San José-Santa Clara Regional Wastewater Facility

# Capital Improvement Program
# **Monthly Status Report: May 2017**

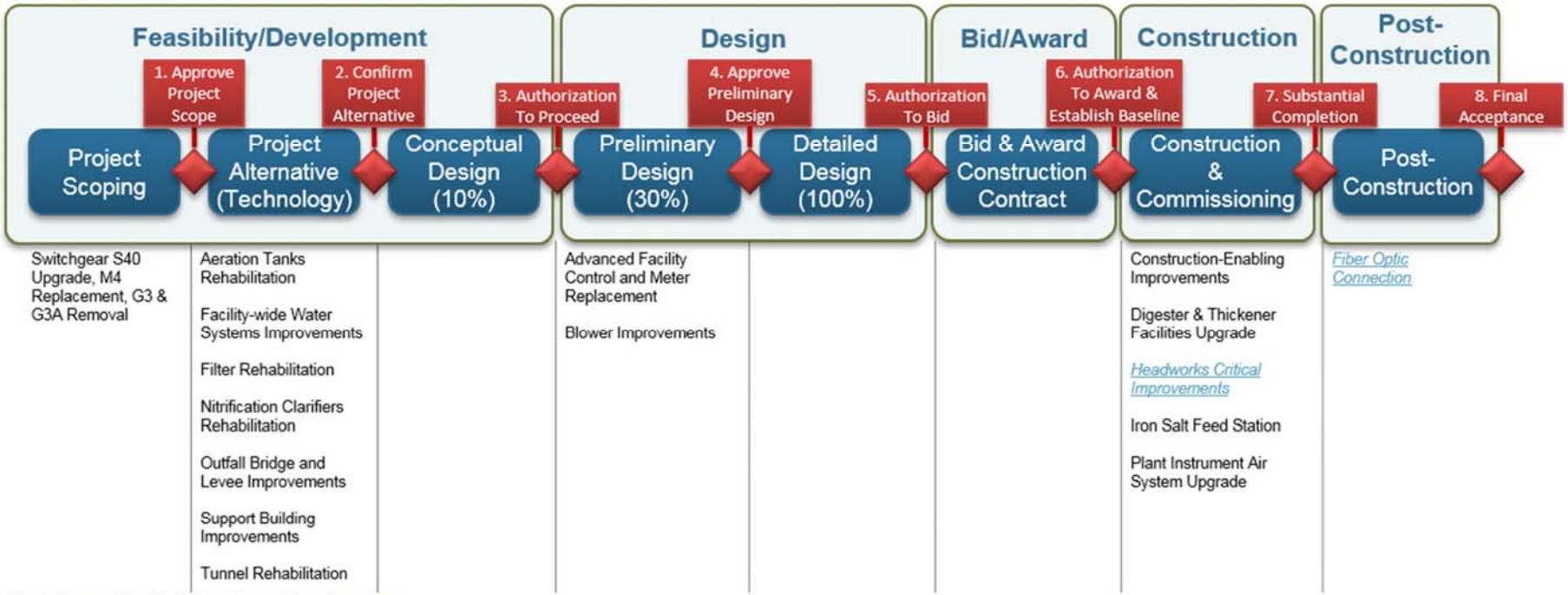
July 6, 2017

This report summarizes the progress and accomplishments of the Capital Improvement Program (CIP) for the San José-Santa Clara Regional Wastewater Facility (RWF) for May 2017.

