San José-Santa Clara
Regional Wastewater Facility

CIP

CAPITAL IMPROVEMENT PROGRAM

Monthly Status Report:
November 2020

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 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 November 2020.

Safely Working Around the Clock—Protecting Public Health, the Environment, and Eagles

By: Kerrie Romanow, ESD Director

In California, including Santa Clara County, COVID-19 cases are rising quickly. Workplaces everywhere are taking extra precautions. Here at the RWF, staff, contractors and vendors have grown accustomed to working remotely or, in the case of construction personnel, undergoing health screenings, wearing face coverings, and maintaining at least six feet of social distance. Everyone's health and safety has never been more important.

Unlike other entities, however, the RWF never closes. In fact, we have maintained wastewater treatment services without interruption since 1956. That means 24 hours a day, 365 days a year. Reliably cleaning wastewater -- and thereby protecting public and environmental health -- is our ongoing commitment and mission.

To continue to provide excellent, non-stop service into the future, the RWF is in the sixth year of a major capital improvement program to upgrade equipment and infrastructure worn out from decades of use. The Filter Rehabilitation Project is a great example of this work. Filtration is one of the final steps in the RWF's advanced wastewater treatment process and is critical to final wastewater quality. In the tertiary filtration unit, treated wastewater goes through multiple filters before it can be released to the south San Francisco Bay in compliance with our National Pollutant Discharge Elimination System (NPDES) permit.

The filtration process consists of 16 granular media filters and related equipment. Having run continuously since the 1970s and 1980s, all elements of the system--structural, mechanical, electrical, and instrumentation/control—urgently need rehabilitation. I'm happy to report that the project is moving forward: the City awarded the contract in October and the contractor will start construction in December. Project completion is expected mid-2024.

At the RWF, we protect waterways as we discharge highly-treated effluent. Likewise, we also protect wildlife and wildlife habitat near our work sites. This past spring, staff were delighted to see a pair of golden eagles, a protected species under state and federal law, make their home in a palm tree about 1,000 feet from the planned Headworks Project construction site, soon followed by a baby eaglet.

Adult Golden Eagle and nest

To ensure that the eaglet fledged successfully, the CIP staff worked with the City's environmental consultant to develop a Golden Eagle Nest Avoidance Plan, approved by both the state Department of Fish and Wildlife and the U.S. Fish and Wildlife Service. With monitoring by a biologist, a buffer zone and a no-disturbance fence, the plan worked. Throughout the summer, the parents and eaglet could be seen perched in their palm tree or flying around the RWF bufferlands, unperturbed by human activity. At the same time, construction of the new headworks facility began. I applaud the responsiveness of our team to protect wildlife habitat and move our critical project forward.

CIP Spotlight – Increasing Filtration Capacity and Reliability

Filtration is the last step of treatment at RWF. **The Filter Rehabilitation Project** has two main objectives: 1) make key process improvements, resulting in water and energy savings and increased treatment capacity; and 2) repair and/or replace critical infrastructure to improve the useful life and reliability of RWF assets. The project will replace all valves and actuators in the filter gallery, granular filter media, and the existing surface wash system with a new air scour system. It will also rehabilitate electrical equipment (switchgears and motor control centers) and complete structural work and concrete repairs. Normally, two batteries of filters are available, with an annual average flow rate of 110 million gallons per day. Once project construction begins, one of the batteries will be taken out of service for upgrades and all wastewater flow will be treated by the remaining battery—not an easy task. For this purpose, the construction sequencing of the project was carefully designed by the project team in close coordination with operations and maintenance (O&M) staff so the work is completed in the dry season (summer) when flows are lower**.** The process will then be repeated the next summer for the other battery. **"It's kind of like working on a plane while it's in flight," said Tina Pham, project manager**. Watch for project updates soon!

