. Therefore Fiscal Year End Green: >=\$393M; Red: < \$393M							
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 Rate⁴	10%	14%			9%		
		12/88			8/88		
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 2020-2021 information](#)

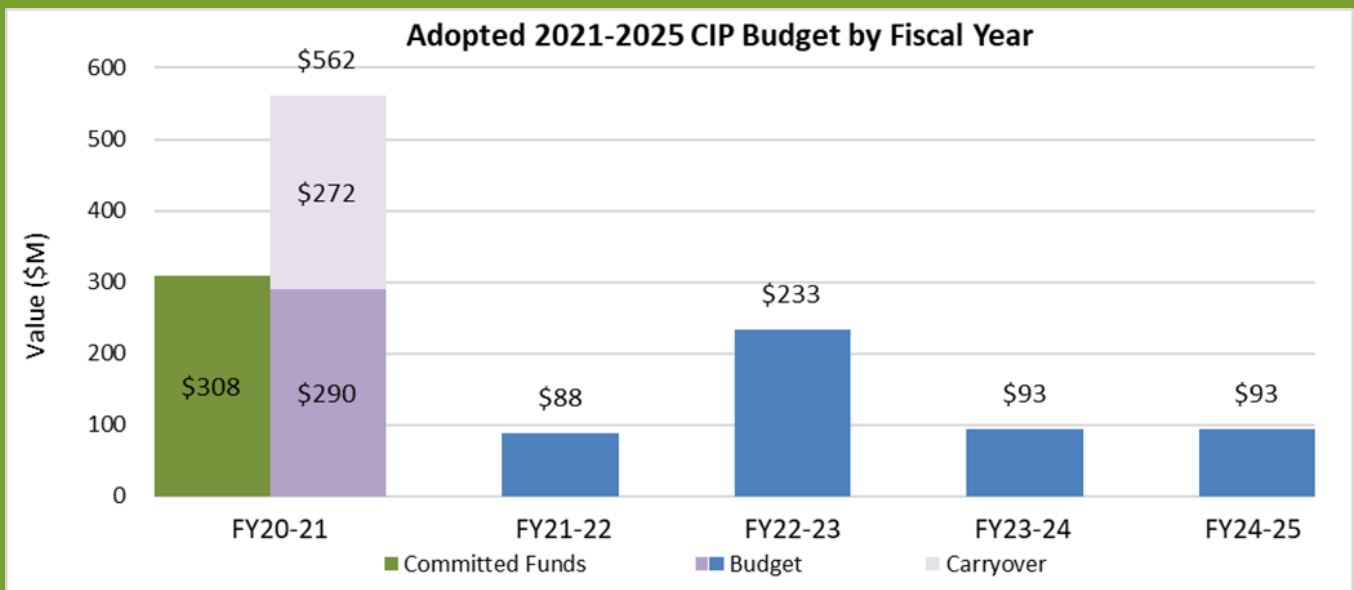




Program Budget Performance

This section summarizes the cumulative monthly budget performance for fiscal year 20-21 based on the Adopted 2021-2025 CIP Budget.