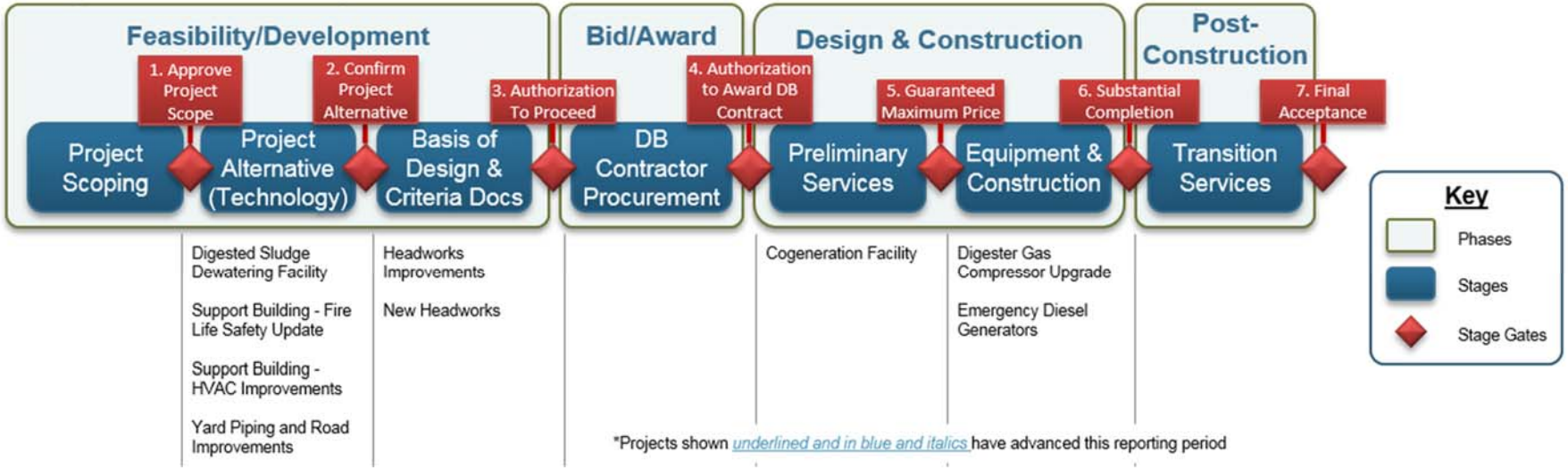
## Report Contents

# Project Delivery Model

## Design-Bid-Build Active Projects




## Design-Build Active Projects




*Projects shown underlined and in blue and italics have advanced this reporting period

# Program Summary

## May 2017

In May, the Headworks Improvements and New Headworks projects advertised a Request for Qualifications (RFQ) to prequalify design-builders. The Cogeneration Facility Project reached the 30 percent design milestone, submitted an air permit application to the Bay Area Air Quality Management District (BAAQMD), and authorized an early work package to procure the internal combustion engines and gas purification equipment. The Fiber Optic Connection Project advanced through the Substantial Completion stage gate. City Council (Council) approved a master consultant agreement (MCA) for on-call industrial hygienist services to SCA Environmental, Inc. and awarded the construction contract for the Headworks Critical Improvements Project to Overaa Construction. Council also accepted the July-December 2016 CIP Semiannual Status Report.

During May, 17 active projects continued to make good progress through the feasibility/development, design and bid/award stages. Alternatives analysis work continued for the Filter Rehabilitation, Nitrification Clarifier Rehabilitation, Facility-wide Water Systems Improvements, Digested Sludge Dewatering, and Aeration Tanks Rehabilitation projects. Of particular note, the Digested Sludge Dewatering project team completed its alternative analysis phase resulting in a recommendation to select dewatering centrifuges as the preferred technology for the new facility. Also of note, the Nitrification Clarifier Rehabilitation Project team completed its alternatives analysis phase and will make recommendations at the next project stage gate to commence the conceptual design stage. Design work also continued on the Advanced Facility Control and Meter Replacement, Blower Improvements, and Cogeneration Facility projects. The Blower Improvements Project team recommended incorporating value engineering changes into the design, which will generate net savings of approximately $3.6 million to bring the project back within budget. Pending approval at the project's next stage gate, the project team will incorporate these changes into the 60 percent design submission planned for completion by September.

Six active construction projects also made significant progress in May. Testing, commissioning, and resolution of punch-list items continued successfully on the Digester Gas Compressor Upgrade and the Emergency Diesel Generators projects. Both projects are scheduled to be completed this summer. Major construction also continued across multiple work areas for the Digester and Thickener Facilities Upgrade, Plant Instrument Air System Upgrade, Construction-Enabling Improvements, and Iron Salt Feed Station projects. Specifically, the contractor for the Iron Salt Feed Station completed installation of the polymer and ferric chloride tanks and mechanical equipment. The contractor will begin commissioning of this project this summer. Staff also continued to coordinate process shutdowns, isolating sections of the RWF to allow construction to continue and utilities to be rerouted as necessary. In particular, extensive efforts are underway to address the many unforeseen conditions encountered during construction of the Digester and Thickener Facilities Upgrade Project. These unforeseen conditions include the discovery of heavily corroded pipelines, multiple utility conflicts, air permit restrictions, and structural change conditions identified during construction. Additionally, unanticipated hazardous materials including asbestos, lead, and polychlorinated biphenyls (PCBs) were identified. These hazardous materials are in the process of being safely removed from the site. Of particular note this month, the project team developed a temporary bypass pumping scheme that will allow repairs on a heavily corroded 78" primary effluent pipeline to be carried out while construction continues during next years' dry season. These unforeseen conditions will likely result in some delay and additional costs to the project. Staff will continue to evaluate the impacts in the coming months and will provide additional updates as more information becomes available.

## Look Ahead

In June, the City anticipates receiving Statements of Qualifications (SOQs) for: 1) owner's advisor services for the Yard Piping and Road Improvements Project; and 2) design-build services for the Headworks Improvements and New Headworks projects. The Tunnel Rehabilitation Project will also advertise an RFQ for design consultant services. The Aeration Tanks Rehabilitation Project will commence condition assessment activities, and the Blower Improvements and Nitrification Clarifiers Rehabilitation projects will seek to advance through the Approve Preliminary Design and Confirm Project Alternative stage gates, respectively. The Headworks Critical Improvements Project team will hold a pre-construction meeting. The contractor for the Emergency Diesel Generators Project will continue testing and commissioning activities, with the project anticipated to reach Beneficial Use in July. The contractor will substantially complete major construction activities on the Construction-Enabling Improvements Project next month.

Also in June, staff will make two recommendations to the Treatment Plant Advisory Committee (TPAC) and City Council: 1) purchase insurance policies as part of a recommended Owner-Controlled Insurance Program (OCIP) for the RWF CIP; and 2) approve and adopt the 2018-2022 RWF CIP Proposed Budget.