Project Manager Tina Pham

The RWF filtration system is critical to producing 99 percent-clean wastewater

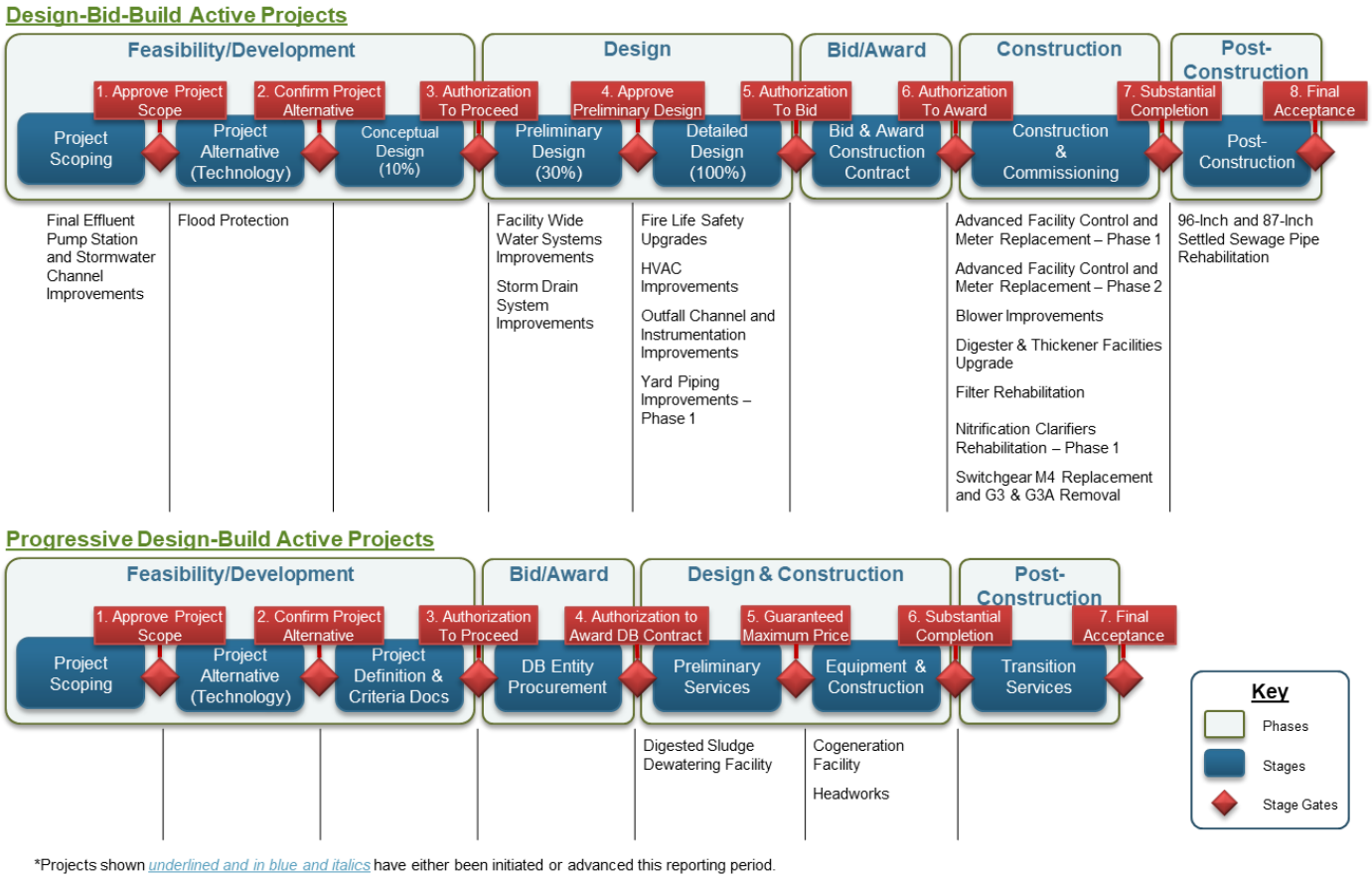
How the CIP Delivers Projects

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 scope continues to address existing needs, budget/schedule control, and O&M 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 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 November, 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.

