San José-Santa Clara Regional Wastewater Facility

Capital Improvement Program

Monthly Status Report: September 2020

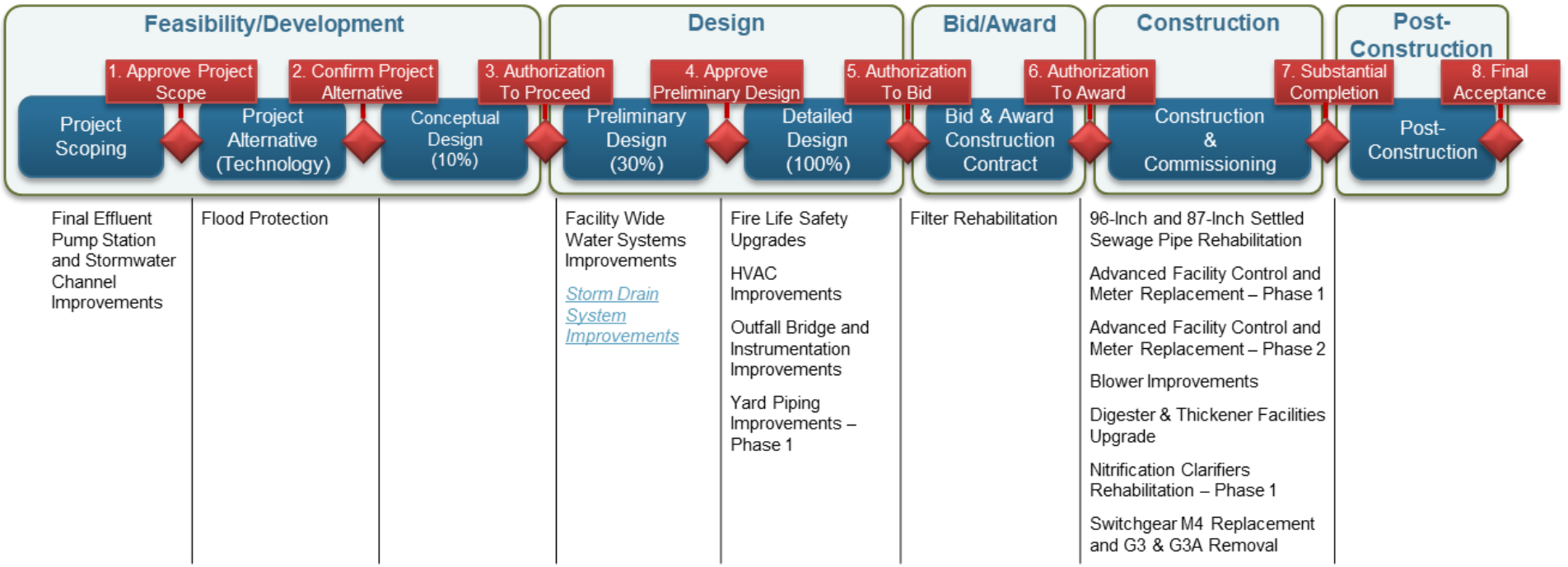
November 3, 2020

This report summarizes the progress and accomplishments of the Capital Improvement Program (CIP) for the San José-Santa Clara Regional Wastewater Facility (RWF) for September 2020.

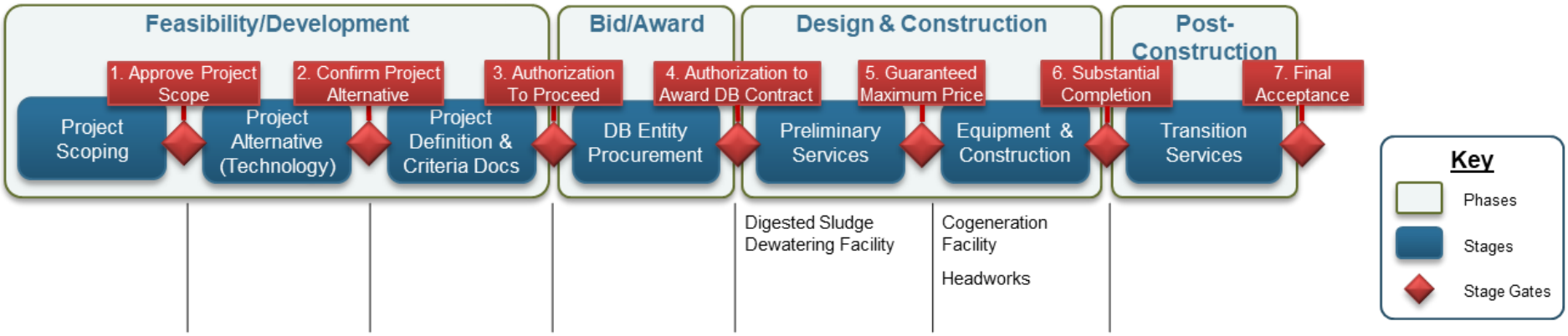
Report Contents

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.

Program Summary

September 2020

In September, 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.

One project successfully passed a Project Delivery Model (PDM) stage gate: the Storm Drain Systems Improvements Project was approved to proceed with preliminary design.

The Digester and Thickener Facilities Upgrade Project contractor completed operational testing of the new flares. The contractor also installed digester gas compressors, installed gas piping on the elevated pipe rack from Digesters 5 and 6 to the gas holder, and energized the motor control centers in the sludge screening building.

The Cogeneration Facility Project design-builder successfully ran all four engines on full load using both digester and natural gas.

