



San José-Santa Clara
Regional Wastewater Facility

Capital Improvement Program

Monthly Status Report: July 2020

September 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 July 2020.

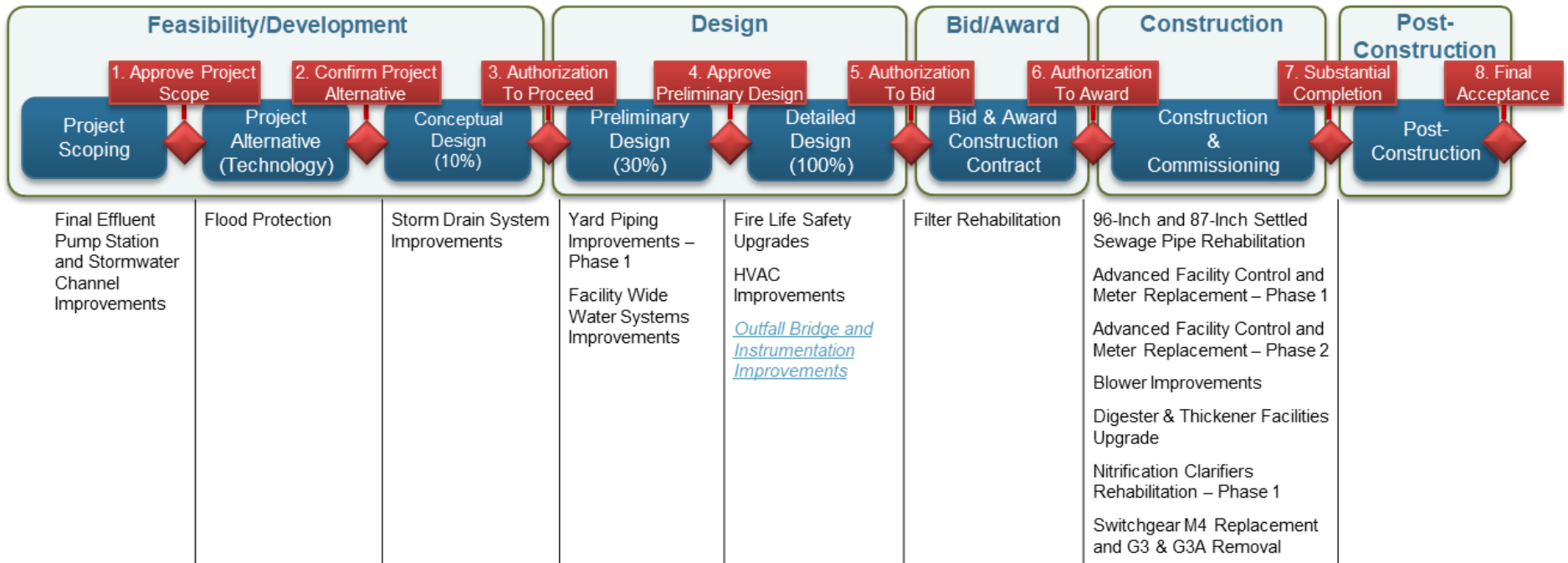
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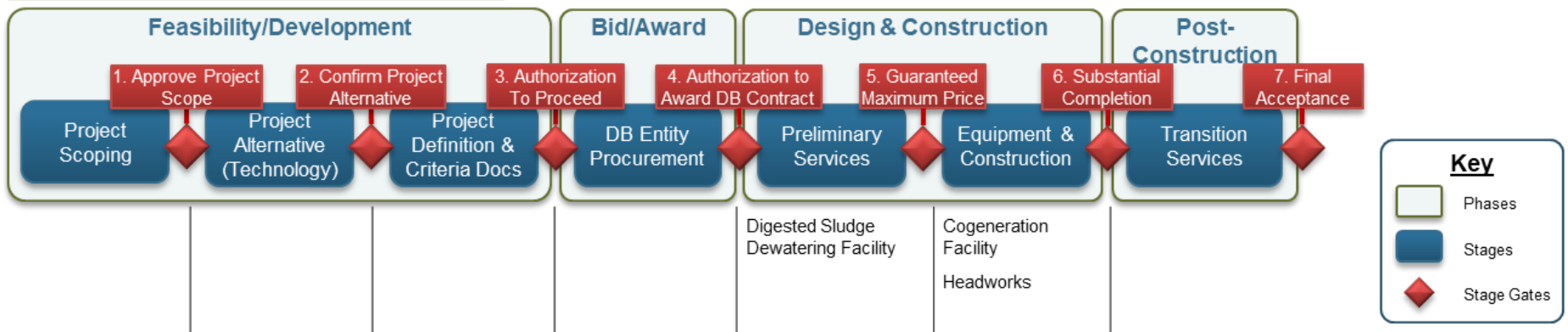