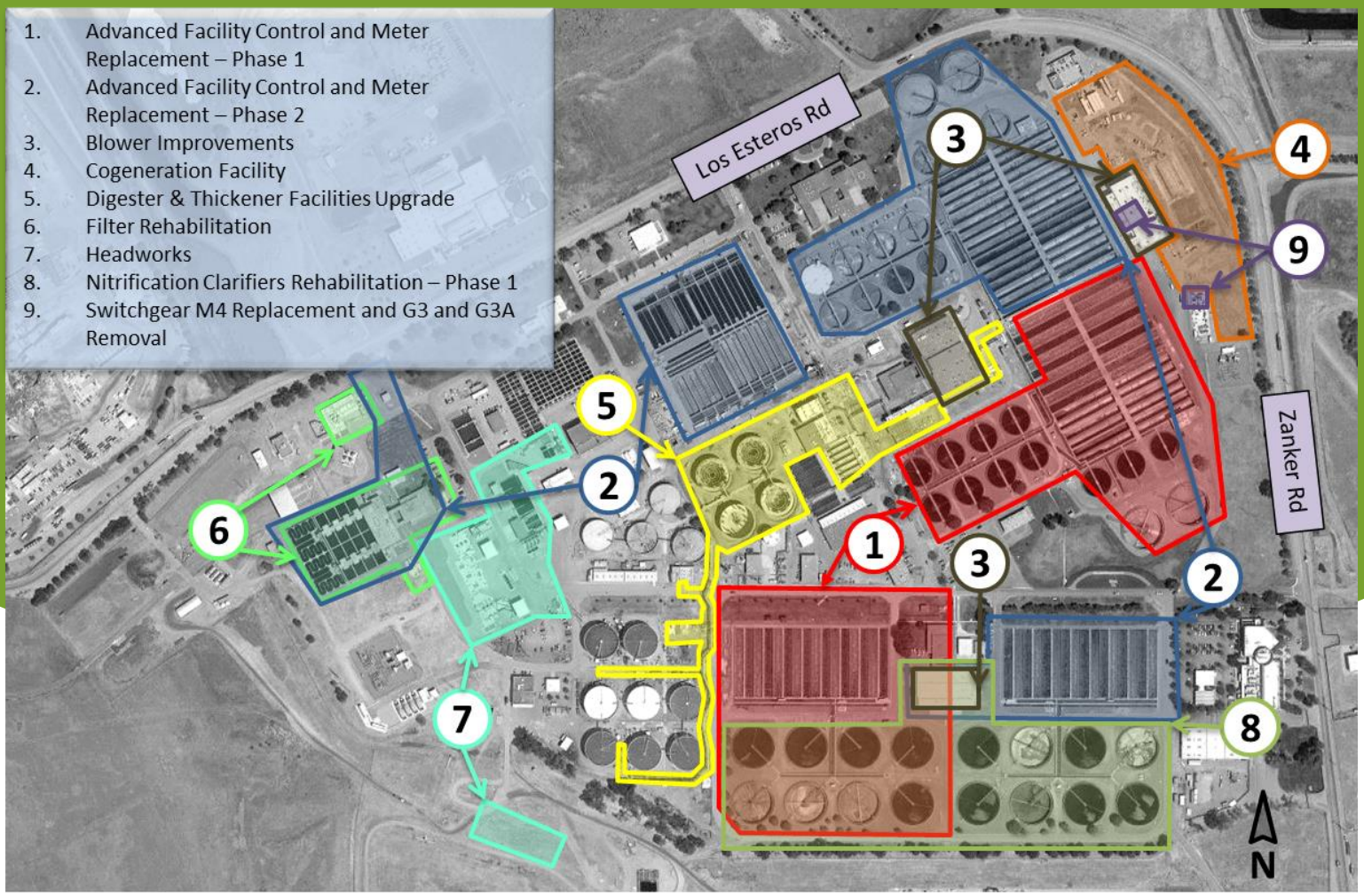
Projects in Design

- Digested Sludge Dewatering Facility Project
  The project team and design-builder Walsh held a workshop to identify and review project hazards.