The Blower Improvements Project contractor completed pre-operational testing and began functional testing on the first of three blowers in Building 40 and calibrated the associated flow meter.

The Advanced Facility Control and Meter Replacement – Phase 1 Project contractor completed influent pipe lining repair work at three nitrification tanks.

On the Advanced Facility Control and Meter Replacement – Phase 2 Project, the project team completed submittal review for long-lead equipment including butterfly valves, plug valves and process control instrumentation.

The Switchgear M4 Replacement and G3 & G3A Removal Project contractor placed the order for the M4 switchgear, a critical path item, with the manufacturer.

Figure 1 – New Cogeneration Engines

The Headworks Project design-builder completed the foundation slabs for influent screens and the grit facility. The design-builder also began excavation for the 96-inch pipe installation, which will convey flow from the new Headworks 3 to existing Headworks 2.

The Nitrification Clarifier Rehabilitation – Phase 1 Project contractor demolished drain valves in the return activated sludge (RAS) gallery; clarifier mechanisms in two clarifiers; and scum valves and partial exterior wall at clarifier B5. The contractor also began installing piping, valve and flow meter in the RAS gallery and rebar at one of the clarifier's launder wall.

The Yard Piping Improvements – Phase I Project team completed the condition assessment for the 42-inch-diameter mixed liquor (ML) pipes for nitrification clarifiers B1 through B8.

Treatment Plant Advisory Committee (TPAC) and San José City Council (Council) approved the award of four construction management master agreements, which will supplement existing City resources to provide the needed construction management and inspection services for the increased number of construction projects underway at the RWF.

Look Ahead

The following key activities are forecast for October and November 2020:

- The first phase of the Dissolved Air Flotation Thickener (DAFT) tank functional testing will commence for the Digester and Thickener Facilities Upgrade Project.
- Staff will recommend the following to TPAC and Council:
    - Award of the Filter Rehabilitation Project construction contract;
    - Award of the Facility Wide Water Systems Exploratory Trenching contract; and
    - Award of two construction management controls master agreements.
- The Yard Piping Improvements – Phase 1 Project will seek stage gate approval to advertise for bid.

Program Highlight – Advanced Facility Control Meter Replacement – Phase 2 Project

The RWF relies on control equipment: flow meters; valves and actuators; sensors; and transmitters. RWF staff utilize this equipment for process monitoring and control, to safely and efficiently operate the RWF, and to maintain compliance with the facility's National Pollutant Discharge Elimination System (NPDES) permit. Most of the RWF's control equipment was installed during the 1960s and 1970s. Used year round, 24 hours a day, it is now in poor condition and requires excessive maintenance. Some of the equipment is difficult to repair because the manufacturers no longer support it, and replacement parts are either scarce or unavailable. New control equipment is urgently needed to increase equipment data reliability and integrity, improve the RWF's overall operational efficiency, and reduce maintenance of the advanced control equipment. In 2016, the City selected Black & Veatch as the design consultant to provide engineering services for the project.

The Advanced Facility Control and Meter Replacement – Phase 2 Project will replace or upgrade the control equipment in the East Primaries, Secondary A battery tanks, Nitrification A tanks battery, and the Filtration Building (see Figure 2). The project scope includes replacing 53 flow meters, four density meters, 24 valves, 12 valve actuators, and 61 sensors and transmitters, including associated piping modifications and electrical improvements.

The project was advertised for bid in January 2020. In June 2020, the Council awarded the construction contract to Kiewit Infrastructure West Co. Between June and November 2020, the contractor will submit early and critical submittals for City review, and prepare to start work in the Filtration Building in winter 2020. To better align construction with planned maintenance shutdowns of the secondary and nitrification treatment areas, the project team sequenced the work to be completed over two summers. The total estimated project cost is $12.98 million and the project is expected to reach Beneficial Use in winter 2022.