Project Delivery Models

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

July 2020

In July, 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 stage gate of the Project Delivery Model (PDM). The Outfall Bridge and Instrumentation Improvements Project was approved to proceed with detailed design.

The Digester and Thickener Facilities Upgrade Project contractor completed inspection and pre-operational testing of the dissolved air flotation thickener (DAFT) tanks, and began functional testing of the new flares.

The Cogeneration Facility Project design-builder successfully tested the hot water boilers on natural and compressed digester gas. Staff reached agreement with the design-builder to proceed with remote engine generator testing to minimize schedule delays caused by COVID-19 travel restrictions that prevented needed experts from travelling internationally.

The Blower Improvements Project contractor installed and tested Building 40 medium-voltage cables and completed modifications to the distributed control system (DCS) network panels.

The Advanced Facility Control and Meter Replacement – Phase 1 Project contractor demolished the influent piping, valves, and flow meters in the Nitrification Battery B tunnel, as well as the dissolved oxygen probe and analyzer at the Nitrification Battery B tanks.

The Headworks Project design-builder began the mass excavation of the new headworks site (see Figure 1), relocated existing utilities, and installed temporary power and fiber optic cables.

The Nitrification Clarifier Rehabilitation – Phase 1 Project contractor demolished the return activated sludge (RAS) piping, valves, and flow meters in the RAS gallery and began trenching for an electrical duct bank.

The Advanced Facility Control and Meter Replacement – Phase 2 Project team held a pre-construction meeting and issued the notice to proceed (NTP) to the contractor.

The Digested Sludge Dewatering Facility Project team conducted a value engineering analysis on the 10 percent design.

The City advertised the Facility Wide Water Systems Exploratory Trenching contract.



Figure 1 - Headworks mass excavation and erection of tower crane

Look Ahead

The following key activities are forecast for August and September 2020:

- The first phase of the DAFT functional testing will commence with the introduction of waste-activated sludge (WAS).
- The City will open bids for the Facility Wide Water Systems Exploratory Trenching contract.
- Staff will recommend award of four construction management master agreements to the Treatment Plant Advisory Committee (TPAC) and San José City Council (Council).
- Staff will initiate a condition assessment of the RWF’s pump stations and primary treatment system, including the East and West Primary tanks and pipes, to help inform potential future capital projects.
- Two projects will seek to advance through the following stage gates:
 - Yard Piping Improvements – Phase 1 Project – Stage Gate 4: Approve Preliminary Design; and
 - Storm Drain System Improvements Project – Stage Gate 3 – Authorization to Proceed.

Program Highlight – Construction Activity Update

Below are updates on the progress made on several active construction projects at the RWF over the past five months. Project descriptions and additional information are available on the [RWF CIP website](#).

Advanced Facility Control and Meter Replacement – Phase 1 Project

Over the past several months, the contractor Overaa conducted and completed functional testing on 15 Secondary Battery B tanks. A majority of the new flow meters & analyzers have been put into service, with operational testing being planned in the next two months. Demolition of the influent piping, valves, and flow meters in the Nitrification Battery B tunnel, as well as demolition of the dissolved oxygen probe and analyzer at the Nitrification Battery B tanks began in June and is ongoing.



Figure 2 – Nitrification Battery B Tunnel Influent Pipe Demolition



Figure 3 - Building 40 Blower No. 2 Motor

Blowers Improvement Project

Major milestones reached for Building 40 Blower No. 2 include the installation of the variable frequency drives (VFDs) and the installation of a new 4000 HP electric motor.

A new 2,250 HP motor has been set on the skid at Tertiary Blower Building Blower No. 3, ready to replace the old motor that was recently removed. Mechanical and electrical installations for the blower, as well as startup, are scheduled to begin in December 2020.