  A technical memorandum (TM) defining performance requirements of critical equipment was submitted for review and a meeting was held with staff to discuss the TM's recommendations.
- Facility Wide Water Systems Improvements Project
  Consultant Kennedy Jenks (K/J) conducted a geotechnical investigation of the site for the water storage tank. They also performed hydrant testing.
- Storm Drain System Improvements Project
  The City approved consultant AECOM's process shutdown request to collect samples for hazardous materials testing at the stormwater pump stations to help define design and construction requirements. The consultant anticipates submitting the 50 percent design documents to the City in December.
- Yard Piping Improvements - Phase 1 Project
  Consultant Black & Veach completed the revised 100 percent design and the project team prepared for repeat of Stage Gate 5: Authorization to Bid, planned for early December.

Projects in Construction

This map of the RWF shows the active construction projects from the CIP.



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

RAS elbow repairs: Before (left) and after (right).

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 completed the shoulder repair work on three return activated sludge (RAS) elbows in the nitrification tunnel and the operational testing of six aeration tanks and nine clarifiers in the secondary battery B area.

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

Current RWF control equipment.

This is the second 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.

Project Budget: $15.0 million
Expected Beneficial Use: March 2023

Update:

- Staff held a pre-construction meeting with contractor Kiewit and the field construction work at the filter building is scheduled to begin in December.

3 Blower Improvements Project: Oxygenating wastewater with greater energy efficiency

Electrical duct bank under construction.

RWF's aeration blower systems supply the oxygen needed for the breakdown of 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: October 2022

Update:

- Contractor Monterey Mechanical completed the 28-day operational test for Building 40 Blower #2.
- The contractor also dismantled Tertiary Building Blower #3's discharge piping silencer.

4 Cogeneration Facility Project: Powering the RWF with renewable biogas

Cogeneration Building 41 engine exhausts with completed architectural facade.

Pursuant to the City's 2012 Energy Management Strategic Plan, this project will upgrade and improve the RWF's aging power equipment, much of which is more than 35 years old. The project will install four new engine generators, a heat recovery system and gas treatment system to improve equipment reliability, energy efficiency, and enable full reuse of digester biogas.

Project Budget: $112.5 million
Expected Beneficial Use: December 2020

Update:

- Design-builder CH2M Hill completed six of eight acceptance tests on the four engines. Acceptance testing is anticipated to be completed in December.

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

New Sludge Screening Building

The RWF's 16 digesters use anaerobic digestion to break down sludge. The 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: October 2021

Update:

- Contractor Walsh installed various mechanical piping and pipe supports, including tying in the primary sludge pipe to the new sludge screening facility; and installing Digester 5 through 8 overflow pipes in the digester remote tunnels.
- Walsh completed vibration and performance testing on the new pressure flow pump in the dissolved air flotation thickener tank gallery.

6 Filter Rehabilitation Project: Protecting health, environment and 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 instrumentation elements of the system.
Project Budget: $58.3 million
Expected Beneficial Use: July 2024

Update:

- Staff executed the construction contract with Walsh Construction, Staff will issue the NTP and hold a pre-construction meeting in December.

7 Headworks Project: Pretreating wastewater with better performance and reliability

Excavation of the 96-inch pipeline trench for Headworks 3

Headworks pretreatment of raw wastewater enhances and protects downstream treatment processes. The project will replace Headworks 1, the oldest facility in the RWF, with a new Headworks 3 and 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 commenced installation of a large steel beam shoring system for the 96-inch pipeline near Headworks 1 and 2.
- CH2M began installing new electrical duct banks that will provide dual power feeds from the existing RWF M3 and M5 switchgears to Headworks 3.

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

Nitrification clarifier wall rehabilitation

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:

- Contract Overaa sandblasted the corroded reducers and wall spools in eight influent valve boxes, as well as repaired concrete cracks in two clarifiers.

9 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, once the new cogeneration facility is operational, is also in the project scope.