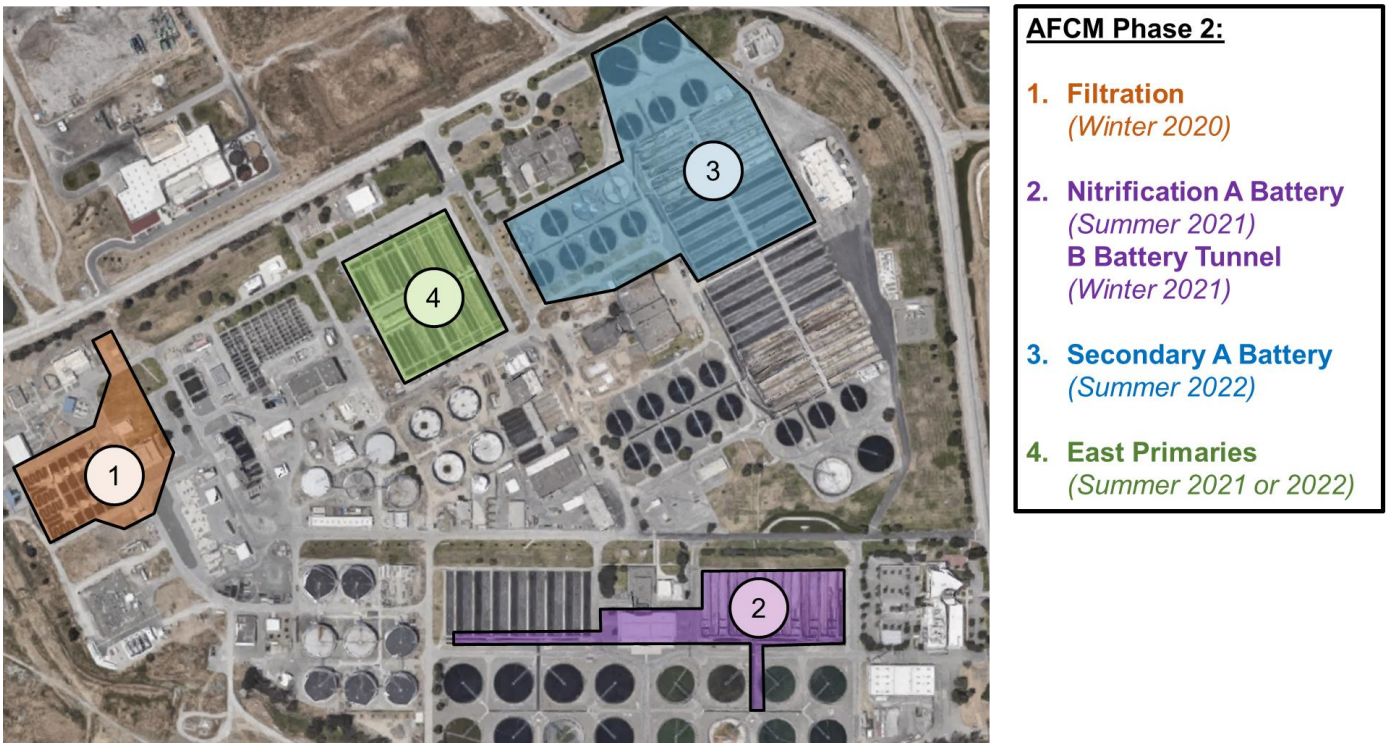


Figure 2 – Project Map

Program Performance Summary

Seven key performance indicators (KPIs) have been established to measure overall CIP success. Each KPI represents a metric that will be monitored on a regular basis. Through the life of the CIP, KPIs that best reflect the current program will be selected and measured. KPIs are reset each fiscal year.

Program Key Performance Indicators – Fiscal Year 2020-2021

KPI	Target	Fiscal Year to Date			Fiscal Year End		
		Actual	Status	Trend	Forecast	Status	Trend
Stage Gates	90%	100% 4/4 [1]	●	→	100% 12/12	●	→
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%	N/A 0/0	●	→	100% 3/3	●	→
Measurement: Percentage of CIP projects delivered within 2 months of approved baseline Beneficial Use Milestone.[2] Target: Green: >= 90%; Amber: 75% to 90%; Red: < 75%							
Budget	90%	N/A 0/0	●	→	67% 2/3 [3]	◆	→
Measurement: Percentage of CIP projects that are accepted by the City within the approved baseline budget.[2] Target: Green: >= 90%; Amber: 75% to 90%; Red: < 75%							
Expenditure	$389M	$285M	●	↑	$494M [4]	●	↑
Measurement: CIP FY20-21 committed costs. Target: Committed costs meets or exceeds 70% of planned budget. 70% of $556M = $389M. Therefore Fiscal Year End Green: >=$389M; Red: < $389M							
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[5]	10%	14% 12/88	▲	→	9% 8/88	●	→
Measurement: Ratio of the number of vacant approved positions to approved positions. Target: Green: <= 10%; Amber: 10% to 20%; Red: > 20%							