Building 40 Blower No. 2 is currently in the midst of startup. Blower rebuilder Howden will be on site mid-August and will continue through early September. Howden will work to power up the blower local control panel, then run through all the panel checks and configuration before instrument startup. Medium and low-voltage cables, breakers, and transformers associated with Building 40 blowers have been tested. Control power to the power quality monitors and protective relays located in the switchgear have been powered up with a successful connection to the DCS through the network. The VFDs and motor are expected to receive certificates of proper installation from the manufacturers in late August. Blower No. 2 has been offline for upgrades since November of 2019. Staff expect it to be operational, putting air back into the system on the last day of August 2020.

Cogeneration Facilities Project

In March, electrical connection to Switchgear M2 was completed and the project moved into the startup and commissioning phase where the engines and ancillary equipment are being tested prior to acceptance. Functional testing of various equipment including HVAC, air handling units, and the digester gas treatment system began in April and continued into July. The construction work is ongoing to replace two chillers in the basement of the Secondary Blower Building. Progress in July included boiler source testing on natural and digester gas and passivation on cooling towers.



Figure 4 – Testing generators in Building 45

Digester and Thickener Facilities Upgrade Project

In the past months, the project continued to install and test sections of pipes along the pipe rack. The recently completed pipe rack system has relocated the digester gas piping above-ground for improved safety. Digester gas, blended gas, foul air, and hot water supply and return piping have all been laid onto the rack and are in the final stages of installation. In April, contractor Walsh worked with Operation and Maintenance staff on 12 process shutdowns for portions of the wastewater treatment process to connect new pipes, electrical, and controls into the existing system.

The project team is currently completing pre-operational testing on the DAFT system and two new digester gas flares. The contractor will be introducing WAS into the newly refurbished DAFTs, testing the new mechanical components and the recently installed pressure retention tanks and foul air system in the next few months.

The new flares, an enclosed flare and a new open flame (candlestick) flare, will be added to the existing RWF digester gas system once testing is complete. Putting them into service will allow the contractor to upgrade the existing gas flares.



Figure 5 – Digester pipe rack system

Headworks Project

Design-builder CH2M began construction in June with the erection of a tower crane and commencement of mass excavation. In July, CH2M completed rerouting electrical and fiber optics for the Emergency Basin Overflow site, for the Ferric Chloride Feed Station, and to provide a temporary electrical connection to the Headworks 3 site. Excavation continued at the Headworks 3 site. CH2M began subgrade preparation at the Grit Basin main slab with the installation of rebar.



Figure 6 – Installation of rebar for the future Headworks Grit Building

Nitrification Clarifiers Rehabilitation – Phase 1 Project

Contractor Overaa began construction in June by draining Clarifier B8 of groundwater and the construction of a temporary stairwell for access for Clarifiers B6 and B8. In July, Overaa removed a 42-inch flowmeter and butterfly valves from Clarifier B5 and B6 vault, respectively, as well as the sweep arms and flapper from Clarifier B6. Overaa has also begun trenching between the clarifiers in preparation for installation of an electrical duct bank.



Figure 7 – Nitrification Clarifier B6 demolition

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%			100%		
		2/2 ¹			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			100%		
		0/0			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			67%		
		0/0			2/3		
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 ³	NA	N/A			N/A		
Measurement: CIP FY20-21 committed costs. Target: Committed costs meets or exceeds 70% of planned budget. 70% of \$528M = \$369M. Therefore Fiscal Year End Green: >=\$369M; Red: < \$369M							
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%			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%							