Project Budget: $9.6 million

Expected Beneficial Use: January 2023

Update:

- The City approved contractor Blocka's submittal for fabrication of the long- lead item M4 switchgear, which is anticipated to be delivered to the RWF in May 2021.

Construction on Grit Removal Facility at Headworks 3

What's Ahead?

In December 2020 and January 2021:

- The Cogeneration Facility Project is expected to achieve Beneficial Use.
- Staff will recommend the following items to TPAC and Council:
  - Award of two construction management controls master agreements;
  - Approval of an increase to the construction contingency for the Cogeneration Facility Project for remote testing, transition services, and impacts due to COVID-19; and
  - Approval of an amendment to the consultant agreement with K/J to provide engineering services during construction for the Filter Rehabilitation Project.
- Two projects will seek to advance through the following stage gates:
  - Yard Piping Improvements - Phase 1 – Stage Gate 5: Authorization to Bid; and
  - 96-Inch and 87-Inch Settled Sewage Pipe Rehabilitation – Stage Gate 7: Substantial Completion.

Program Performance Summary

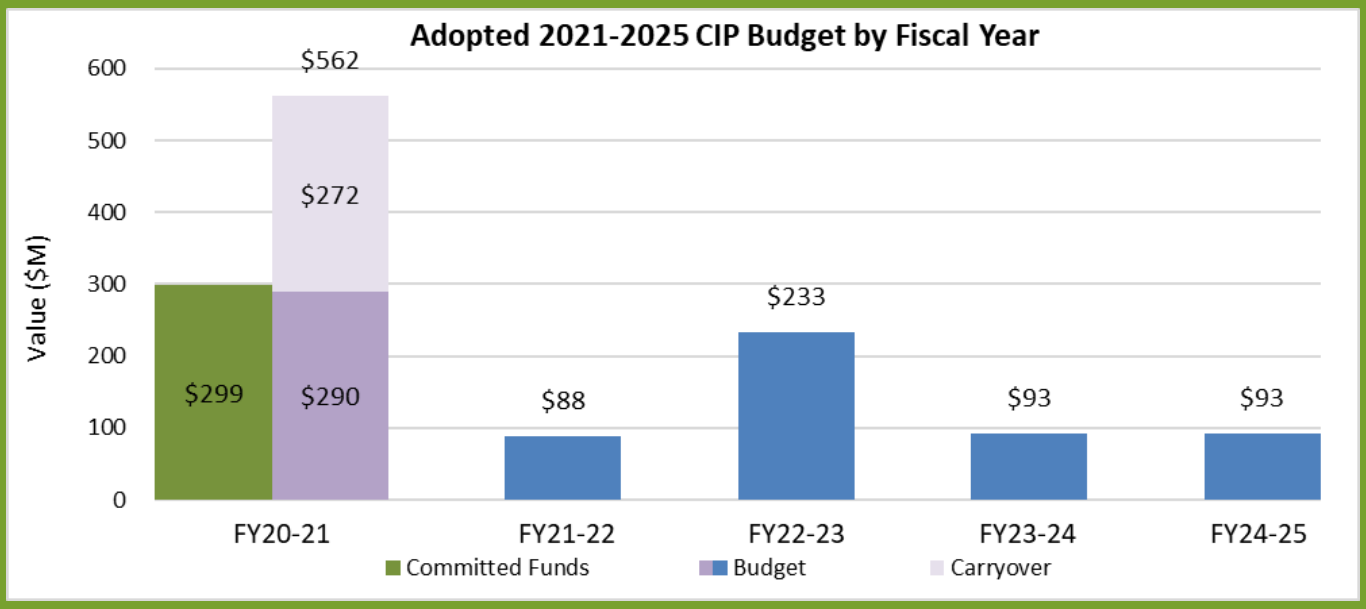
KPI	Target	Fiscal Year to Date			Fiscal Year End		
		Actual	Status	Trend	Forecast	Status	Trend
Stage Gates	90%	80% 4/5	▲	→	92% 11/12	●	→
Measurement: Percentage of initiated projects and studies that successfully pass each stage gate on their first attempt. Target: Green: >= 90%; Amber: 75% to 90%; Red: < 75%							
Schedule	90%	100% 1/1	●	↑	67% 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 0/0	●	→	50% 1/2[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	$299M	●	↑	$395M[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 Rate[4]	10%	14% 12/88[5]	▲	↑	9% 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

