



**San José-Santa Clara**  
Regional Wastewater Facility

# Capital Improvement Program Monthly Status Report: August 2018

October 4, 2018

This report summarizes the progress and accomplishments of the Capital Improvement Program (CIP) for the San José-Santa Clara Regional Wastewater Facility (RWF) for August 2018.

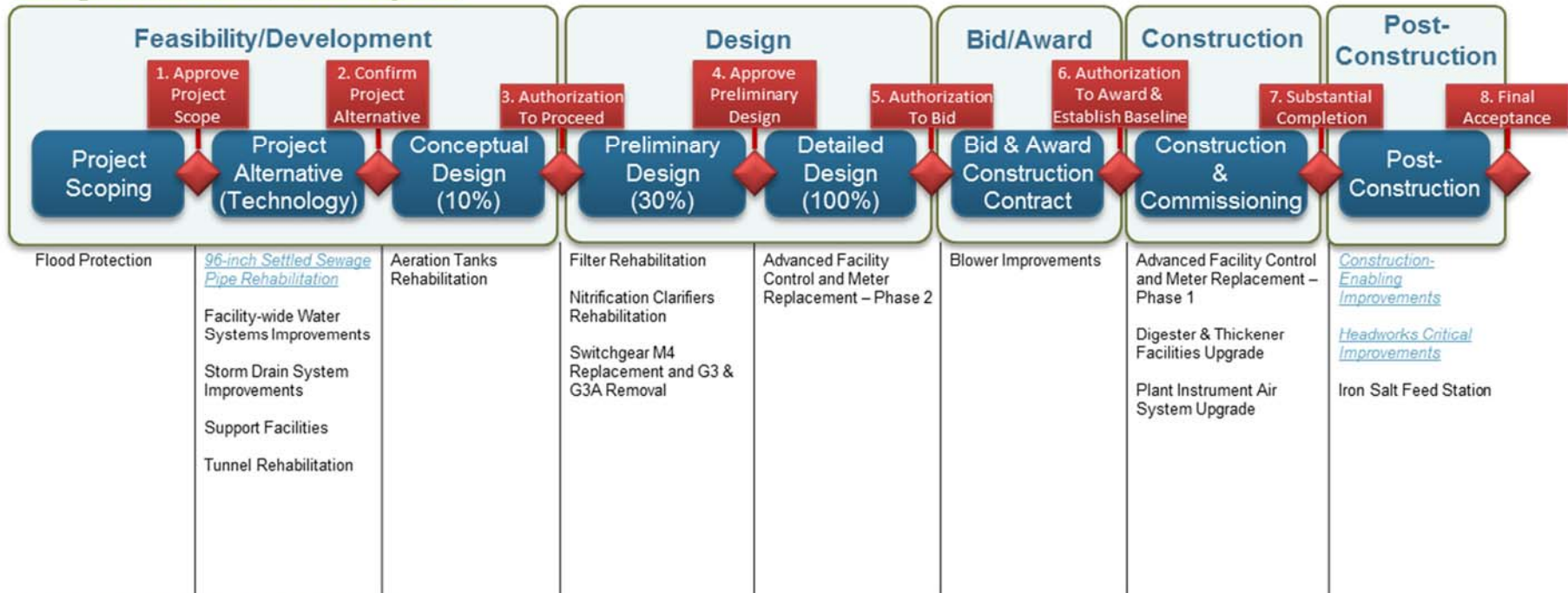
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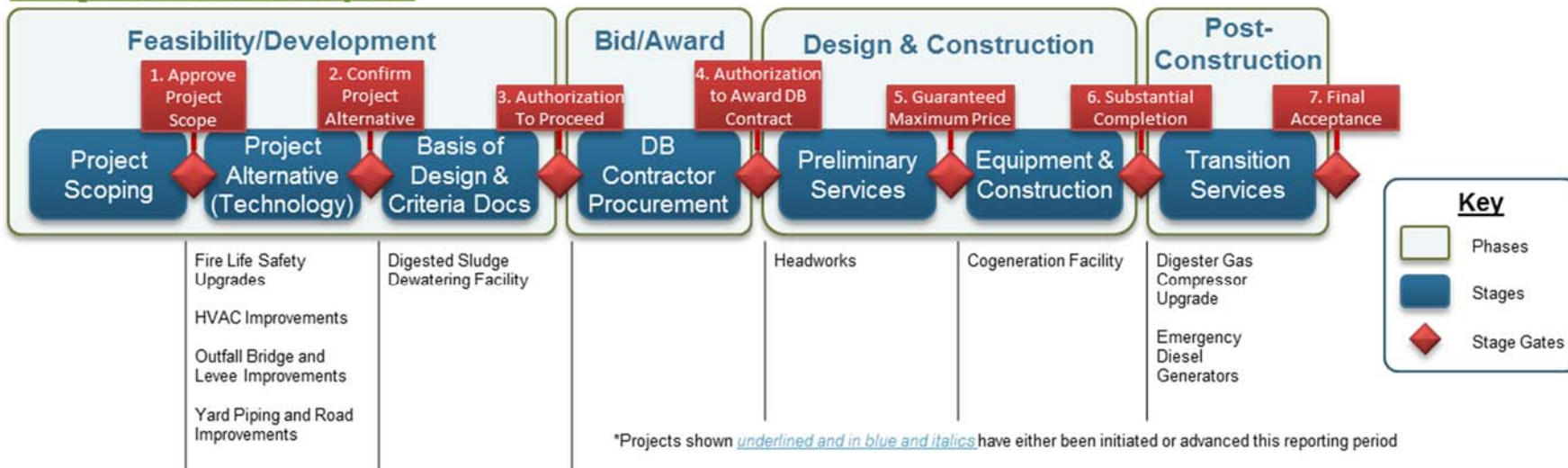


# Project Delivery Model

## Design-Bid-Build Active Projects



## Design-Build Active Projects





# Program Summary

## August 2018

In August, the Headworks Critical Improvements and Iron Salt Feed Station projects advanced through Stage Gate 7 – Substantial Completion of the Project Delivery Model (PDM) to the post-construction phase. The Headworks Critical Improvements Project replaced two existing climber screens with multi-rake screens and replaced slide gate stems and actuators at the headworks facilities. The Iron Salt Feed Station Project constructed new ferric and polymer dosing stations.