Notes

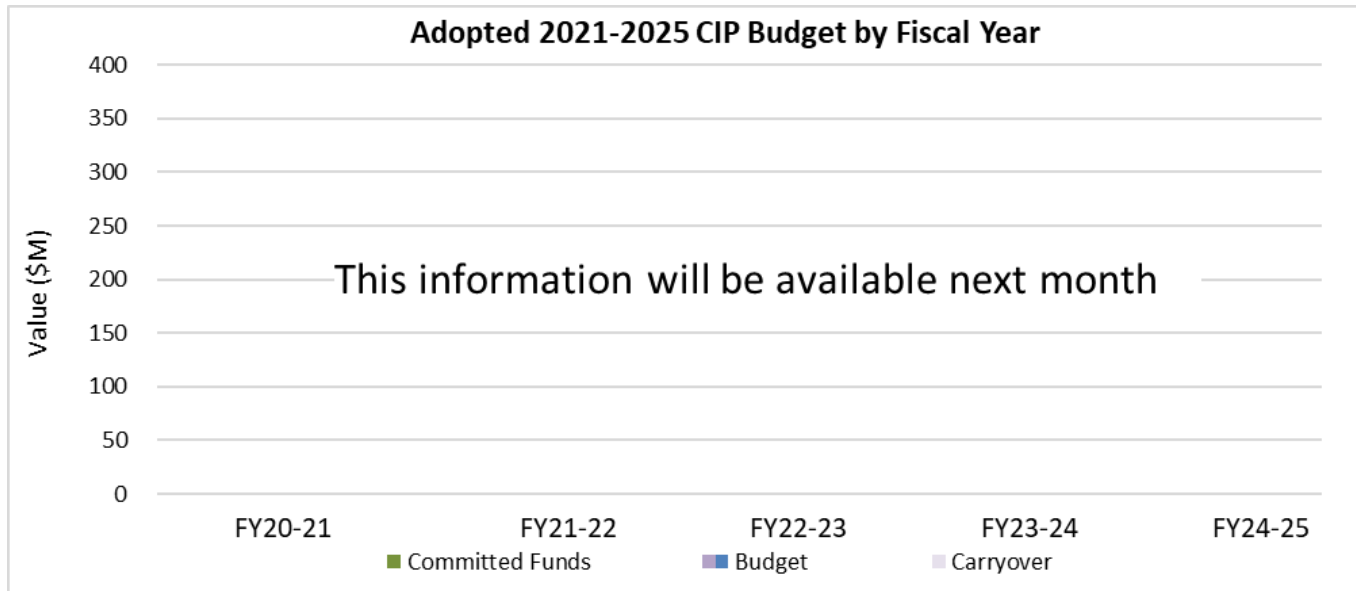
1. The Outfall Bridge and Instrumentation Improvement Project passed Stage Gate 4: Approve Preliminary Design and the Chemically Enhanced Primary Treatment Study passed Stage Gate 2: Final Acceptance.
2. The baseline Beneficial Use date and the baseline budget for each project are established at construction contract award and execution.
3. Expenditure and adjusted fiscal year budget information will be available next month.
4. 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:

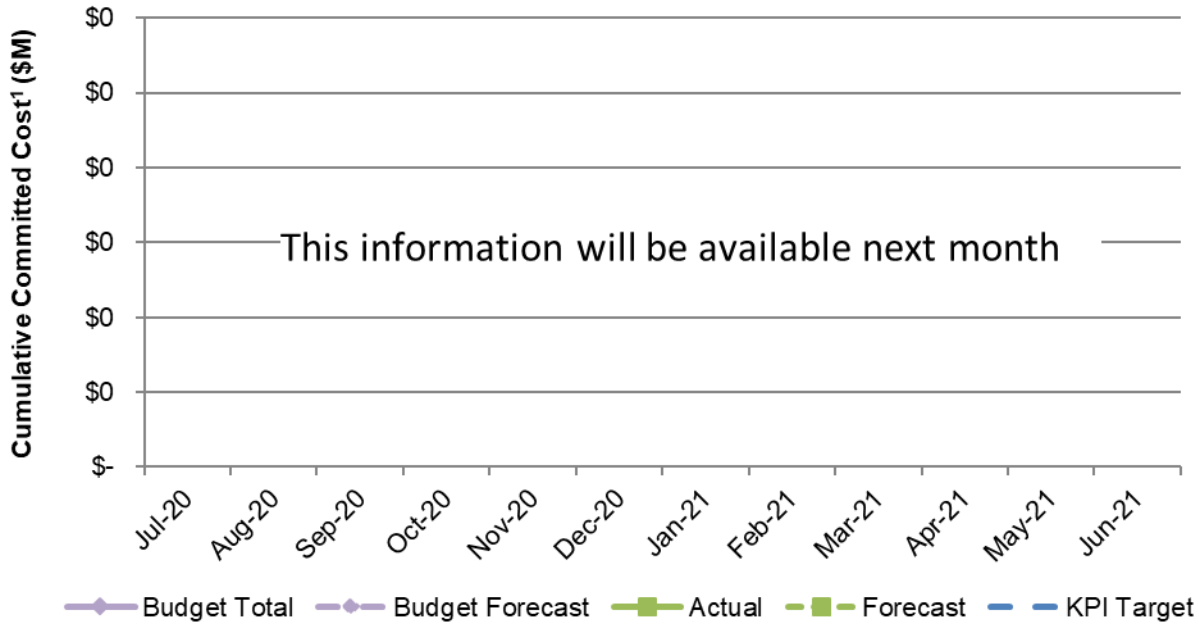
1. Due to the reversal of 2019-2020 accruals, actual expenses in July are negative. These negative expenses will be offset when the 2019-2020 invoices are paid.