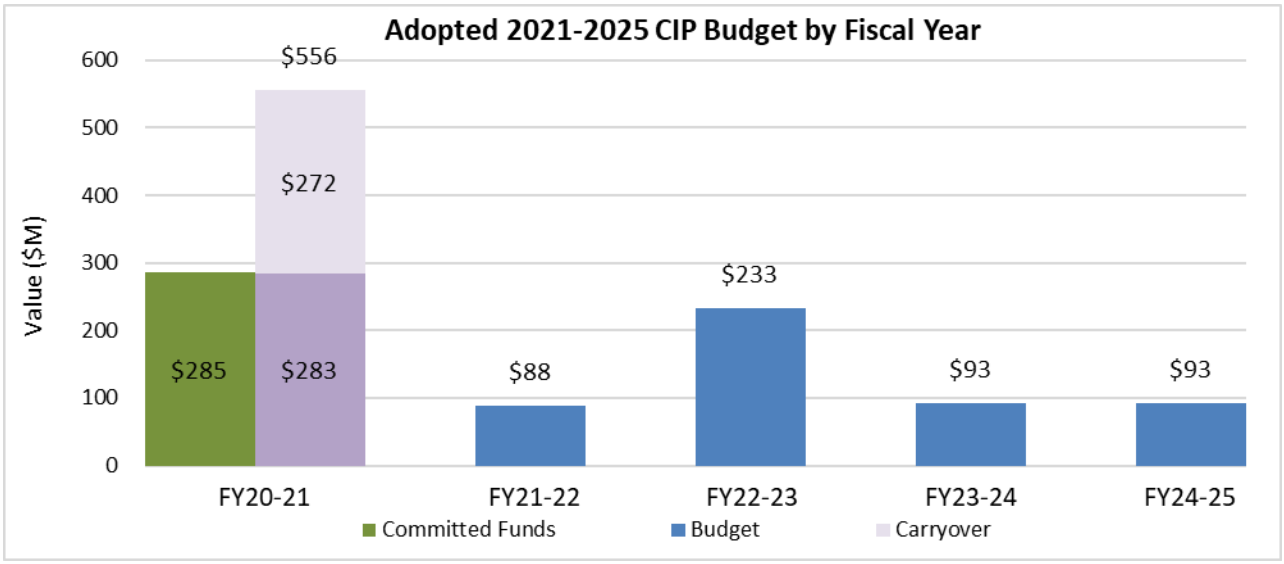
Notes

1. The Storm Drain System Improvements Project passed Stage Gate 3: Authorization to Proceed.
2. The baseline Beneficial Use date and the baseline budget for each project are established at construction contract award and execution.
3. The City anticipates accepting three projects this fiscal year: The Cogeneration Facility; 96-Inch and 87-Inch Settled Sewage Pipe Rehabilitation; and Advanced Facility Control & Meter Replacement – Phase 1 projects. The Advanced Facility Control and Meter Replacement – Phase 1 Project is anticipated to exceed the project baseline budget by over 1%.
4. The fiscal year-end expenditure has adjusted due to unaccounted staff expenses.
5. The vacancy rate KPI measures CIP-approved positions, including ESD, Public Works, and program management consultant full-time staff.

Program Budget Performance Summary

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

Adopted 2021-2025 CIP Expenditure and Encumbrances



Notes:

Committed Funds: Total of expenditures and encumbrances.

Expenditure: Actual cost expended, either by check to a vendor or through the City's financial system, for expenses such as payroll or for non-personal expenses that do not require a contract.

Encumbrance**:** Financial commitments such as purchase orders or contracts that are committed to a vendor, consultant, or contractor. An encumbrance reserves the funding within the appropriation and project.

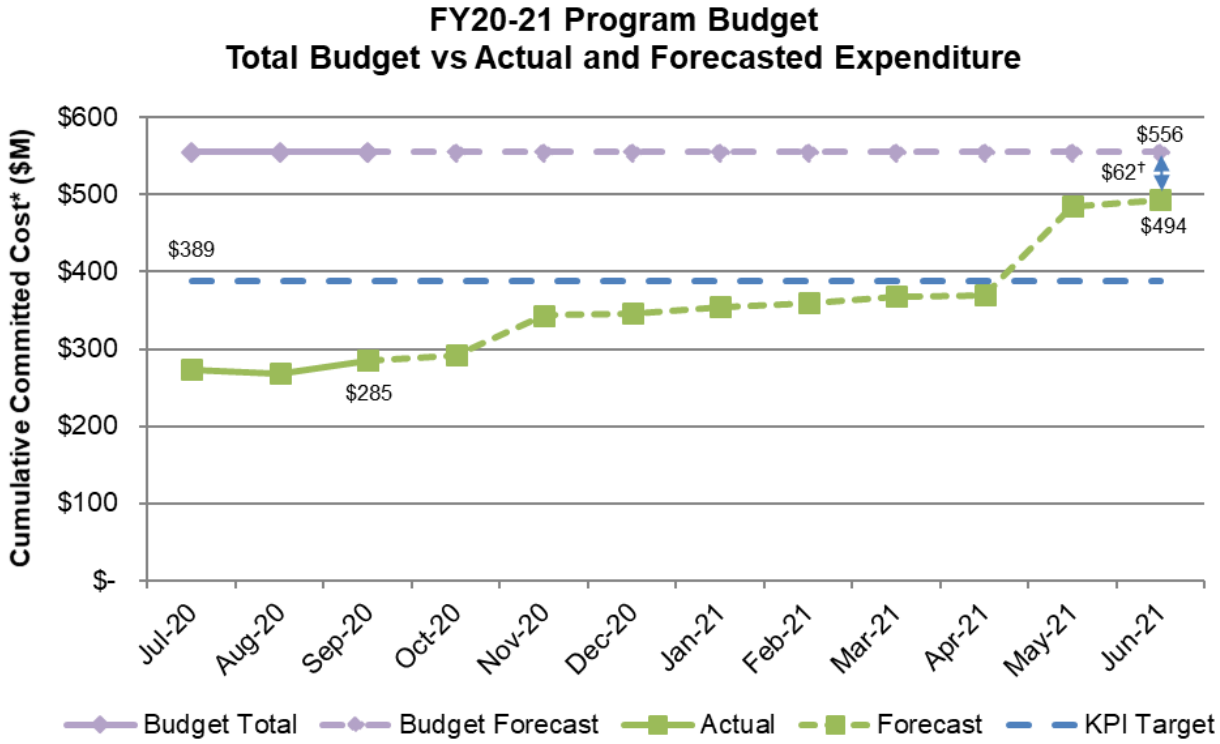
The FY20-21 budget is $301.8 million, which consists of $195.6 million in new funds and $106.2 million in rebudgets. For purposes of this monthly report, the adopted FY20-21 budget is adjusted from $301.8 million to $283.4 million due to the exclusion of certain appropriations that are not measured as part of the expenditure KPI. Excluded appropriations include City Hall Debt Service Fund; Clean Water Financing Authority Debt Service Payment Fund; Debt Service Repayment for Plant Capital Improvement Projects (San José only debt service); Equipment Replacement Reserve; Ending Fund Balance; and Urgent and Unscheduled Treatment Plant Rehabilitation. Similar adjustments have been made to the budgets for FY21-22 through FY24-25.

Carryover: Encumbrance balances at the end of the previous fiscal year are automatically carried forward to the current fiscal year as carryover funding to pay invoices for approved construction contracts and consultant agreements. FY20-21 carryover is $272.3 million.

Budget of $283.4 million and carryover of $272.2 million totals $555.5 million for FY20-21.