Adopted 2021-2025 CIP Expenditures and Encumbrances

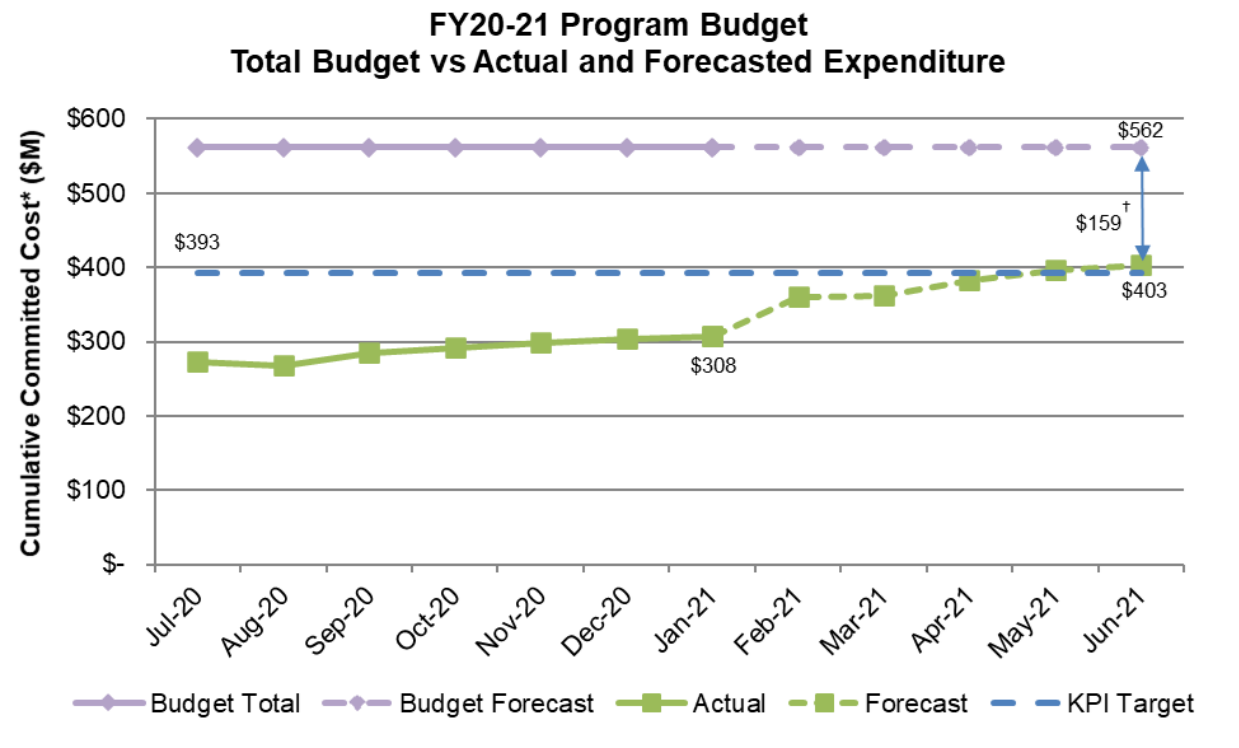


[Budget performance information](#)

Fiscal Year 2020-2021 Program Budget Performance

The FY20-21 CIP budget is comprised of approximately \$289.6 million in new and re-budgeted funds, plus encumbered carryover of \$272.2 million, for a total of \$561.8 million.

FY20-21 Program Budget



[CIP program budget information](#)



How does the wastewater facility clean wastewater?



San José-Santa Clara Regional Wastewater Facility

Fourth Step: Aeration Tanks

secondary

Biological Stage (6 hrs)
Water is 95% cleaner



4

Aeration tanks pump air into the wastewater to nurture the growth of naturally occurring aerobic bacteria that remove organic pollutants in the water.



Want to learn more?