In addition, CIP staff will continue to participate in monthly training for project managers. This training gives project managers tools and techniques based on Project Management Institute (PMI) fundamentals, tailored to the CIP. The training includes topics such as project scope, cost, and schedule management; design management; risk and quality management; and permitting. Project management training modules are being repeated to provide consistent training for new staff. In June, training will focus on work breakdown structures and activity sequencing.

## Program Highlight – Health and Safety

The cornerstone of successful CIP delivery is a robust health, safety and security program. Leadership of this program is provided by the Health, Safety and Security Manager (HSSM).

The HSSM works with each of the City's functional departments and individual contractors constructing CIP projects to ensure that all work is conducted in accordance with the requirements of regulating authorities including the State of California OSHA (CalOSHA), the Federal Occupational Safety and Health Administration (OSHA) and other state and federal agencies as appropriate.

**The Role of the HSSM**

As the leader of the program's health, safety and security efforts, the HSSM duties include:

- Administering and updating the CIP Health and Safety Plan (HASP)
- Reviewing all contractors' HASPs
- Conducting routine safety audits against both contractor and CIP HASPs, documenting and tracking findings to closure
- Conducting accident reporting and root cause analyses
- Facilitating and documenting contractor orientation and CIP site safety training
- Producing monthly statistical reports related to safety
- Coordinating health, safety and security issues with CIP staff and O&M, and
- Providing subject matter expertise and advice to staff and contractors with regard to safety issues

**The Health and Safety Plan**

The OSHA and Cal-OSHA require written safety plans for specific workplace activities and for the use of chemicals. The CIP HASP has been prepared to meet these requirements. The HSSM is responsible for the development, implementation and on-going administration of the CIP HASP.

The HASP helps increase employee productivity and morale, prepares employees for special emergencies, and helps maintain workplace security.

The HASP includes:

- A process for identifying physical and health hazards that could harm employees,
- Procedures to prevent accidents, and
- Steps to take when accidents occur.
- The HASP prescribes specific roles, including the key roles of the HSSM.

The HASP is reviewed and updated annually or as necessary to reflect changes in the CIP or regulatory changes. The current version is available on the CIP Portal.

Future HASP goals include implementing OSHA10 training for CIP staff and consultants, and establishing a new safety and security trailer at the Zanker Road entrance.

All contractors delivering projects under the CIP are also required to prepare and submit a site specific HASP. The HSSM is responsible for auditing contractor safety performance based on the contents of their HASP.

Figures 1 and 2 illustrate an example of safety improvements as a result of a field inspection by the HSSM. The HSSM reports on trends by tracking leading indicators that show areas in which incidents may occur or where additional training is needed based on the frequency of safety violations or observations.


**Figure 1: A potentially unstable trench and pipe pose an exposure to injury to the worker in the trench**

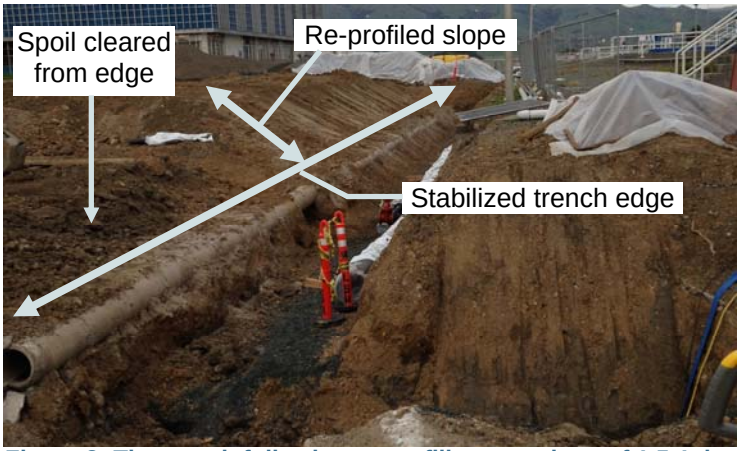



**Figure 2: The trench following re-profiling to a slope of 1.5:1, in accordance with OSHA regulations, minimizes exposure to workers**

## Program Performance Summary

Eight 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.

### Program Key Performance Indicators – Fiscal Year 2016-2017

| KPI | Target | Fiscal Year to Date | | | Fiscal Year End | | |
|---|---|---|---|---|---|---|---|
| | | Actual | Status | Trend | Forecast | Status | Trend |
| **Stage Gates** | 80% | 92%<br>11/12 [1] | ● | ↑ | 93%<br>13/14 [2] | ● | ↓ |
| Measurement: Percentage of initiated projects and studies that successfully pass each stage gate on their first attempt. | | | | | | | |
| **Schedule** | 90% | 50%<br>1/2 | ◆ | → | 50%<br>1/2 [3] | ◆ | ↑ |
| Measurement: Percentage of CIP projects delivered within 2 months of approved baseline Beneficial Use Milestone. [4] | | | | | | | |
| **Budget** | 90% | NA<br>0/0 | ● | → | 100%<br>1/1 | ● | → |
| Measurement: Percentage of CIP projects that are accepted by the City within the approved baseline budget. [4] | | | | | | | |
| **Expenditure** | $186M | $195M | ● | ↑ | $228M | ● | → |
| Measurement: CIP FY16-17 committed costs. Committed cost meets or exceeds 70% of planned Budget. Target: 70% of $266M = $186M. Therefore Green: >=$186M; Amber: $146M to $186M; Red: < $146M | | | | | | | |
| **Procurement** | 80% | 100%<br>6/6 [5] | ● | → | 100%<br>7/7 | ● | → |
| Measurement: Number of consultant and contractor procurements advertised compared to planned for the fiscal year. Target: Green: >=80%; Amber: 70% to 79%; Red: < 70% | | | | | | | |
| **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 | | | | | | | |
| **Staffing** [6] | 80% | 80%<br>16/20 | ● | → | 100%<br>24/24 | ● | → |
| Measurement: Number of planned positions filled for the fiscal year. Target: Green: >=80%; Amber: 70% to 79%; Red: < 70% | | | | | | | |