Fiscal Year 2020-2021 Program Budget Performance

The committed costs forecast for Fiscal Year 2020-21 are currently being finalized and will be included in next month's report.

**FY20-21 Program Budget
Total Budget vs Actual and Forecasted Expenditure**



Notes:

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



Project Performance Summary

There are currently nine projects in the 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 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. Cogeneration Facility	Design & Construction	Nov 2020	●	●
2. 96-Inch and 87-Inch Settled Sewage Pipe Rehabilitation	Construction	Jan 2021	●	●
3. Advanced Facility Control & Meter Replacement - Phase 1	Construction	June 2021	◆	●
4. Digester and Thickener Facilities Upgrade	Construction	Sep 2021	◆	◆
5. Blower Improvements	Construction	Sep 2022	●	●
6. Advanced Facility Control & Meter Replacement - Phase 2	Construction	Jan 2023 ³	●	●
7. Nitrification Clarifiers Rehabilitation – Phase 1	Construction	Jan 2023	●	●
8. Switchgear M4 Replacement and G3 & G3A Removal	Construction	Jan 2023	●	●
9. Headworks	Design & Construction	Jun 2023	●	●

Key:

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

- 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.
- An explanation of cost and schedule variances on specific projects identified in this table is provided on page 13.
- The project construction Beneficial Use date will be baselined once the City issues the construction contract NTP letter.



Project Performance – Pre-Baselined² Projects (not yet in construction)

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

Notes

- 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.
- Pre-baselined projects are CIP projects not yet in construction that do not yet have schedules and budgets baselined.



Project Significant Accomplishments

Biosolids Package

Digested Sludge Dewatering Facility Project

- The project team performed a value engineering analysis of the 10 percent design. Staff will review the ideas presented to potentially save costs or improve functionality.

Digester and Thickener Facilities Upgrade Project

- Contractor Walsh completed inspection and pre-operational testing of the DAFTs.
- Walsh began functional testing of the new flares and submitted the startup and commissioning manual for City review.

Facilities Package

Facility Wide Water Systems Improvements Project

- The project was approved to proceed with preliminary design.
- The City advertised the exploratory trenching contract, which will help inform the project's design. Bids will be opened in August and staff will recommend contract award to Council in October.

Outfall Bridge and Instrumentation Improvements Project

- The project was approved to proceed with detailed design. Staff anticipates design completion by summer 2021.

Liquids Package

Advanced Facility Control and Meter Replacement – Phase 1 Project

- Contractor Overaa demolished the influent piping, valves, and flow meters in the Nitrification Battery B tunnel and dissolved oxygen probe and analyzer at the Nitrification Battery B tanks.

Advanced Facility Control and Meter Replacement – Phase 2 Project

- Staff held a pre-construction meeting and issued an NTP to contractor Kiewit. Staff anticipates reviewing contractor equipment and schedule submittals in August.

Blowers Improvements Project

- Contractor Monterey Mechanical installed and tested medium-voltage cables in Building 40 and completed network panel modifications for the DCS.

Headworks Project

- Staff reviewed the 90 percent design documents.
- Design-builder CH2M relocated existing utilities, installed temporary power and fiber, and began mass excavation of the new headworks site.

Nitrification Clarifier Rehabilitation – Phase 1 Project

- Contractor Overaa demolished the RAS piping, valves, and flow meters in the RAS gallery.
- The contractor also began trenching for an electrical duct bank and laying out electrical conduit for the new equipment.