@sienvironment

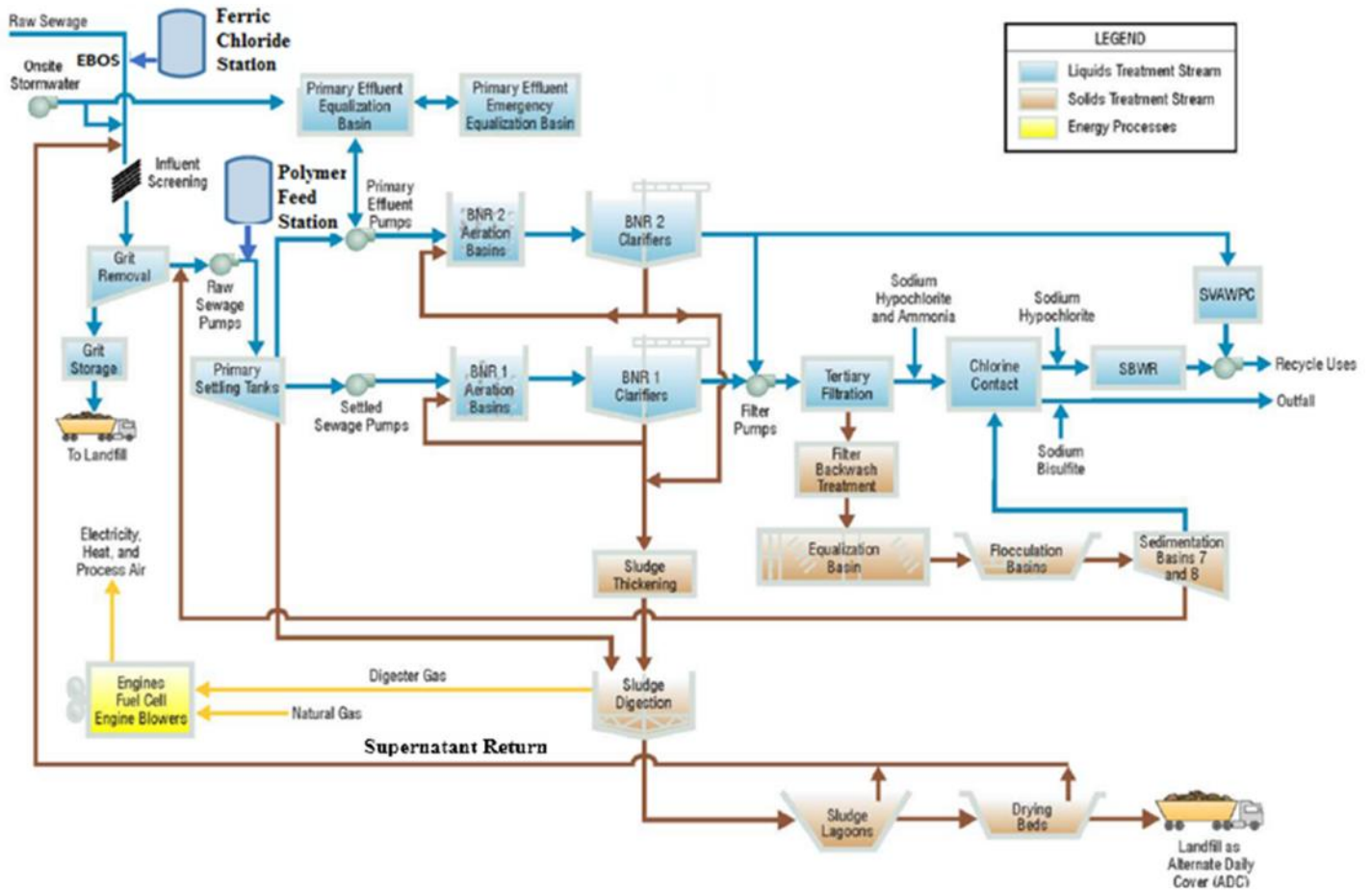
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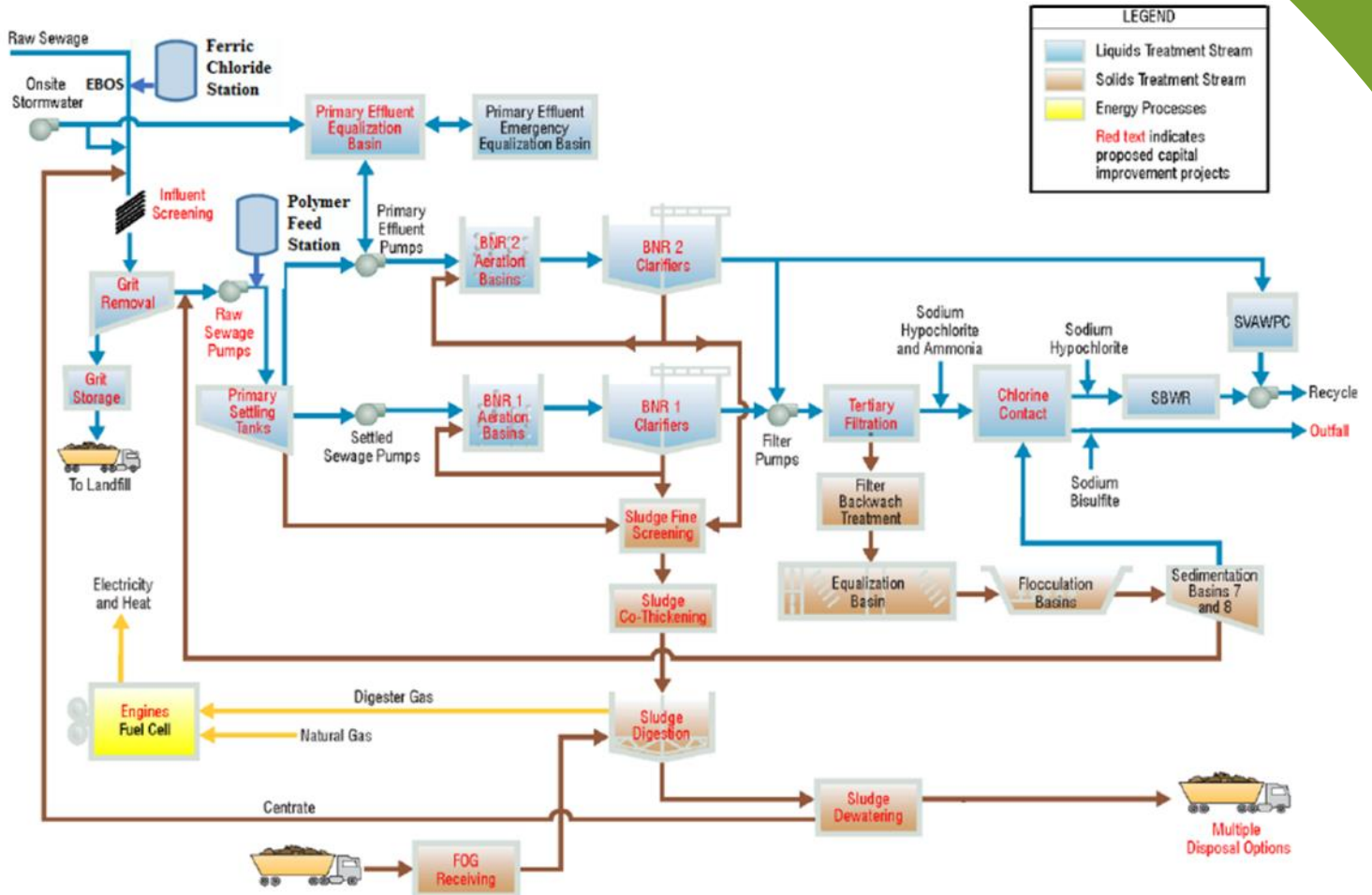
Regional Wastewater Facility Treatment

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 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 after dewatering that is compressed.
WAS	Waste-activated sludge, or the excess quantity of bacteria and microbes removed from the secondary wastewater treatment process.