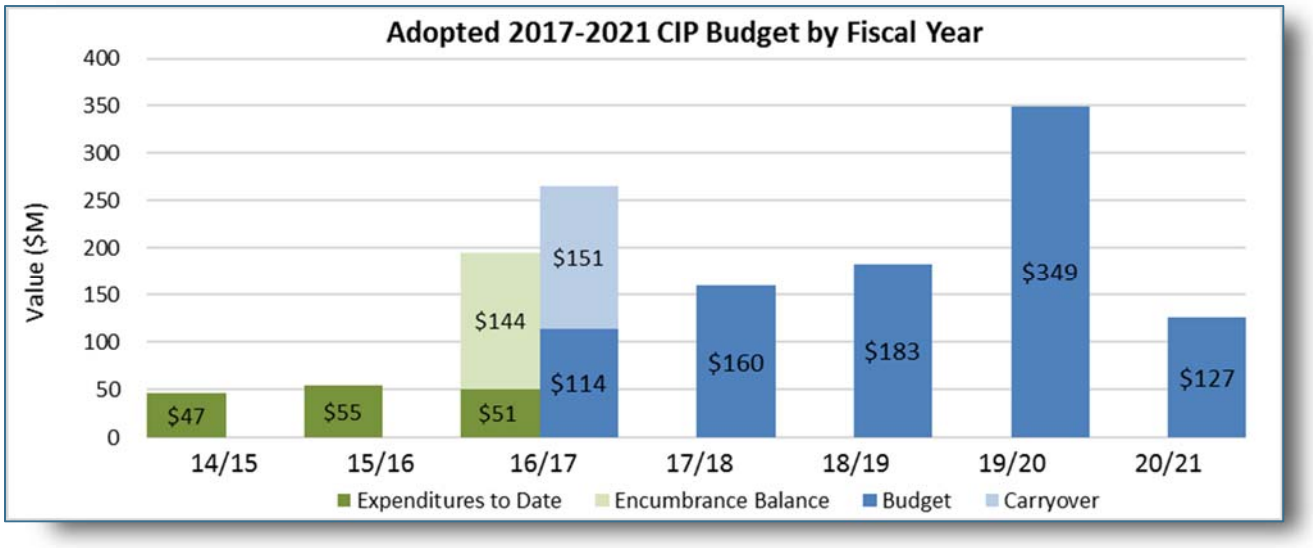
**Notes**

1. The Fiber Optic Connection Project passed Stage Gate 7: Substantial Completion, advancing the project to the Post-Construction stage.
2. The fiscal year-end count has been updated to reflect a decrease in planned stage gates due to project schedule revisions.
3. The Emergency Diesel Generators Project is no longer expected to reach Beneficial Use this fiscal year.
4. The Baseline Beneficial Use Date and the Baseline Budget for a project are established at construction contract award and execution.
5. The City advertised an RFQ for Design-Build Services for the Headworks Improvements and New Headworks projects.
6. The staffing KPI represents CIP recruitments planned for the fiscal year and is measured quarterly. This KPI measurement does not account for staff turnover throughout the fiscal year.

# Program Cost Performance Summary

This section summarizes CIP cost performance for all construction projects and non-construction activities for fiscal year (FY) 16-17 and for the 2017-2021 CIP.

## Adopted 2017-2021 CIP Expenditure and Encumbrances




**Notes**

Expenditure: Actual cost expended, either by check to a vendor or through the City's financial system, for expenses such as payroll or 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.