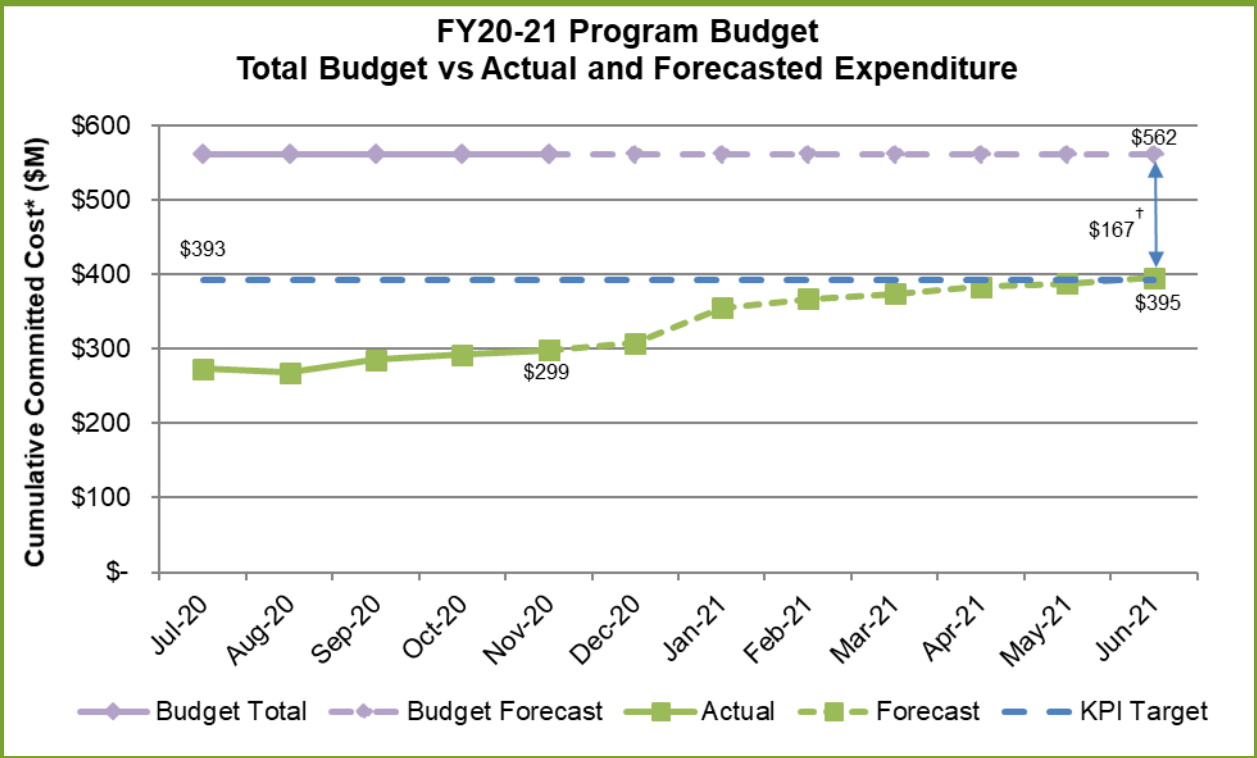


Budget performance information

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?

Second of 7 Treatment Steps: Grit Removal

indoor water

waste water

influent
Incoming wastewater

Flows from homes and businesses through the sanitary sewer system to the Plant for treatment, where solids are separated from the liquids.