The Construction-Enabling Improvements Project achieved Beneficial Use and the Plant Instrument Air System Upgrade Project contractor completed functional testing. For the Cogeneration Facility Project, the four internal combustion engine generators were delivered to the RWF, and factory acceptance testing was completed for the gas purification system with delivery expected in September. The Digester and Thickener Facilities Upgrade Project contractor completed the removal of the PCB-contaminated soil and concrete encapsulation work in accordance with the EPA approved risk-based mitigation plan. Construction continued on the sludge screening building, dissolved air flotation thickeners and gallery, above-ground pipe rack, and digester tanks.

The Advanced Facility Control and Meter Replacement Phase 1 Project team conducted a hazardous material site walkthrough with the contractor. They received the contractor's baseline schedule and several critical submittals, including the flowmeters and valves.

The City opened bids for the Blower Improvements Project. Four bids were received, with the lowest bid five percent below the Engineer's Estimate. The team expects to return to TPAC and Council to recommend award of a construction contract in October 2018.

Design-builder CH2M held a series of workshops to provide the basis for selecting the new headworks site. The project team expects to select the site by October 2018.

The Fire Life Safety Upgrades Project design consultant began conceptual design work and completed an electrical site survey. The City also received a draft condition assessment report for the HVAC Improvements Project and approved a condition assessment plan for the Storm Drain System Improvements Project. The Outfall Bridge and Levee Improvements Project completed review of the alternative analysis report. The Nitrification Clarifiers Rehabilitation Project team completed review of the preliminary design report (PDR) and will receive the final PDR in September.

The CIP initiated the 96-inch Settled Sewage Pipe Rehabilitation Project to address the severe crown corrosion in this pipeline as part of the Yard Piping and Road Improvements Project. A condition assessment of this pipe and the adjacent 87-inch by 136-inch was performed this month to determine the extent of the corrosion and viable rehabilitation methods.

## Look Ahead

The following key activities are forecast for September and October of 2018:

- The following projects will proceed to stage gate:
  1. The Facility Wide Water Systems Improvements, Outfall Bridge and Levee Improvements, and 96-inch Settled Sewage Pipe Rehabilitation projects - Stage Gate 2: Confirm Project Alternative.
  2. Digested Sludge Dewatering Facility Project - Stage Gate 3: Authorization to Proceed.
  3. Filter Rehabilitation and Nitrification Clarifiers Rehabilitation projects - Stage Gate 4: Approve Preliminary Design.
  4. Headwork Project – Stage Gate 4.1 Site Selection.
- The Headworks Project will hold workshops on risk management, cost, final site selection, and permitting.
- The Advanced Facility Control and Meter Replacement Phase 2 Project will finalize the hazardous material report.
- The Yard Piping and Road Improvements and Storm Drain System Improvements projects will complete condition assessment work.
- The Digester and Thickener Facilities Upgrade Project will complete replacement of the 78-inch settled sewage pipeline with a final inspection walkthrough scheduled for October. The 78-inch pipeline will be placed into service in October before the wet weather season, and the temporary pumping and pipeline system will be decommissioned.
- The Plant Instrument Air System Upgrade Project will complete the 28-day operational testing.
- The City will advertise an RFP for design-builder services for the Digested Sludge Dewatering Facility Project.
- The City will issue the Notice of Completion and Acceptance (NOCA) for the Headworks Critical Improvements Project.



## Program Highlight – Construction Activity Update

August 31 was a significant day at the RWF with the delivery of four new engine generators, as seen in Figure 1. The new engine generators are being installed as part of the Cogeneration Facility project and will use a combination of biogas (a by-product of the anaerobic digestion process) and natural gas provided by PG&E to produce 100 percent of the electrical power and heat needed to operate the RWF through the next 10-15 years. It is anticipated the new engines will run on up to a 50-50 blend of digester gas and natural gas, limited only by the volume of digester gas produced at the RWF.



Figure 1: Unloading Caterpillar CG260-16 engines at the RWF

Each engine generator weighs a little more than 56 tons. Together, the four generators can produce up to 14 megawatts (MW) of power if running at full capacity on 100 percent digester gas, but with available digester gas production the four generators are anticipated to deliver a total of up to 12.5 MW of power. On average, 8 to 10 MW of electrical power is needed to operate the RWF.

The engine generators also serve to produce heat for the heating water loop, which is used in the digestion process and non-digester heating loads. The heat recovery system will be configured to maximize recoverable heat, and any excess heat will be rejected to cooling towers.

The engine generators are currently temporarily staged at the new construction

laydown area until the design-builder CH2M completes subgrade preparation work, underground utilities, and building foundation work. CH2M is planning to pour the new concrete foundation slab in October and estimates it will take approximately 18 hours to complete the monolithic (single) pour of an estimated 1,650 cubic yards.

A short distance away, the Digester and Thickener Facilities Upgrade Project is completing the demolition and replacement of an existing wye structure, 200-feet of 78-inch diameter pipe, 40-feet of a 96-inch diameter pipe run, and 20-feet of an 87-inch oval pipe run, as seen in Figure 2. This was unforeseen work that had to be completed in a very short time frame during the summer months under low flow conditions. Contractor Walsh has demolished all pipe; installed new pipe; and formed and placed the new wye structure. Walsh is currently backfilling the new pipe and welding the T-lock at the new wye structure and new pipe. T-lock is a polyvinyl chloride (PVC) coating cast into the concrete to protect it from corrosion caused by hydrogen sulfide and other wastewater gases. The original wye structure and pipes were replaced due to the corrosion of the concrete as a result of these gases.