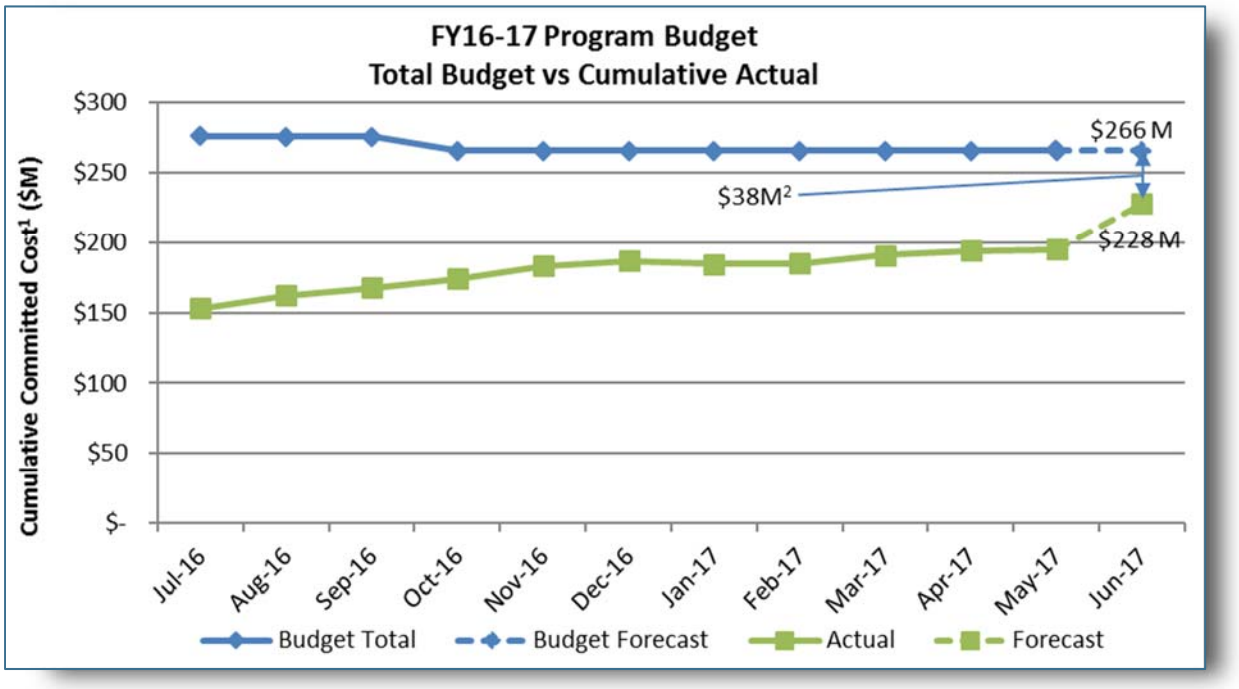
Encumbrance Balance: The amount of the remaining encumbrance committed after payments.

Budget: Adopted 2017-2021 CIP Budget, which is new funding plus rebudgeted funds in FY16-17.

Carryover: Encumbrance balances at the end of a fiscal year become carryover funding. Carryover is different from rebudgeted funds, in that it automatically utilizes funding that was previously committed, but not yet paid.

## Fiscal Year 2016-2017 Program Budget Performance

This budget comprises the FY16-17 budget of $114 million, plus carryover of $151 million. The budget excludes Reserves, Ending Fund Balance, South Bay Water Recycling, Public Art, and Urgent and Unscheduled Rehabilitation items.




**Notes**

1. Committed costs are expenditures and encumbrance balances, including carryover (encumbrance balances from the previous fiscal year).
2. The forecasted variance between budget and expenditures can be primarily attributed to the following factors:
    a. The Blower Improvements Project had originally planned to pre-purchase blower equipment in FY16-17 due to long lead times. However, the equipment will now be furnished through the construction contract, shifting approximately $12 million in estimated expenditures to FY17-18.
    b. The Cogeneration Facility Project had originally planned to issue early work packages for site preparation and design work in FY16-17. Those packages, estimated at $8.2 million, are now forecast to be issued in FY17-18.
    c. Several encumbrances for consultant services are either anticipated to be lower than budgeted or are anticipated to be awarded in FY17-18.
    d. Estimated personal services are anticipated to be under budget. Several authorized positions are currently vacant, resulting in lower than budgeted personal services expenses.
    e. The FY16-17 budget includes three recurring appropriations (Preliminary Engineering, Equipment Replacement, and Plant Infrastructure Improvements) totaling approximately $3.66 million. These appropriations are included in the budget for implementing minor capital improvement projects that may be needed during the fiscal year. As of May 2017, there are no new major expenditures or encumbrances against these appropriations.

## Project Performance Summary

There are currently eight active projects in the construction or post-construction phases, with an additional 17 projects in feasibility/development, design, bid and award, or design and construction (design-build projects) phases (see PDM, page 2). All active projects are listed in the tables below. 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, using CPMS data as a source.

### Project Performance – Baselined Projects

| Project Name | Phase | Estimated Beneficial Use Date[1] | Cost Performance [2] | Schedule Performance[2] |
|---|---|---|---|---|
| 1. Fiber Optic Connection | Post-Construction | Jan 2017[3] | ● | ● |
| 2. Digester Gas Compressor Upgrade | Construction | Apr 2017[3] | ◆ | ◆ |
| 3. Emergency Diesel Generators | Construction | Jul 2017 | ● | ◆ |
| 4. Construction-Enabling Improvements | Construction | Sep 2017 | ● | ◆ |
| 5. Iron Salt Feed Station | Construction | Sep 2017 | ● | ● |
| 6. Plant Instrument Air System Upgrade | Construction | Apr 2018 | ● | ● |
| 7. Headworks Critical Improvements | Construction | Apr 2018[4] | ● | ● |
| 8. Digester and Thickener Facilities Upgrade | Construction | Jul 2020[5] | ● | ◆ |

### 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 12.
3. Actual Beneficial Use date.
4. The project construction Beneficial Use date will be baselined once the contractor submits their construction schedule.
5. The Digester and Thickener Facilities Upgrade Project has been delayed three months due to unforeseen conditions. See page 12 for a detailed explanation of the delay.