Fiscal Year 2020-2021 Program Budget Performance

The FY20-21 CIP budget is comprised of approximately $283.4 million in new and rebudgeted funds, plus encumbered carryover of $272.2 million, for a total of $555.5 million. This excludes City Hall Debt Service Fund; Clean Water Financing Authority Debt Service Payment Fund; Debt Service Repayment for Plant Capital Improvement Projects (San José only debt service); Equipment Replacement Reserve; Ending Fund Balance; and Urgent and Unscheduled Treatment Plant Rehabilitation items. Overall, the forecast fiscal year-end committed funds exceed the fiscal year-end target by $105 million.



Notes:

* Committed costs are expenditures and encumbrance balances, including carryover (encumbrance balances from the previous fiscal year).

† The variance between budget and commitments can be primarily attributed to the following factors:

1. Three construction contracts are no longer anticipated to be awarded in FY20-21, based on updated schedules:
    a. Fire Life Safety Upgrades
    b. HVAC Improvements
    c. Outfall Bridge and Instrumentation Improvements
2. The Filter Rehabilitation Project construction contract award was under budget.
3. Several minor encumbrances for consultant services are either lower than budgeted or are not anticipated to be awarded in FY20-21.
4. Several authorized positions remain vacant, resulting in lower personal services expenses than budgeted.
5. Certain emergency and urgent appropriation funds are at this time not expected to be committed.

Project Performance Summary

There are currently nine projects in construction phases and an additional nine projects in feasibility/development; design; bid and award; or design and construction phases (see PDM, page 2). Projects in the construction phase have established cost and schedule baselines in the budget and are monitored using the City's Capital Project Management System (CPMS). Green/red icons are included in the table below to indicate whether these projects are on budget and schedule.

Project Performance – Baselined Projects (construction and post-construction)

Project Name	Phase	Estimated Beneficial Use Date[1]	Cost Performance[2]	Schedule Performance[2]
1. 96-Inch and 87-Inch Settled Sewage Pipe Rehabilitation	Construction	Oct 2020	●	●
2. Cogeneration Facility	Design & Construction	Nov 2020	●	●
3. Advanced Facility Control & Meter Replacement - Phase 1	Construction	May 2021	◆	●
4. Digester and Thickener Facilities Upgrade	Construction	Sep 2021	◆	◆
5. Blower Improvements	Construction	Oct 2022	●	●
6. Nitrification Clarifiers Rehabilitation – Phase 1	Construction	Jan 2023	●	●
7. Switchgear M4 Replacement and G3 & G3A Removal	Construction	Jan 2023	●	●
8. Advanced Facility Control & Meter Replacement - Phase 2	Construction	Mar 2023	●	●
9. Headworks	Design & Construction	Jun 2023	●	●

Key:

Cost:	●	On Budget	◆	>1% Over Budget	**Schedule:**	●	On Schedule	◆	>2 months delay

Notes

1. Beneficial Use is defined as work that is sufficiently complete, in accordance with contract documents, that it can be used or occupied by the City. Beneficial Use dates are reviewed as part of project schedule reviews.
2. An explanation of cost and schedule variances on specific projects identified in this table is provided on page 11.

Project Performance – Pre-Baselined[2] Projects (not yet in construction)

Project Name	Phase	Estimated Beneficial Use Date[1]
1. Filter Rehabilitation	Bid & Award	Jul 2024
2. Digested Sludge Dewatering Facility	Design and Construction	Mar 2024
3. Yard Piping Improvements – Phase 1	Design	Oct 2021
4. Outfall Channel and Instrumentation Improvements	Design	Nov 2022
5. Fire Life Safety Upgrades	Design	Feb 2023
6. HVAC Improvements	Design	Jun 2024
7. Storm Drain System Improvements	Feasibility/Development	Sep 2023
8. Facility Wide Water Systems Improvements	Feasibility/Development	Aug 2025
9. Final Effluent Pump Station and Stormwater Channel Improvements	Feasibility/Development	Feb 2027

Notes

1. Beneficial Use is defined as work that is sufficiently complete, in accordance with contract documents, that it can be used or occupied by the City. Beneficial Use dates are reviewed as part of project schedule reviews.
2. Pre-baselined projects are CIP projects not yet in construction, whose schedule and budget information is not yet baselined in the budget.

Project Significant Accomplishments

Biosolids Package

Digester and Thickener Facilities Upgrade Project

- Contractor Walsh, CM and O&M staff completed operational testing and start-up of the new flare.
- Walsh completed equipment pads for the digester gas compressors and installed all six gas compressors and gas piping to the elevated pipe rack from Digesters 5 and 6 to the gas holder.
- In the new sludge screening building, Walsh energized the new motor control centers.

Digested Sludge Dewatering Facility Project

- The City and design-builder agreed on value engineering recommendations and began the 30 percent design.
- The teams held architectural programming and process mechanical workshops.

Facilities Package

Yard Piping Improvements – Phase I Project

- The project team completed the condition assessment for the 42-inch-diameter ML pipes for nitrification clarifiers B1 through B8. The steel pipe components for each of the ML pipes were in poor condition and require rehabilitation. The remainder of each pipe, made from reinforced concrete, was generally in good condition.

Liquids Package

Advanced Facility Control and Meter Replacement – Phase 1 Project

- Contractor Overaa completed the influent pipe lining repair work at nitrification tanks B4 to B6 and removed the corroded RAS wall spool pipes.

Advanced Facility Control and Meter Replacement – Phase 2 Project

- The City completed the long lead equipment submittal review on butterfly valves, plug valves and process control instrumentation, and returned the review with comments to contractor Kiewit.