2

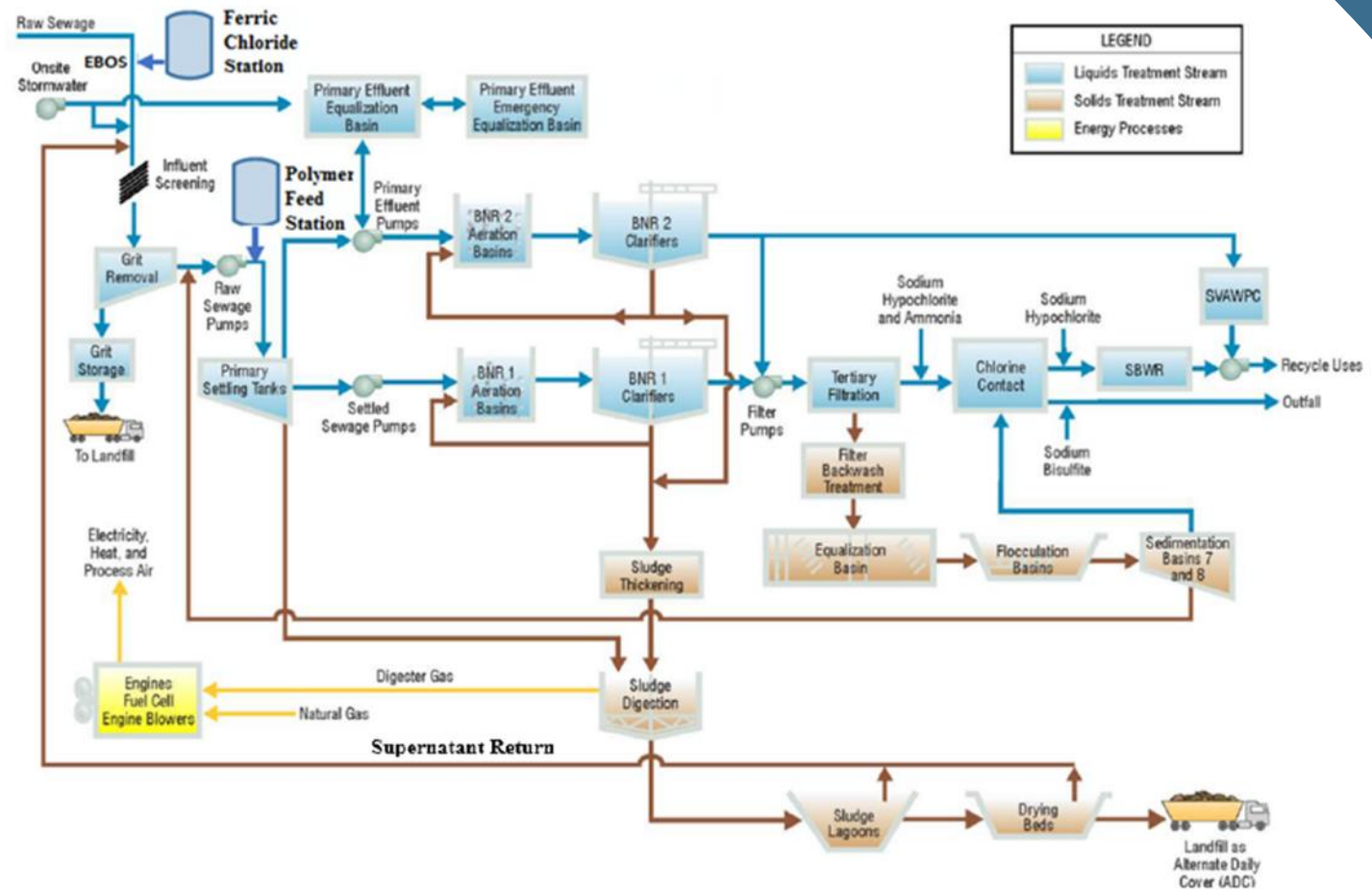
Wastewater then flows to **grit chambers** that remove heavier objects like sand and gravel. Debris and objects removed at this stage are taken to a landfill.

Want to learn more?