## Project Performance – Pre-Baselined Projects

| Project Name | Phase | Estimated Beneficial Use Date[1] |
|---|---|---|
| 1. Cogeneration Facility | Design & Construction | Aug 2019 |
| 2. Blower Improvements | Design | Oct 2020 |
| 3. Adv. Facility Control & Meter Replacement | Design | Jan 2021 |
| 4. Outfall Bridge and Levee Improvements | Feasibility/Development | Oct 2020 |
| 5. Headworks Improvements | Feasibility/Development | May 2021 |
| 6. Switchgear S40 Upgrade, M4 Replacement, G3 & G3A Removal | Feasibility/Development | Dec 2021 |
| 7. Digested Sludge Dewatering Facility | Feasibility/Development | Jul 2022 |
| 8. Filter Rehabilitation | Feasibility/Development | Aug 2022 |
| 9. Support Building - Fire Life Safety Update | Feasibility/Development | Sep 2022 |
| 10. Support Building - HVAC Improvements | Feasibility/Development | Sep 2022 |
| 11. New Headworks | Feasibility/Development | Oct 2022 |
| 12. Facility-wide Water Systems Improvements | Feasibility/Development | Feb 2023 |
| 13. Nitrification Clarifiers Rehabilitation | Feasibility/Development | Sep 2023 |
| 14. Aeration Tanks Rehabilitation | Feasibility/Development | Jul 2025 |
| 15. Tunnel Rehabilitation | Feasibility/Development | Dec 2025 |
| 16. Support Building Improvements | Feasibility/Development | Jan 2026 |
| 17. Yard Piping and Road Improvements | Feasibility/Development | Aug 2026 |

**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 Thickener and Facilities Upgrade

- Contractor Walsh Construction continued the structural rehabilitation of the digesters, which is expected to be completed in the fall. The contractor also began foundation work for the elevated pipe rack that will carry digester gas to the future Cogeneration Facility.
- The project team finalized a temporary bypass pumping plan that will allow repair of the 78" settled sewage pipeline to be carried out next summer while construction continues.

Digested Sludge Dewatering Facility

- Owner's Advisor Brown and Caldwell completed the alternative analysis to select the preferred dewatering technology for the new facility. Using a triple-bottom-line analysis of potential technologies, the project team chose dewatering centrifuges.

## Facilities Package

Cogeneration Facility

- Design-builder CH2M completed the 30 percent design and held a design review workshop.
- The City executed a contract amendment for the first early work package allowing the design-builder to purchase four engine-generators and the gas purification system for approximately $23.6 million.

Construction Enabling Improvements

- Contractor Teichert completed grading and final paving. All road improvements are now substantially complete. Work will continue over the summer to complete the trailer installation.

Fiber Optic Connection

- The project team successfully progressed through Stage Gate 7: Substantial Completion. Staff is closing out the project and anticipates issuing the Notice of Completion and Acceptance in the next two months.

Facility-wide Water Systems Improvement

- Design consultant Kennedy/Jenks completed the field testing verification and hydraulic model calibration plans. This summer, the consultant will perform a field test to verify the water systems operation and allow calibration of the hydraulic model. In June, Kennedy/Jenks will issue a technical memorandum detailing the results of the condition assessment work for City review.

Yard Piping and Roads Improvements

- The City held a non-mandatory site conference for consultants interested in responding to the Owner's Advisor RFQ. Staff anticipates awarding the Owner's Advisor agreement this fall.

## Liquids Package

Blower Improvements

- The project team met with design consultant Brown and Caldwell and O&M staff to select the value engineering concepts to incorporate into the design, to keep the project within budget. The net savings of the selected concepts is estimated to be $3.6 million. Pending approval during the project's next stage gate, Brown and Caldwell will incorporate the changes.

Filter Rehabilitation

- The project team held an alternative analysis workshop to select the long-range alternative for tertiary filtration, which will be constructed under a separate, future capital project. The alternatives to either continue using multi-media filtration in the existing filter building or move to a cloth disc filtration system in a new filter building scored similarly. The project team is recommending to pilot test different cloth disc filters to collect more information to determine the best long-term filtration approach.

Headworks Critical Improvements

- Council awarded a $1,499,000 construction contract to Overaa Construction. Construction is expected to commence in late June.

Iron Salt Feed Station

- Contractor Anderson Pacific completed installation of the polymer and ferric chloride tanks and mechanical support equipment, including pumps and piping. Startup and commissioning is expected to begin in August.

Headworks Improvements and New Headworks

- The project team advertised the design-build RFQ. The RFQ conference is scheduled for early June, and SOQs are due at the end of the month.

## Studies and Programwide Services

Flow Management Study

- Program Management consultant, Stantec, completed the preliminary calibration of the RWF hydraulic model. In June, City staff will review the calibration report and model results.
- The consultant also completed the draft report and submitted it for City review.