Blowers Improvements Project

- The project team completed DCS hardwired and network signal loop testing.
- Staff field-calibrated the flow meter and completed the pre-operational test on the Building 40 Blower #2.

Headworks Project

- The project team completed required burrowing owl surveys, which will allow full use of the construction area.
- Design-builder CH2M completed construction of foundation slabs for influent screens and the grit facility, and began excavation for the 96-inch pipe installation near Headworks 1 and 2.

Nitrification Clarifier Rehabilitation – Phase 1 Project

- Contractor Overaa completed the demolition of drain valves in the RAS gallery, clarifier mechanisms in clarifiers B6 and B7, and scum valves and a partial exterior wall at clarifier B5.
- Overaa began the piping, valve and flow meter installation in the RAS gallery, and rebar installation at the clarifier B2 launder wall.
- Consultant Black & Veatch completed the nitrification clarifier influent piping condition assessment and recommended pipe repair.

Storm Drain System Improvements Project

- The project passed Stage Gate 3: Authorization to Proceed, and the project team was approved to proceed with preliminary design.

Power and Energy Package

Cogeneration Facility Project

- Design-builder CH2M completed running all four engines on full load using both digester and natural gas.

Switchgear M4 Replacement and G3 & G3A Removal Project

- Contractor Blocka Construction selected and placed an order to fabricate the M4 switchgear.

Explanation of Project Performance Issues

Digester and Thickener Facilities Upgrade Project

This project encountered numerous unforeseen conditions at the beginning of construction in 2016, including corroded underground pipe and other obstructions for new building foundations. A temporary reroute system was installed to enable replacement of a 78-inch settled sewage pipeline and junction structure during the 2018 dry season.

In 2017, design modifications were required to address seismic risks, control system changes, additional underground obstructions, pipe anchorage, and new fire department requirements. Discovery of hazardous materials required the City to submit an extensive cleanup proposal to the federal Environmental Protection Agency (EPA) for approval. Once mitigation was completed in 2019, the City submitted another report to the EPA that detailed how it met each EPA cleanup permit requirement.

In late 2019 and early 2020, further design modifications were required to remove underground interferences to make room for new pipe and conduit duct banks. As a result, twice as much paving had to be removed and excavation done than originally planned. COVID-related power plant shutdowns reduced availability of fly ash, which increased paving material costs. After an anchor in the tunnel ceiling failed, structural engineers determined that new pipes should be supported from the tunnel floors instead of being hung from the ceiling. The contractor had to redesign supports and procure different support materials than originally planned. These changes, along with additional pipe supports required in the elevated pipe rack and the digester area, also increased costs. In addition, more concrete was used for equipment pads than originally planned, which required redesign of site drainage.

Late in 2020, due to the large new foundation ring beams, the City discovered that several sections of four piping systems needed to be re-routed (digester gas, recirculating sludge, hot water and water 3). Over several months, the contractor designed the new supports; obtained design review and approval for them; ordered fabrication; and received and installed them. Upon DAFT startup the team discovered that the control programming was incomplete and did not conform to RWF operations practices, and that the installed control systems did not adequately communicate. Over the course of several months the contractor remedied these issues. The City is currently determining the number of work days to be added to the construction schedule to address these changes.

To pay for additional work to address unforeseen conditions, Council approved a construction contingency increase of $15 million in November 2017 and another contingency increase of $25 million in June 2018. Staff anticipates recommending a third contingency increase to Council in early 2021.

Delays for these conditions have amounted to 273 working days. The original construction completion and Beneficial Use date of September 2019 was delayed to November 2020. Currently, the City is evaluating Walsh's request for additional delays due to numerous design-related change orders. If granted, these schedule delays may postpone project completion to September 2021.

Advanced Facility Control and Meter Replacement – Phase 1 Project

In late 2018, the CIP identified the need for additional CM team resources to adequately manage the construction, testing, and startup challenges the project was experiencing, as well as unforeseen conditions (see drain plate issue below). The project team subsequently added staff and increased budget hours for both the CM and project management teams to better support the project's construction and post-construction phases.

Additional staff time and consultant engineering services were required in late 2019 to resolve unforeseen corroded drain plates and other obstructions for the new flowmeter equipment. A design modification was required to address the worn pipe flange connected to the drain plate. The project and construction teams were required to perform additional work to resolve the unforeseen conditions; this additional work has resulted in additional project delivery costs due to increased CM costs. Completion of this work has now been pushed to July 2020 with an additional cost of $530,000. However, the additional work has not changed the overall construction completion date of June 2021.