Construction work on the new wye structure and pipe replacements began in May 2018 and is scheduled to be completed at the end of September. While the construction work only took a few months to complete, detailed planning and preparation began long before. Most notably, a temporary pumping and piping system had to be designed and installed to reroute 100 million gallons per day (MGD) of plant effluent from the primary process in order for the contractor to do the repair work on the wye structure and replace the various pipe segments. It has taken a significant coordination and planning effort from all parties, but the wye structure and pipe replacement work is expected to be completed and accepted on time in early October—prior to the start of the wet season.































Figure 2: New wye structure

## 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 frequency. Through the life of the CIP, KPIs that best reflect the current program will be selected and measured. KPIs have been reset for the current fiscal year.

### Program Key Performance Indicators – Fiscal Year 2018-2019

KPI	Target	Fiscal Year to Date			Fiscal Year End		
		Actual	Status	Trend	Forecast	Status	Trend
<b>Stage Gates</b>	90%	100%			100%		
		3/3 <sup>1</sup>			19/19		
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%							
<b>Schedule</b>	90%	50%			33%		
		1/2 <sup>2</sup>			1/3		
Measurement: Percentage of CIP projects delivered within 2 months of approved baseline Beneficial Use Milestone. <sup>3</sup> Target: Green: >= 90%; Amber: 75% to 89%; Red: < 75%							
<b>Budget</b>	90%	NA			75%		
		0/0			3/4		
Measurement: Percentage of CIP projects that are accepted by the City within the approved baseline budget. <sup>3</sup> Target: Green: >= 90%; Amber: 75% to 89%; Red: < 75%							
<b>Expenditure</b>	\$252M	\$216M			\$294M		
Measurement: CIP FY18-19 committed costs. Target: Committed cost meets or exceeds 70% of planned Budget. 70% of \$360M = \$252M. Therefore Green: >=\$252M; Amber: \$198M to \$252M; Red: < \$198M							
<b>Safety</b>	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							
<b>Environmental</b>	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							
<b>Vacancy Rate<sup>4</sup></b>	10%	17%			6%		
		14/84			5/84		
Measurement: Ratio of the number of vacant approved positions to approved positions. Target: Green: <= 10%; Amber: 10% to 20%; Red: > 20%							

#### Notes

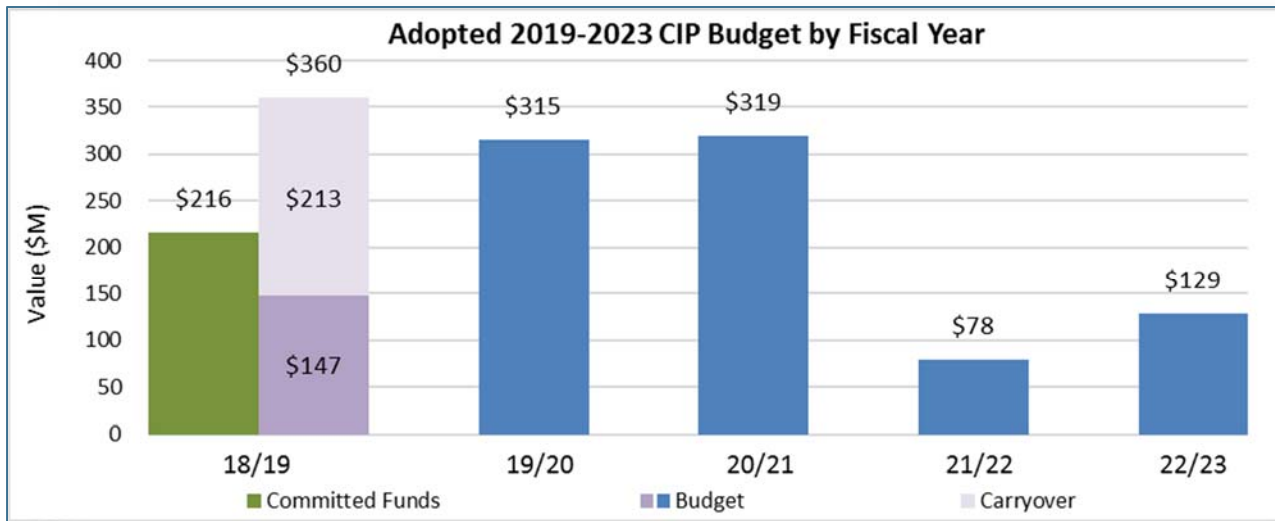
1. The Headworks Critical Improvements and Iron Salt Feed Station projects both successfully completed Stage Gate 7: Substantial Completion.
2. The Construction-Enabling Improvements and Headworks Critical Improvements projects reached Beneficial Use in August, but only the Headworks Critical Improvements Project was completed within two months of the approved baseline Beneficial Use date.
3. The baseline Beneficial Use date and the baseline budget for each project are established at construction contract award and execution.
4. The Vacancy Rate KPI measures City CIP-approved positions (ESD and 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)18-19 based on the 2019-2023 CIP.

### Adopted 2019-2023 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 FY18-19 budget is \$175 million, which consists of \$121 million in new funds and \$54 million in rebudgets. For purposes of this monthly report, the adopted FY18-19 budget is adjusted from \$175 million to \$147 million due to the exclusion of certain appropriations that are not measured as part of the expenditure KPI. Excluded appropriations include Urgent and Unscheduled Treatment Plant Rehabilitation; SBWR Extension; Debt Service Repayment for Plant Capital Improvement Projects (San José only debt service); Public Art; State Revolving Fund Loan Repayment; City Hall Debt Service Fund; Clean Water Financing Authority Debt Service Payment Fund; Equipment Replacement Reserve; and Ending Fund Balance. Similar adjustments have been made to the budgets for FY19-20 through FY 22-23.