# Explanation of Project Performance Issues

## Construction-Enabling Improvements

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

Teichert estimates that trailers required for the project will be delivered in August. Installation and furnishing of the trailers, plus final inspection, should take another three to four weeks to complete, placing the Beneficial Use date in early September 2017.

## Digester and Thickener Facilities Upgrade

Numerous unforeseen conditions are impacting the project schedule. The conditions, detailed below, are resulting in an estimated delay to the Beneficial Use date of three months. The project team continues to evaluate the schedule delays.

- Major corrosion of an existing below ground 78-inch settled sewage (SES) pipeline and junction structure was encountered during construction. This has impacted the piping connections of the dissolved air floatation thickener (DAFT) tanks, two new pressurization flow boxes and utility relocation work. All repairs have been postponed until the 2018 dry season when a bypass pumping system can be safely installed to allow repair work to continue.
- An unidentified 36-inch biochemical oxygen demand pipe was discovered during preparation of the foundation for the new sludge screen building. The contractor had to remove this pipe and also relocate a number of unforeseen digester gas and landfill gas drain vaults and associated piping.
- Multiple unforeseen utility conflicts with water, natural gas, digester gas, landfill gas, storm drain, and sanitary sewer pipelines have impacted progress. These conflicts have caused multiple utility pipe, conduit, and duct bank relocations across the site, and also impacted the new digester gas pipe rack footings, causing rerouting and other design changes.
- Digesters 5-8: Polychlorinated biphenyl (PCBs) were discovered in the digester caulking requiring mitigation; inoperable pressure release valves have required relocation; excessive concrete on top of foundations, and unforeseen wire mesh in the gunite layer encompassing the existing digesters have also affected construction.
- Digester Gas bypass work has been delayed approximately 6 months due to BAAQMD restrictions on venting. This work is now expected to commence in the fall.

## Digester Gas Compressor Upgrade

This project is over budget by approximately 3 percent due to higher than anticipated project delivery costs associated with increased construction inspection requirements and an extended project timeline.

The contractor achieved Beneficial Use last month, but was delayed primarily due to the following factors:

- The compressor skids needed to be reclassified from Class 1 Division 2 to Class 1 Division 1. This issue was resolved in May 2015.
- BAAQMD delayed approval of the digester gas flaring during the tie-in of the new gas piping. This issue was resolved in November 2016.
- Functional testing of the automation system has taken longer than anticipated.
- There are conflicting process shutdowns with other projects.

## Emergency Diesel Generator

The schedule shows a delay in the project completion of approximately one year from the Notice to Proceed completion date. The City granted an additional 179 working days be added to the schedule through the change order process, due to additional scope. The project continues to be late due to the following factors:

- Caterpillar, the supplier of the emergency diesel generator system, encountered delays in developing the controls and network switches that interface with existing RWF controls. Caterpillar and Peterson Control are in the process of completing all outstanding items. A problem was found with the new network switches during the factory acceptance test. The City and the design-build team completed an engineering study and found a solution to the problem. Additional switches have been installed for the existing network system. Caterpillar's completion of the Level 2 process load tuning testing for four new emergency diesel generators also took longer than anticipated.
- Additional time was required for PG&E to review the third-party report on the testing of the protective devices and schedule the witness test for the new emergency diesel generators. PG&E has now completed this work.
- A no-cost time extension change order was required to split the commissioning sequence into two phases and ensure RWF backup power during engine modification work. The contractor completed Phase 1 of the project, which includes modifications to the existing EG1 engine, an eight-hour load test for the four new generators, and the installation of the

fueling system and the diesel exhaust fluid system. Phase 2 includes an upgrade to the existing EG2 and EG3 engines and M4 switchgear, and is underway. The project team expects to reach Beneficial Use by July.

## Project Profile – Headworks Critical Improvements

The headworks provide the initial, preliminary treatment of raw sewage that enters the RWF from sewage collection systems. This preliminary treatment removes inorganic material such as sticks, stones, grit, and sand from the influent wastewater stream to protect and reduce wear on the downstream process equipment, and to enhance process performance.

As part of the CIP, the aging Headworks 1 (HW1), which currently serves as the dry-weather headworks, will be replaced by a new Headworks 3 (HW3) (New Headworks Project), while the existing Headworks 2 (HW2) will continue to serve, with improvements, as the wet-weather and backup headworks (Headworks Improvement Project). However, as construction of HW3 will take several years, critical improvements are required to HW2 to ensure that the existing systems continue to function reliably and safely until HW3 is operational.

The first critical improvement will remove and replace the two existing single-rake bar screens at HW2 with two new multi-rake bar screens to improve operational reliability. Multi-rake screens are much more reliable than the older single-rake screens because they provide continuous raking action as opposed to the single rake system that takes minutes to complete a single revolution. This additional time between raking the bar screen clean allows debris to build up and potentially plug the screens. The control panels for all three screens will also be upgraded to accommodate the latest National Fire Protection Association 820 electrical regulations and will be compatible with the RWF Distributed Control System (DCS) platform.

The second critical improvement will replace two existing gate actuators and gate nut/stem systems at the Emergency Basin Overflow Structure (EBOS). The EBOS gates direct the raw sewage flow that enters the RWF from the collection system into HW1 and HW2 and are critical to properly controlling the varying flows that enter the RWF on a daily and seasonal basis.