Regional Wastewater Facility Treatment – Current Treatment Process Flow Diagram

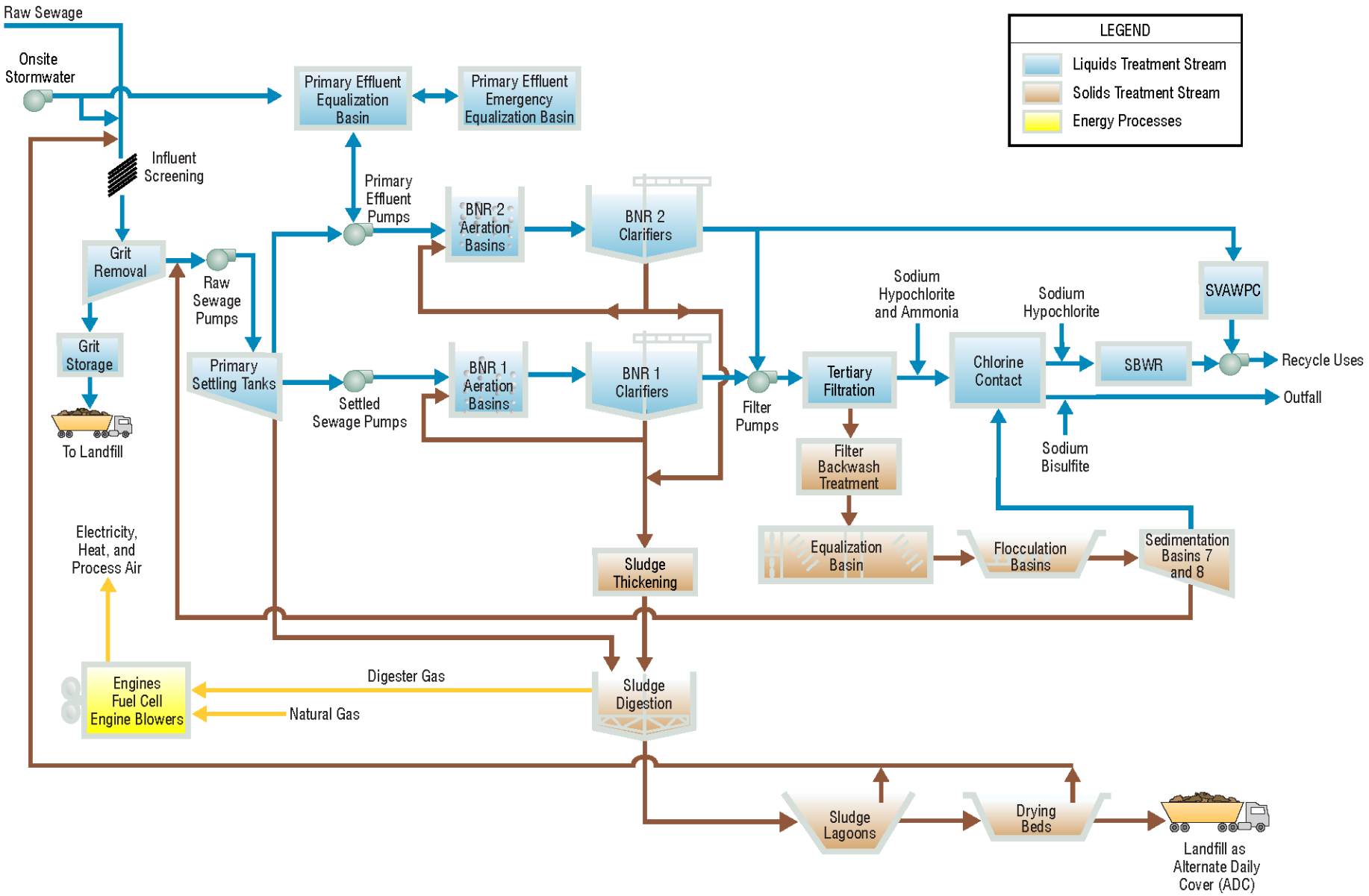


Figure 3 – Current Treatment Process Flow Diagram

Regional Wastewater Facility Treatment – Proposed Treatment Process Flow Diagram