**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. FY18-19 carryover is \$213 million.

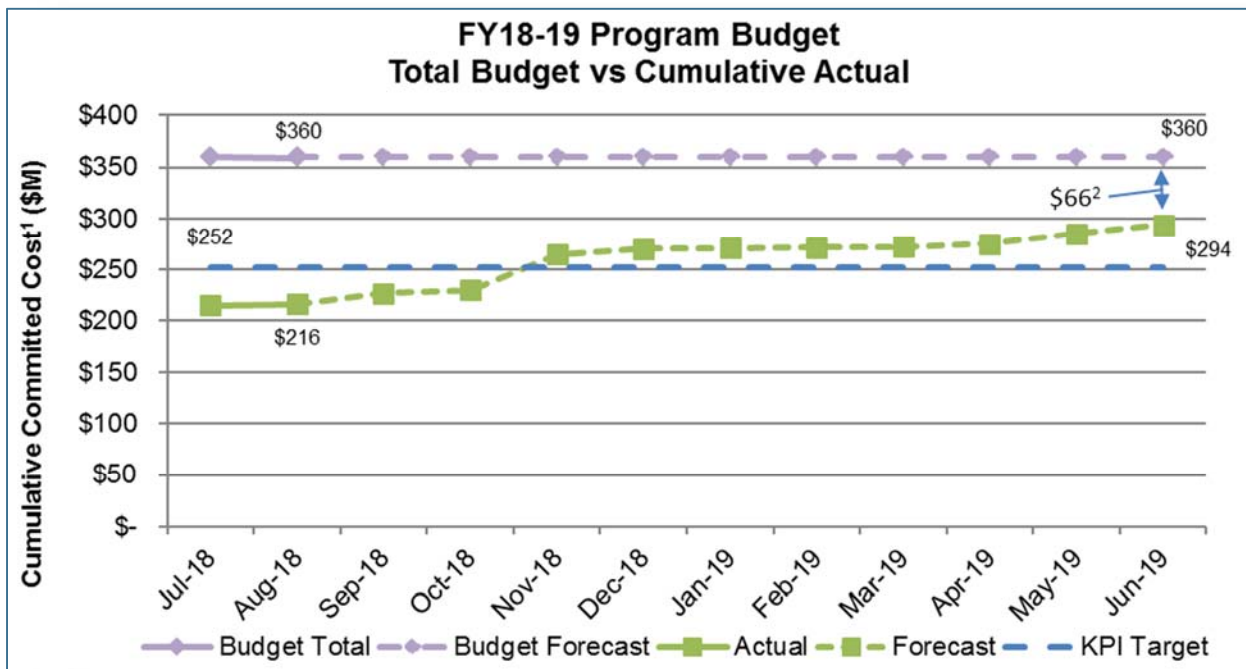
Budget of \$147 million and carryover of \$213 million totals \$360 million for FY18-19.





## Fiscal Year 2018-2019 Program Budget Performance

The committed costs forecast for Fiscal Year 2018-19 are currently being finalized and will be included in next month's report.



### Notes

1. Committed costs are expenditures and encumbrance balances, including carryover (encumbrance balances from the previous fiscal year).
2. The variance between forecasted budget and forecasted commitments can be primarily attributed to the following factors:
  - a. Several construction contracts are now anticipated to be awarded in FY19-20 instead of FY18-19 based on updated schedules:
    - i. Fire Life Safety Upgrades Project
    - ii. Outfall Bridge and Levee Improvements Project
  - b. Several consultant service orders will not be awarded in FY18-19:
    - i. Aeration Tank Rehabilitation Project
    - ii. Support Facilities Project
    - iii. Tunnel Rehabilitation Project
  - c. The Blower Improvement Project construction bids came in under budget.
  - d. Several other minor encumbrances for consultant services are either lower than budgeted or are anticipated to be awarded in FY19-20.
  - e. Several authorized positions remain vacant, resulting in lower personal services expenses than budgeted.
  - f. The payment for the annual premium budgeted for the Owner Controlled Insurance Program in FY18-19 is now anticipated to be paid in FY19-20 due to later than expected invoicing from the insurers in FY17-18.
3. The FY18-19 budget includes three recurring appropriations (Preliminary Engineering, Equipment Replacement, and Plant Infrastructure Improvements) that total approximately \$3.66 million. These appropriations are included in the budget to implement minor capital improvement projects that may be needed during the fiscal year. No major expenditures or encumbrances are currently planned against these appropriations.



## Project Performance Summary

There are currently seven projects in the construction phase and an additional 17 projects in feasibility/development, design, or bid and award 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

Project Name	Phase	Estimated Beneficial Use Date <sup>1</sup>	Cost Performance <sup>2</sup>	Schedule Performance <sup>2</sup>
1. Iron Salt Feed Station	Post-Construction	May 2018 <sup>3</sup>	●	◆
2. Construction-Enabling Improvements	Construction	Aug 2018 <sup>3</sup>	●	◆
3. Headworks Critical Improvements	Construction	Aug 2018 <sup>3</sup>	●	●
4. Plant Instrument Air System Upgrade	Construction	Oct 2018	●	◆
5. Cogeneration Facility	Design & Construction	Mar 2020 <sup>4</sup>	●	●
6. Digester and Thickener Facilities Upgrade	Construction	Jan 2021	◆	◆
7. Advanced Facility Control & Meter Replacement - Phase 1	Construction	June 2021	●	●

#### KEY:

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

#### 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 pages 12 and 13.
- Actual Beneficial Use date.
- The project construction Beneficial Use date will be baselined once the City accepts the design-builder's construction schedule.