Power and Energy Package

Cogeneration Facility Project

- Design-builder CH2M successfully tested the boilers on natural gas and compressed digester gas.
- CH2M completed functional testing of the digester gas treatment system, which is now operational.



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 materials 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.

To pay for the 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 will approach Council for a third contingency increase 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 construction management (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 aging 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, but has not changed the overall construction completion date of June 2021.



Regional Wastewater Facility Treatment – Current Treatment Process Flow Diagram

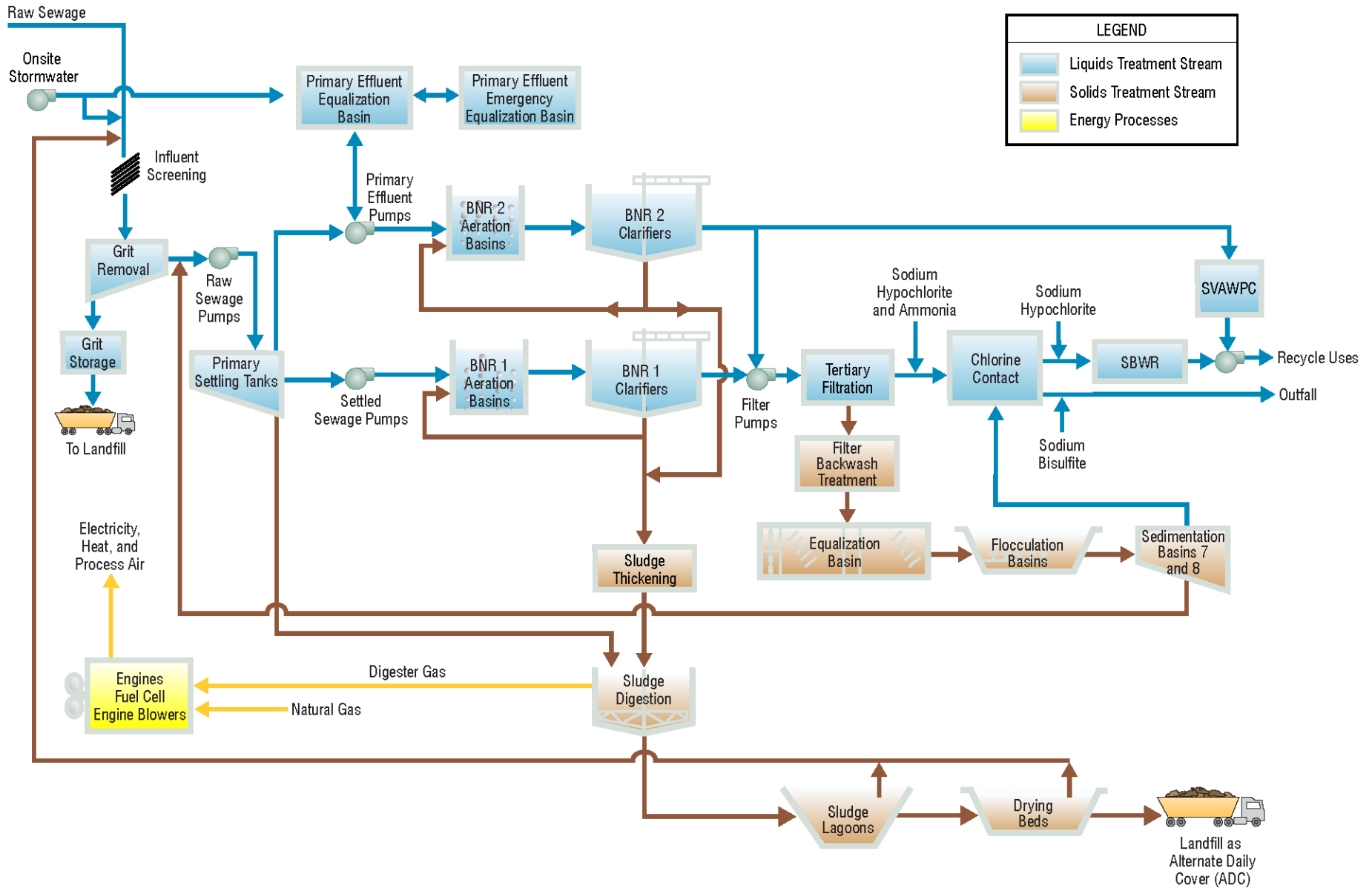


Figure 8 – Current Treatment Process Flow Diagram



Regional Wastewater Facility Treatment – Proposed Treatment Process Flow Diagram

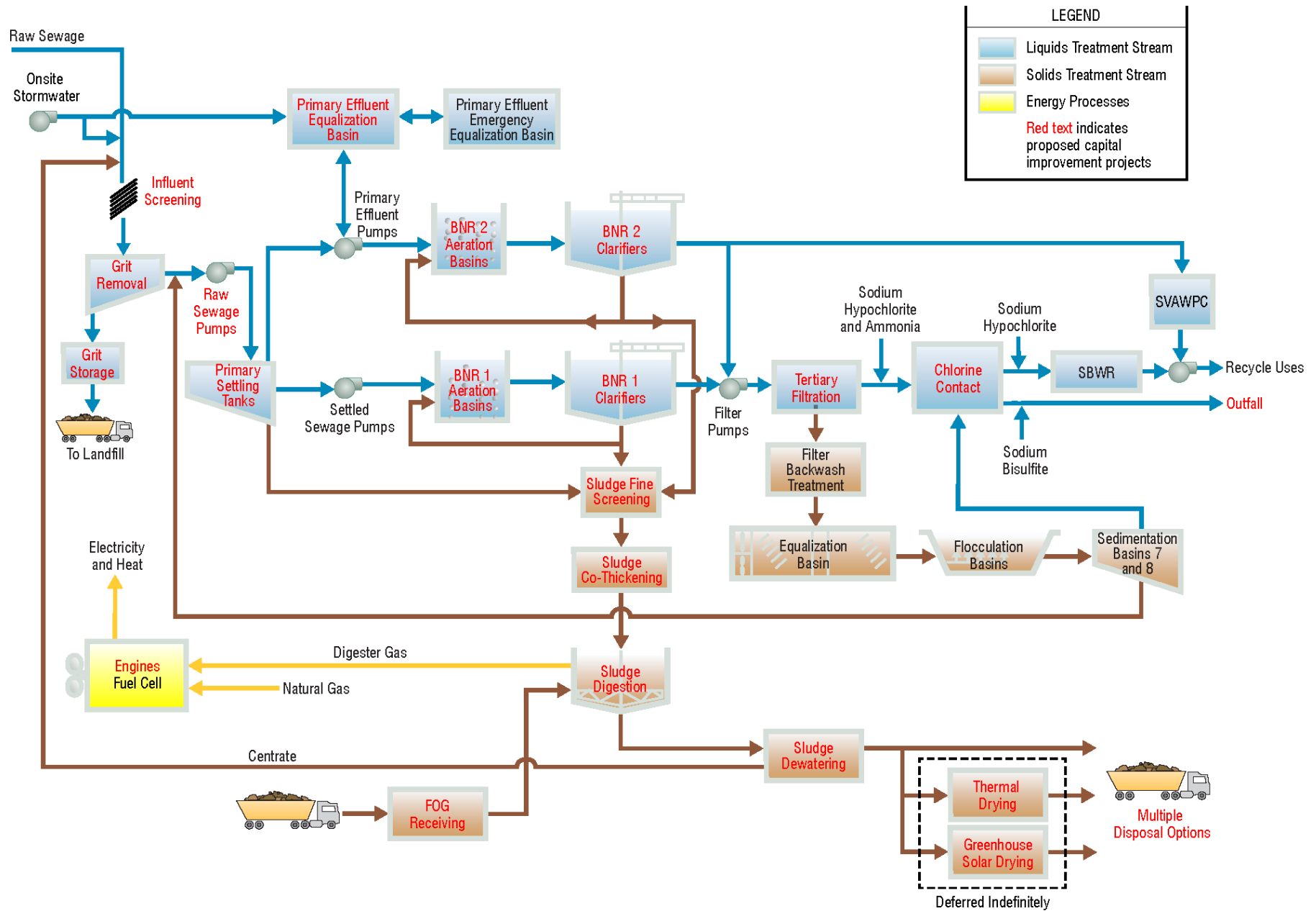


Figure 9 – Proposed Treatment Process Flow Diagram



Active Construction Projects – Aerial Plan

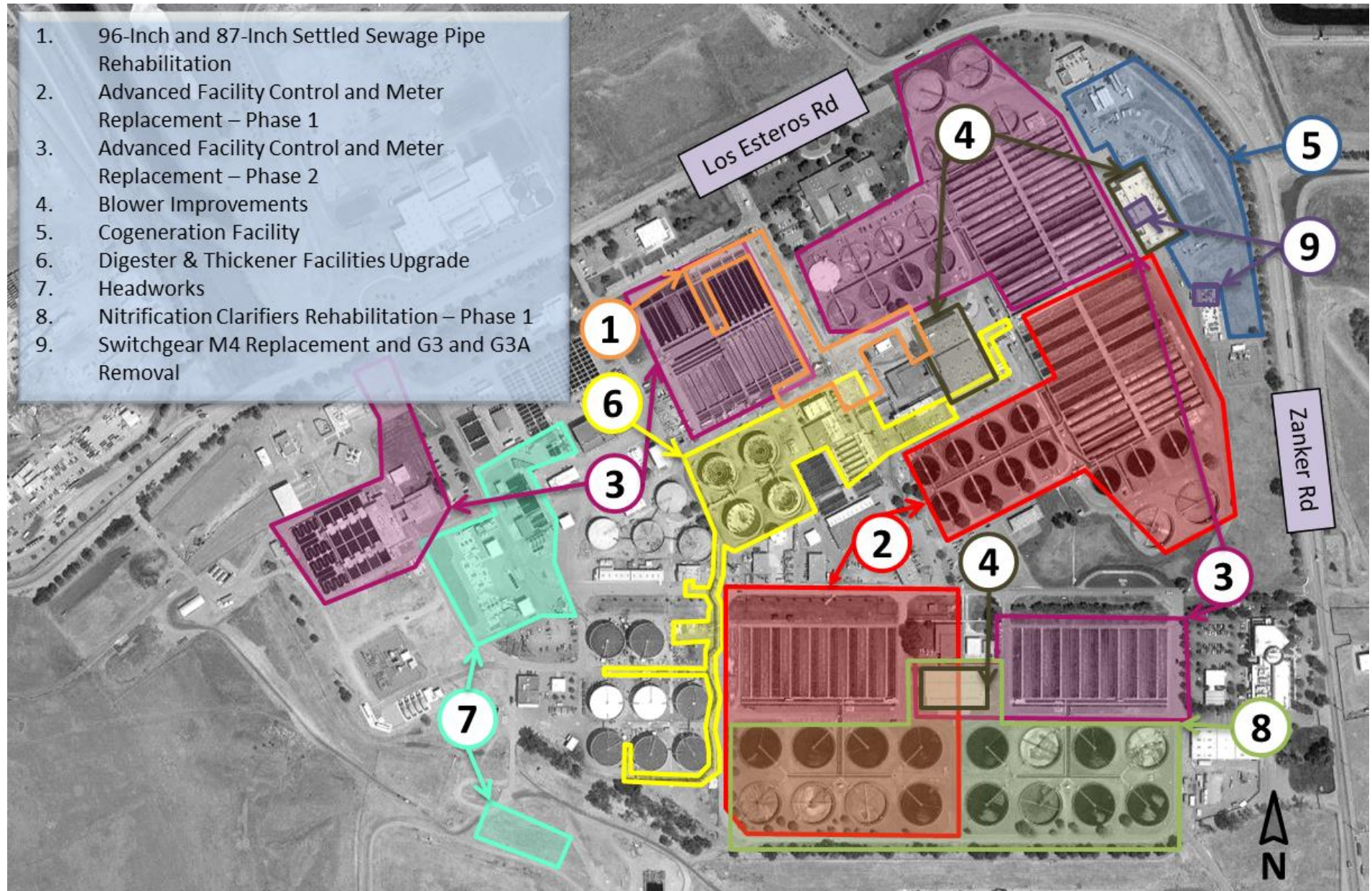


Figure 10 – Active Construction Projects