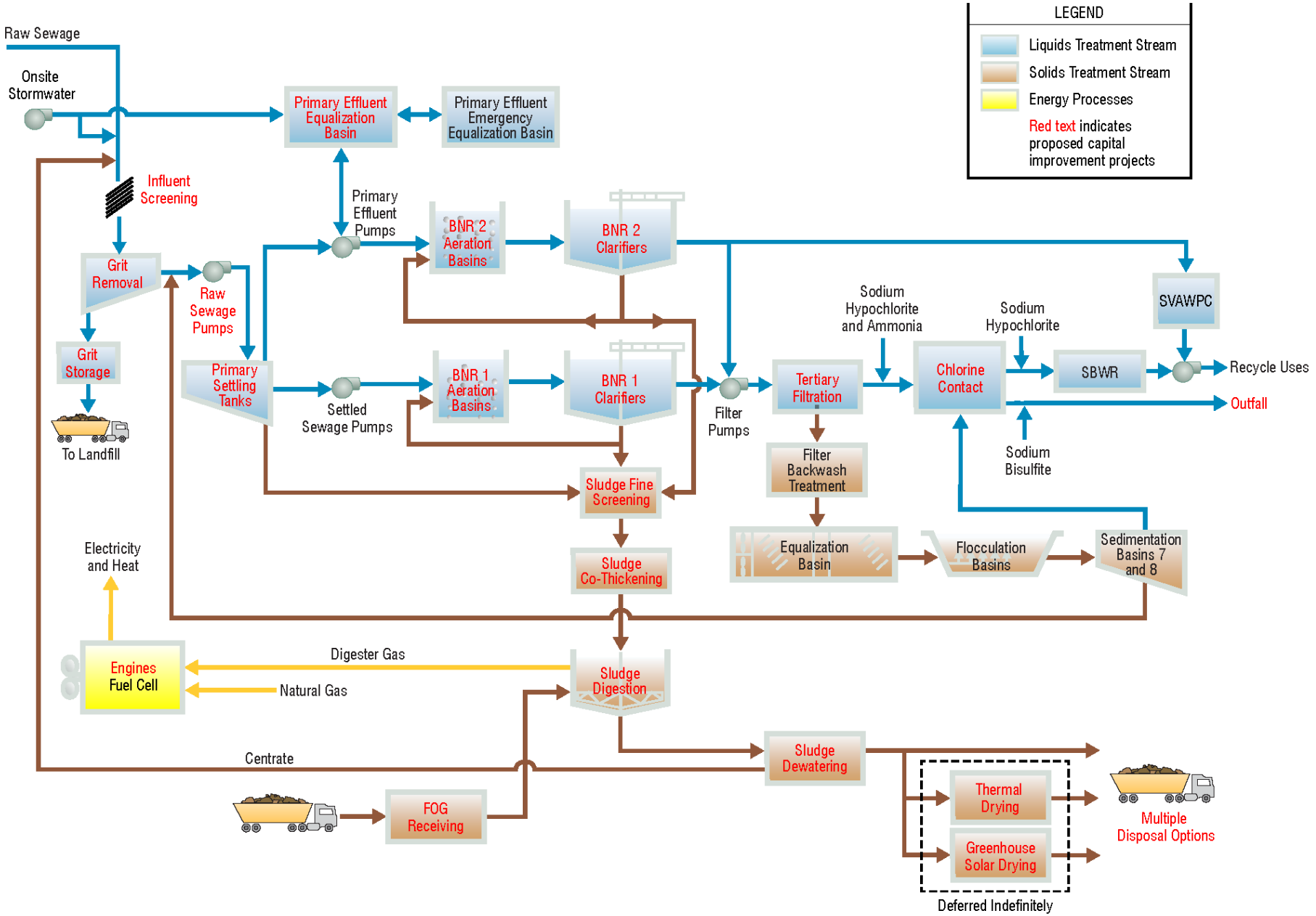


Figure 4 – Proposed Treatment Process Flow Diagram

Active Construction Projects – Aerial Plan

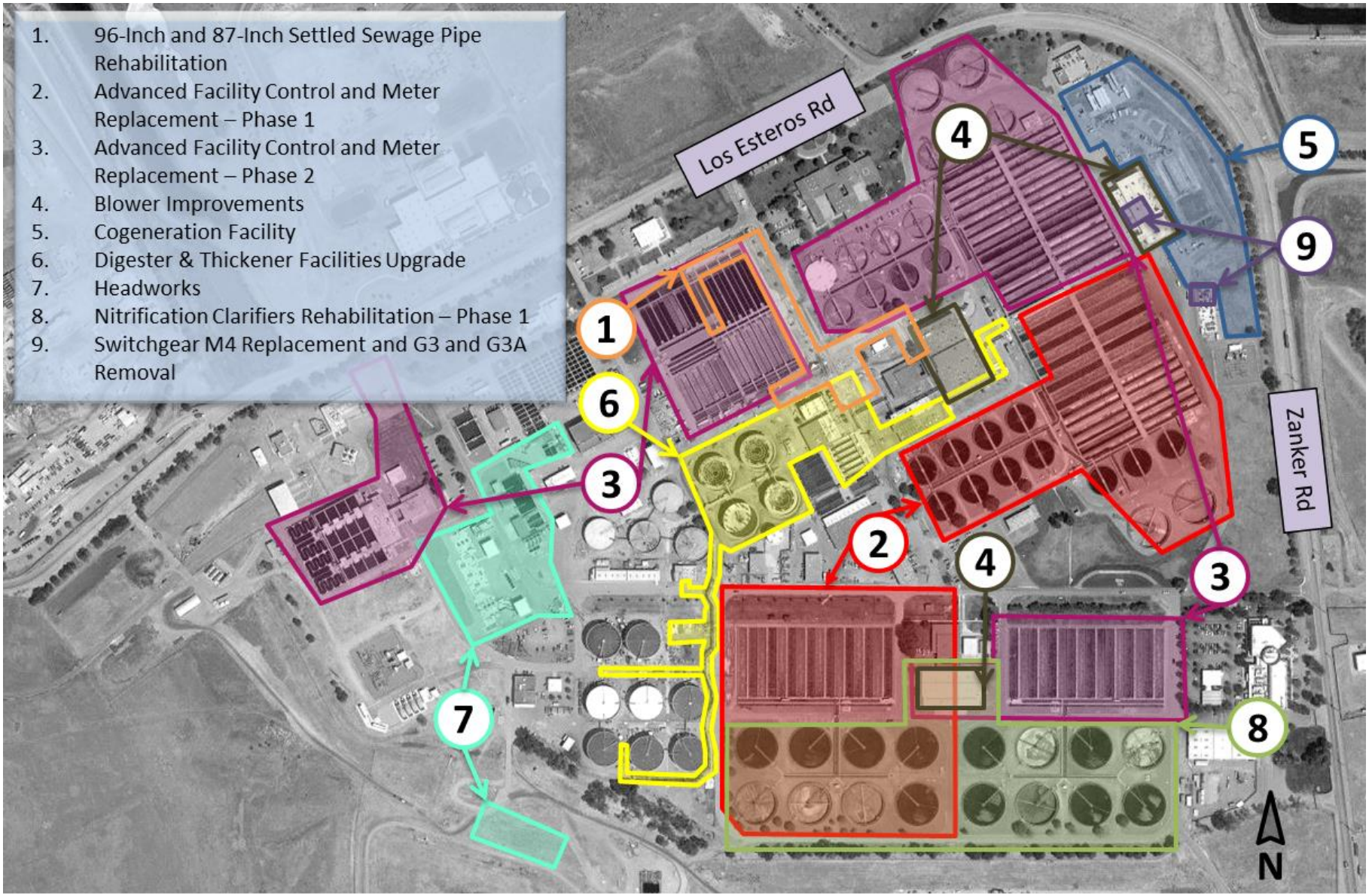


Figure 5 – Active Construction Projects