## Project Performance – Pre-Baselined Projects

Project Name	Phase	Estimated Beneficial Use Date <sup>1</sup>
1. Headworks Project	Design and Construction	Dec 2022
2. Blower Improvements	Bid and Award	Nov 2021
3. Switchgear M4 Replacement and G3 & G3A Removal	Design	Feb 2022
4. Advanced Facility Control & Meter Replacement Phase 2	Design	Dec 2022
5. Filter Rehabilitation	Design	Mar 2023
6. Nitrification Clarifiers Rehabilitation	Design	Jan 2024
7. Outfall Bridge and Levee Improvements	Feasibility/Development	Jan 2021
8. Fire Life Safety Upgrades	Feasibility/Development	Sep 2022
9. Digested Sludge Dewatering Facility	Feasibility/Development	Oct 2022
10. Storm Drain System Improvements	Feasibility/Development	Nov 2022
11. Flood Protection	Feasibility/Development	Jan 2023
12. HVAC Improvements	Feasibility/Development	Mar 2023
13. Facility-wide Water Systems Improvements	Feasibility/Development	Sep 2023
14. Aeration Tanks Rehabilitation	Feasibility/Development	Feb 2026
15. Support Facilities	Feasibility/Development	Mar 2027
16. Yard Piping and Road Improvements	Feasibility/Development	May 2027
17. Tunnel Rehabilitation	Feasibility/Development	Jun 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.



# Significant Accomplishments

## Biosolids Package

### Digester and Thickener Facilities Upgrade

- Contractor Walsh Construction completed the canopy, pump pads, conduits, and control panels for the thickened sludge pumps; formed, installed rebar, and poured the first-floor deck in the Sludge Screening Building; completed the wye junction structure for the 78-inch settle sewage bypass; and installed the 96-inch settle sewage bypass connection.

## Facilities Package

### Cogeneration Facility

- CH2M submitted the 100 percent design documents for review.
- The four 3MW engine generators arrived on-site, including the engine generator exhaust stacks.
- The project team completed the Unison Gas Purification System factory acceptance testing.
- CH2M completed the hauling of spoils from the construction-enabling area to the Spreckles Yard and the preparation of the subgrade of the new project structures.

### Construction-Enabling Improvements

- The Fire Department issued a temporary certificate of occupancy permit and the project reached Beneficial Use.

### Facility-Wide Water Systems Improvements

- Design consultant Kennedy/Jenks (KJ) completed the draft alternative analysis report and conducted a review workshop. The project team will bring the project to Stage Gate 2: Confirm Project Alternative in October.

### Flood Protection

- The project team authorized design consultant AECOM to conduct an RWF flood risk analysis.

### HVAC Improvements

- Design consultant KJ identified alternatives for improvements to the existing support building HVAC systems and conducted an alternative workshop.

### Storm Drain System Improvements

- Design consultant AECOM completed the condition assessment of the storm water pump stations and began utility locating and survey.

### Yard Piping and Road Improvements

- Owner's Advisor Black & Veatch completed the condition assessment of the primary 96-inch and 87-inch by 136-inch settled sewage pipelines and secondary clarifier "A" side return activated sludge pipelines.

## Liquids Package

### Blower Improvements

- Bids were opened on August 16. Four bids were received, with the lowest bid five percent below the Engineer's Estimate. The construction contract will be recommended for award in October 2018.

### Headworks

- The Headworks Project team held three workshops with the design-builder on 1) hydraulics; 2) site selection and scope; and 3) site investigations. The team expects to advance to the next stage gate in October and return to the Treatment Plant Advisory Committee (TPAC) and City Council (Council) to seek delegation of authority to the City Manager to negotiate and execute a Definitive Contract Amendment (DCA) with the design-builder to complete the design-build work for a not-to-exceed guaranteed maximum price (GMP).

### Headworks Critical Improvements

- The project team successfully completed Stage Gate 7 - Substantial Completion. Contractor Overaa Construction is expected to finish punch list items next month.



### Iron Salt Feed Station

- The project team successfully completed Stage Gate 7 - Substantial Completion. Construction is complete, and the City expects to issue NOCA in October 2018.

### Nitrification Clarifiers Rehabilitation

- Design consultant HDR Engineering, Inc. worked with the project team to evaluate cost reduction recommendations from the Value Engineering exercise. Next month the project team is expected to finalize the rehabilitation approach and scope for the clarifiers.

### **Power and Energy Package**

#### Plant Instrument Air System Upgrade

- The functional test and commissioning test standard operating procedures were approved. Next, the project team will begin the 28-day operational testing.





## Explanation of Project Performance Issues

### Iron Salt Feed Station

Project construction was delayed by eight months due to a combination of heavy winter rain in 2016-17; longer than anticipated time to fabricate the double containment pipeline and leak detection system; piping modifications to resolve a pump operational issue at the ferric chloride station; and installation of additional piping to allow O&M staff to temporarily dose polymer at an alternate location. In addition, operational testing and commissioning of the new equipment has taken longer than anticipated. Specifically, fine-tuning the control program; identifying and resolving pump operational issues; and addressing problems with the new flow meter and level sensor have taken additional time.

The project team resolved all issues and completed the commissioning test in May 2018. Beneficial Use was achieved on May 14, 2018. The project team is working with the contractor to complete the remaining work and anticipates filing the NOCA in October 2018.

### Construction-Enabling Improvements

This project was originally scheduled to be substantially complete by mid-February 2017. Due to the extremely wet 2016-17 winter season, contractor Teichert Construction was unable to perform site work for several weeks from October 2016 through April 2017. Teichert was granted 47 extra work days for weather-related delays. Teichert was also granted additional time to remove and replace asphalt pavement in damaged areas of Zanker Road; install traffic-rated pull boxes for the streetlight system; install underground conduits for the fiber optic system; and make additional changes.

Delays in completing the installation of the project's portable trailers impacted the schedule. In early August, the contractor completed installation of the utilities (electrical, communications, and wastewater) required to obtain a temporary certificate of occupancy permit for the trailers. The temporary permit was received this month and substantial completion was issued. The project team provided the contractor with a list of remaining contract work to be completed. With the accumulation of liquidated damages ending, staff will work with Teichert to complete the outstanding work and schedule meetings to begin negotiating project close out.