@sjenvironment @sjenvironment @sjenvironment

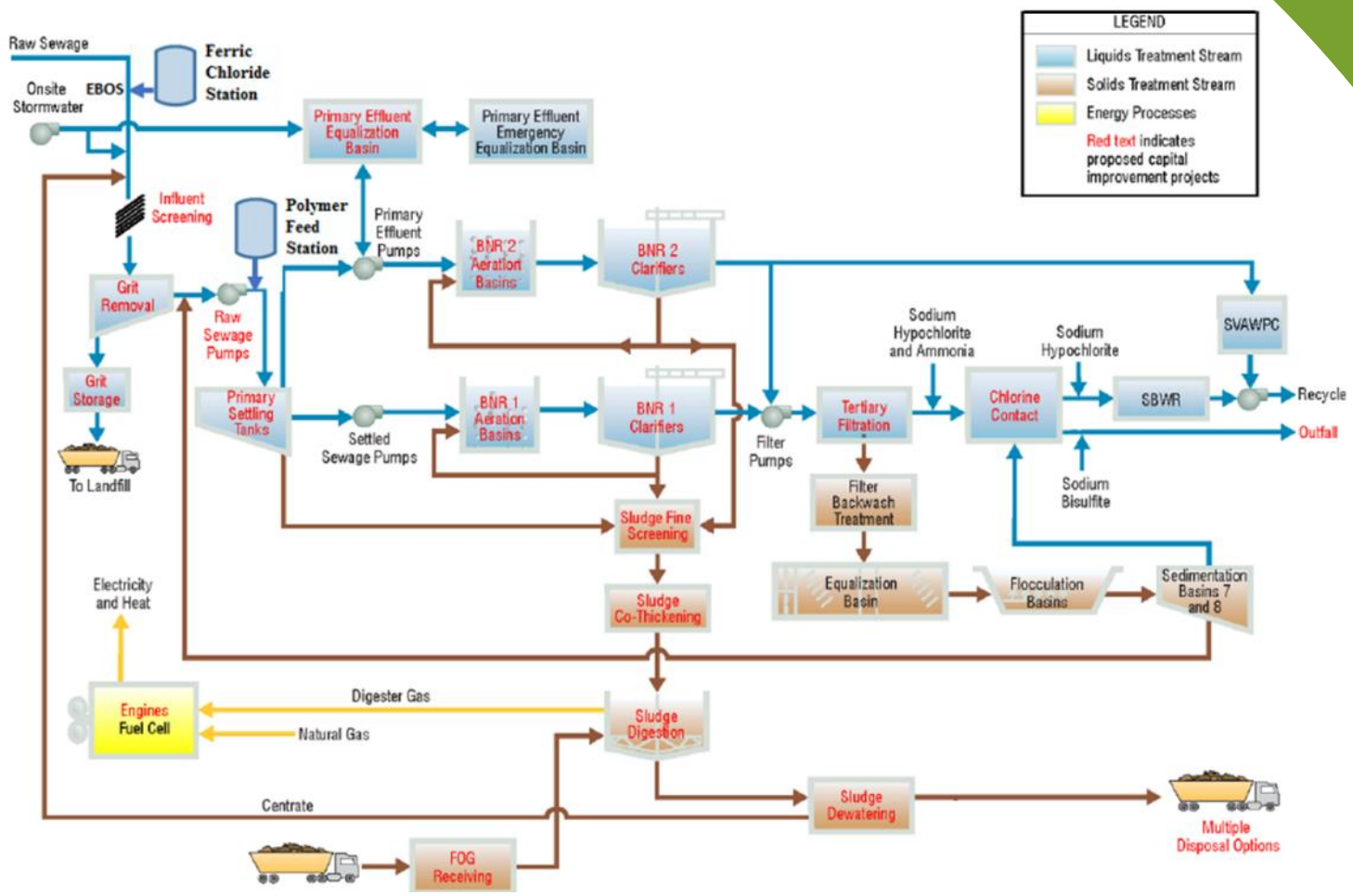
Regional Wastewater Facility Treatment

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