### Plant Instrument Air System Upgrade

Project construction has been delayed by three months due to three issues: 1) Staff discovered that the planned construction site access route crossed a large settled sludge pipeline, requiring an alternative access route to be developed and constructed; 2) the contractor was temporarily unable to install a section of the conduit from the sludge control building to the new compressor building due to other work being performed in the area by a different contractor; and 3) the commissioning test SOP required for Anderson Pacific to perform the 28-day commissioning test is still being finalized. The project is expected to achieve Beneficial Use in October 2018.

### Digester and Thickener Facilities Upgrade

This project encountered numerous unforeseen conditions at the beginning of construction in 2016, described below. In 2017, design modifications were required to address seismic risks, and discovery of hazardous materials required extensive cleanup. Delays for these conditions are still being discussed and evaluated.

The City has negotiated contract change orders for the following unforeseen conditions discovered in 2016:

- Major corrosion of a below-ground, 78-inch settled sewage pipeline and junction structure delayed the construction of dissolved air flotation tank piping connections, two new pressurization flow boxes, and utility relocation work. The contractor postponed all repairs until a temporary pumping and pipeline system could be designed and safely installed to enable replacement of the pipeline in the 2018 dry season. In May of 2018, the contractor started full-time operation of this temporary pumping and pipeline system and began replacement of the 78-inch settled sewage pipeline, which is anticipated to be completed by late September 2018.
- A 36-inch biochemical oxygen demand pipe was found to be obstructing the new sludge screen building foundation. The contractor removed this pipe and relocated several gas drain vaults and associated piping before foundation construction began.
- Multiple conflicts between contract work and existing utilities required numerous relocations including water, natural gas, digester gas, landfill gas, storm drains, and sanitary sewer pipelines. The contractor completed necessary relocations and rerouting, especially near the new digester gas pipe rack footings. Many of these modifications also require design changes.
- Bay Area Air Quality Management District venting restrictions also delayed digester work. The contractor completed the temporary digester gas connections and the system became operational in February 2018.

The following outstanding issues are currently being evaluated and are expected to result in additional costs and delays:

- Digester structural redesign. The design consultant revised the structural drawings to address seismic issues by enlarging the foundation ring beam at the base of each of the four digesters. The contractor provided a cost proposal



associated with this revision and the City issued a change order for a portion of the proposal. Work associated with the new foundation is ongoing and rebar installation is in progress for the first digester.

- Hazardous material mitigation. Testing of soils and concrete for PCBs was completed and a final conditional approval was provided by the Environmental Protection Agency (EPA). All removal and disposal of contaminated materials has been completed to comply with the risk-based management plan approved by the EPA. All contaminated soils have been removed and disposed of and most of the impacted concrete has been encased. The last portion of the work will be finalized once all foundation work is completed. At that time, final reports on the work will be submitted to the EPA.

In November 2017, Council approved a contingency increase of \$15 million. The City issued change orders against the increased contingency for delays associated with the conditions discovered in 2016.

In June 2018, Council approved a second contingency increase of \$25 million for additional costs associated with the seismic redesign, hazardous material remediation, and extended construction duration.

An estimated delay of approximately 145 working days is currently reflected in the revised Beneficial Use date of January 2021.



## Project Profile – Switchgear M4 Replacement and G3 and G3A Removal

For the last 10 years, the RWF has been implementing the Electrical Reliability Improvement Project to improve the RWF electrical distribution system. As part of these improvements, switchgears M1 and M3 have been replaced and switchgear M5 was added to form the 4.16kV electrical ring bus with the existing M4 switchgear. The M4 switchgear is more than 30 years old and has reached the end of its useful life cycle.

The M4 switchgear is located next to the 115kV Substation #2 on the RWF's east side and connects to the 115kV substation through step-up transformers. M4 breakers that interconnect to the RWF's 4.16kV ring bus are rated for 2000 amps, while breakers at the ring bus switchgears at M1, M3, and M5 are for 3,000-amp. Currently, the 2,000-amp breakers at M4 can handle the RWF's existing maximum current load; however, future RWF electrical loads, such as those for the Digested Sludge Dewatering Facility, are expected to exceed the capability of the 2,000-amp breakers.

This project intends to replace the existing M4 switchgear with new switchgear that has 3,000-amp breakers to interconnect to the ring bus.

In addition, the M4 Switchgear replacement will be designed with protective relays that will lower the arc flash levels at M4. The arc flash level is the amount of electrical energy that is expanded during an electrical fault. The Electrical staff while working on the M4 Switchgear must wear the appropriate Personal Protective Equipment (PPE). With a lower arc flash level, the safety of the Electrical staff will significantly improve by eliminating the need to wear a full body protective suit. Consultant Brown & Caldwell has been engaged to develop plans and specifications to replace the existing M4 switchgear. The existing M4 switchgear is scheduled to be replaced in 2021 after the new Cogeneration engine generators have been commissioned. During the installation of the engine generators, the RWF's electrical system will be reconfigured to permit a total replacement of the M4 switchgear.

The project will replace the existing M4 switchgear and outdoor enclosure while retaining the existing foundation. The existing power cables connecting M4 will be reused.

The project will also develop plans to remove the existing G3 and G3A switchgears in Building 40. These switchgears are being used to connect the existing Cogeneration EG1, EG2, and EG3 generators to the RWF's distribution system. The EG1, EG2, and EG3 generators will be decommissioned after the new Cogeneration Facility's generators are commissioned. Once the generators are decommissioned, switchgears G3 and G3A will be removed as part of this project scope.

The project is anticipated to reach Beneficial Use in February 2022 with a total project budget of approximately \$7.5 million.



Figure 3: Exterior of Existing M4 (5kV) Switchgear Enclosure



Figure 4: Interior of Existing M4 (5kV) Switchgear Enclosure



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# Regional Wastewater Facility Treatment – Current Treatment Process Flow Diagram

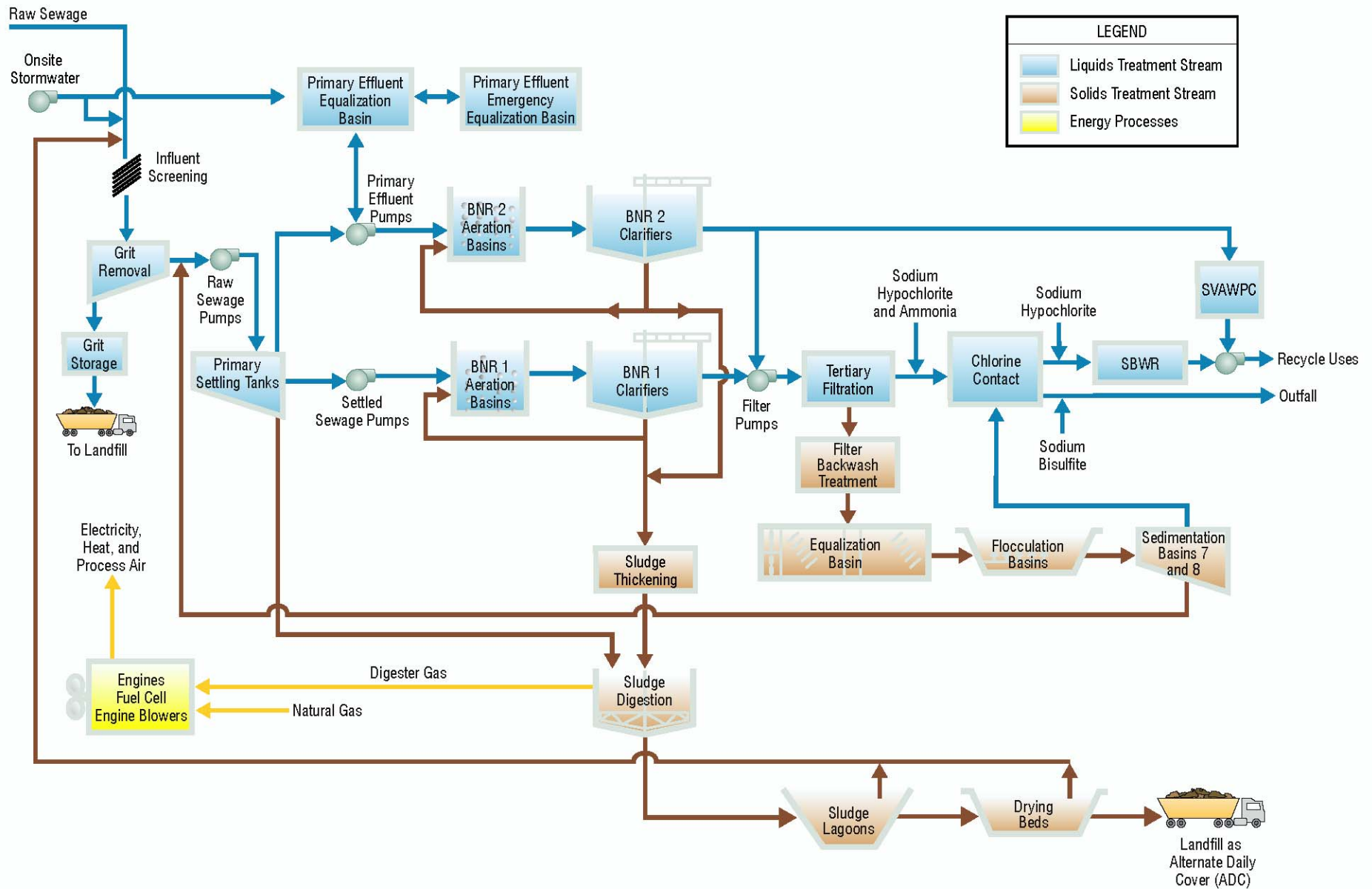


Figure 5 – Current Treatment Process Flow Diagram



# Regional Wastewater Facility Treatment – Proposed Treatment Process Flow Diagram

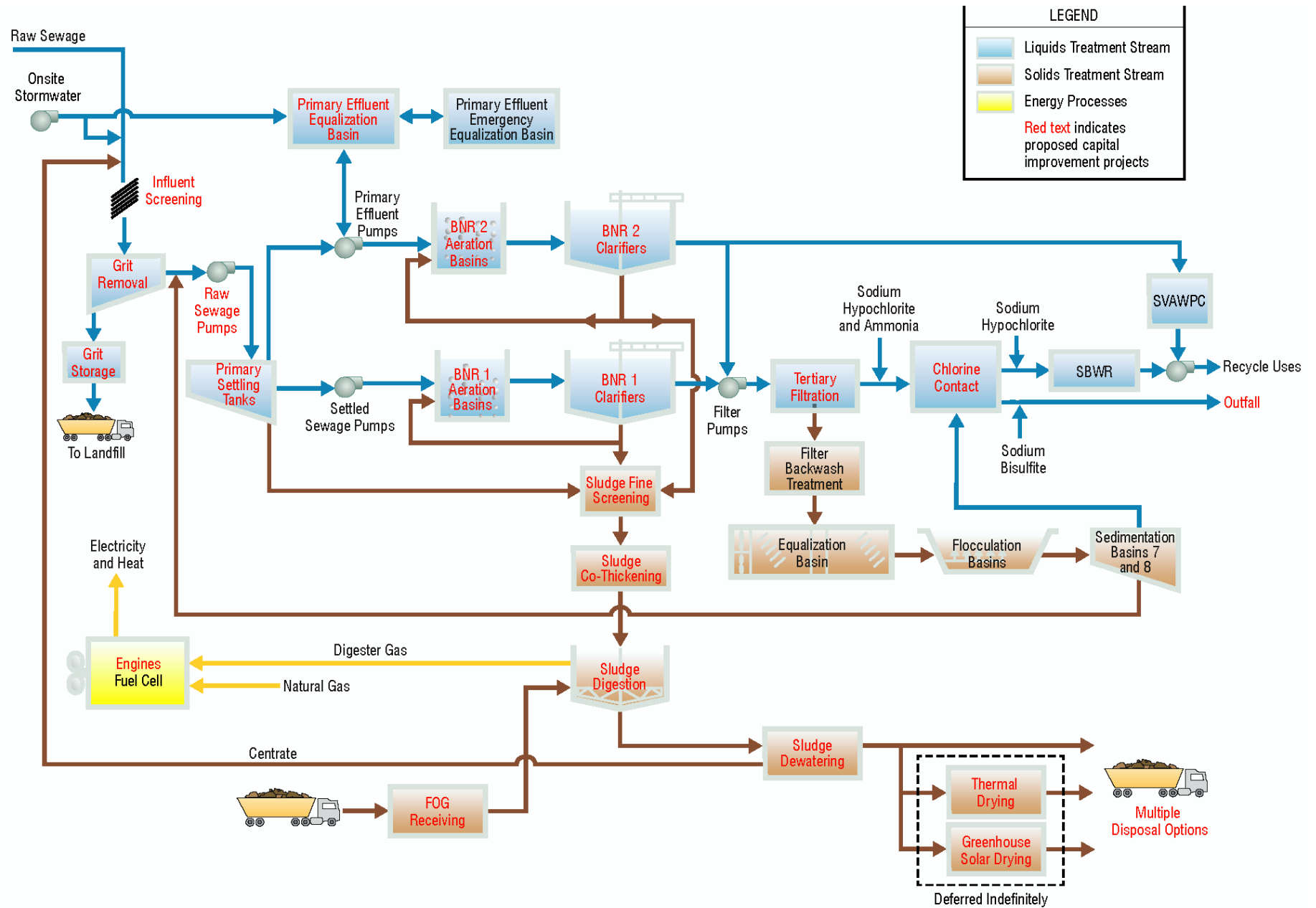


Figure 6 – Proposed Treatment Process Flow Diagram





## Active Construction Projects – Aerial Plan

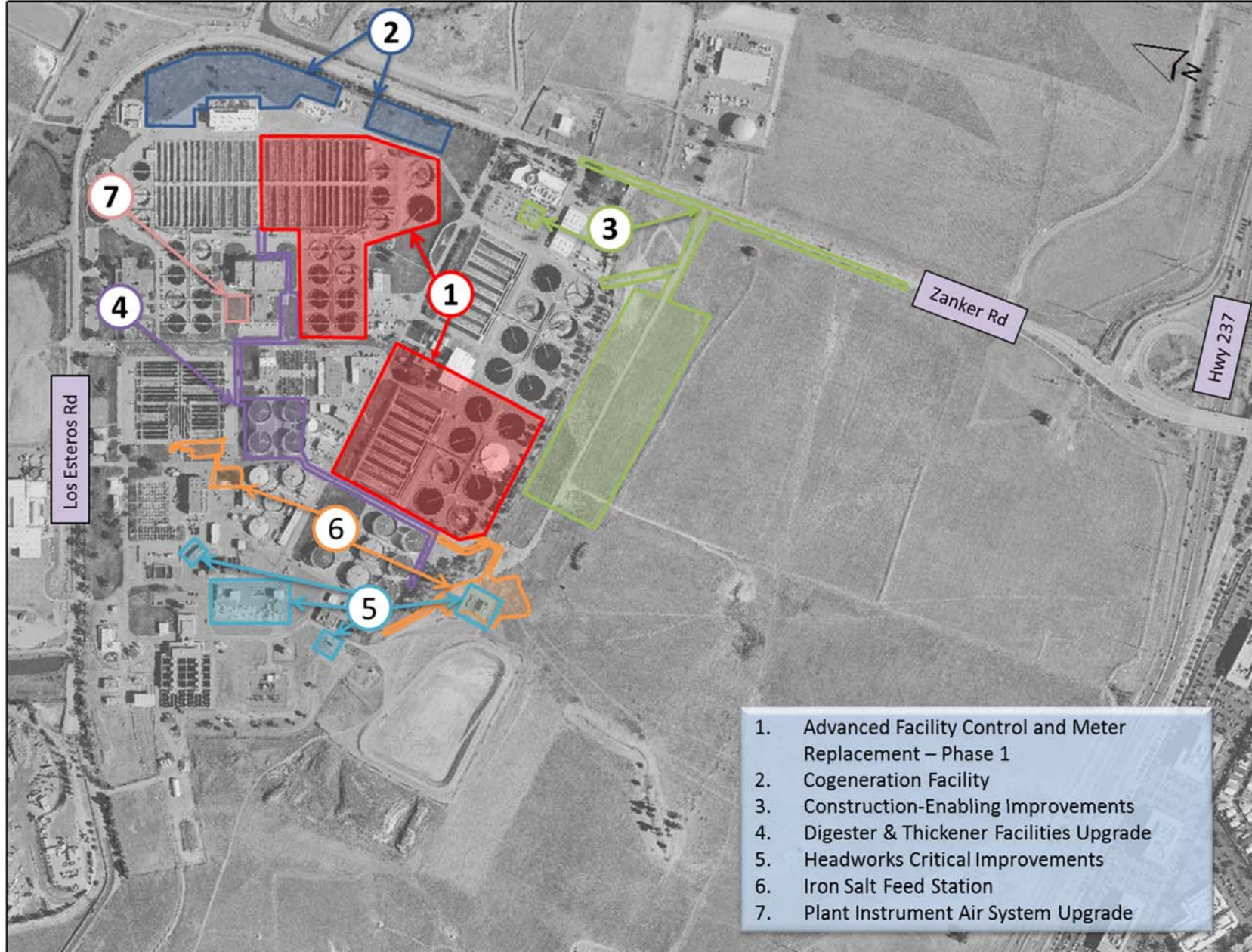


Figure 7: Active Construction Projects