The third critical improvement will address an outstanding safety issue unique to HW2. Currently, local control panels for the HW2 gate actuators are fed with both 480-volt and 120-volt power; however, the local disconnect switches shut off only the 480-volt power and the 120-volt power feed has to be isolated separately from a different location. To resolve a potentially unsafe condition for O&M staff, the disconnect switches will be modified so that a single switch shuts off both the 480-volt and 120-volt power.

Council awarded a $1,499,000 construction contract to Overaa & Co. on May 23, 2017. Staff expects to issue the Notice to Proceed to the contractor in late June. Construction is scheduled to be completed in the second quarter of 2018.


**Figure 3: RWF facilities that will be impacted by the Headworks Critical Improvements Project**

**Figure 4: HW2 existing bar screens showing the two single rake bar screens on the right that will be replaced with new multi-rake bar screens, similar to the screen on the left.**

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# Regional Wastewater Facility Treatment – Current Treatment Process Flow Diagram

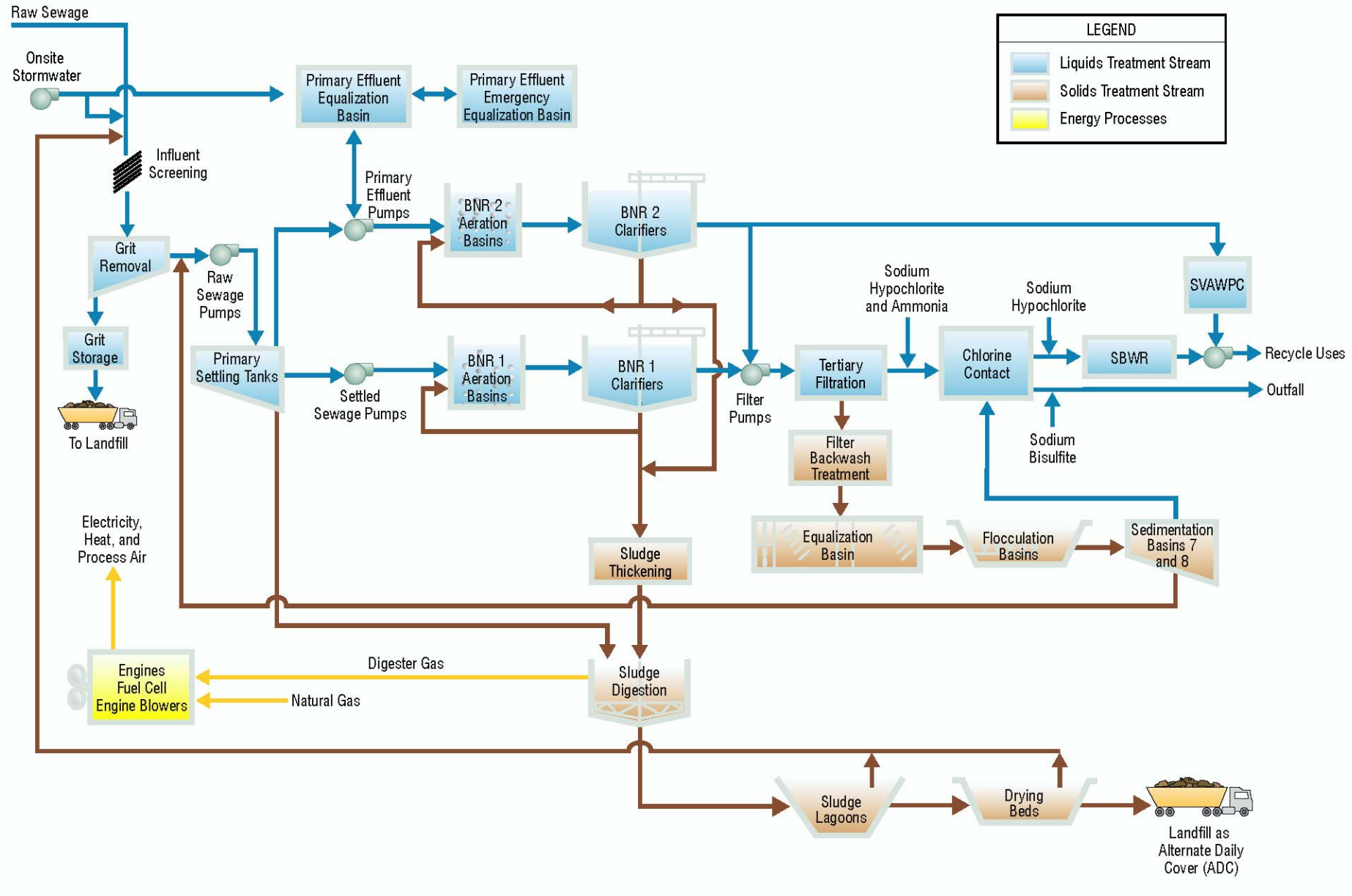


**Figure 5 – Current Treatment Process Flow Diagram**

# Regional Wastewater Facility Treatment – Proposed Treatment Process Flow Diagram

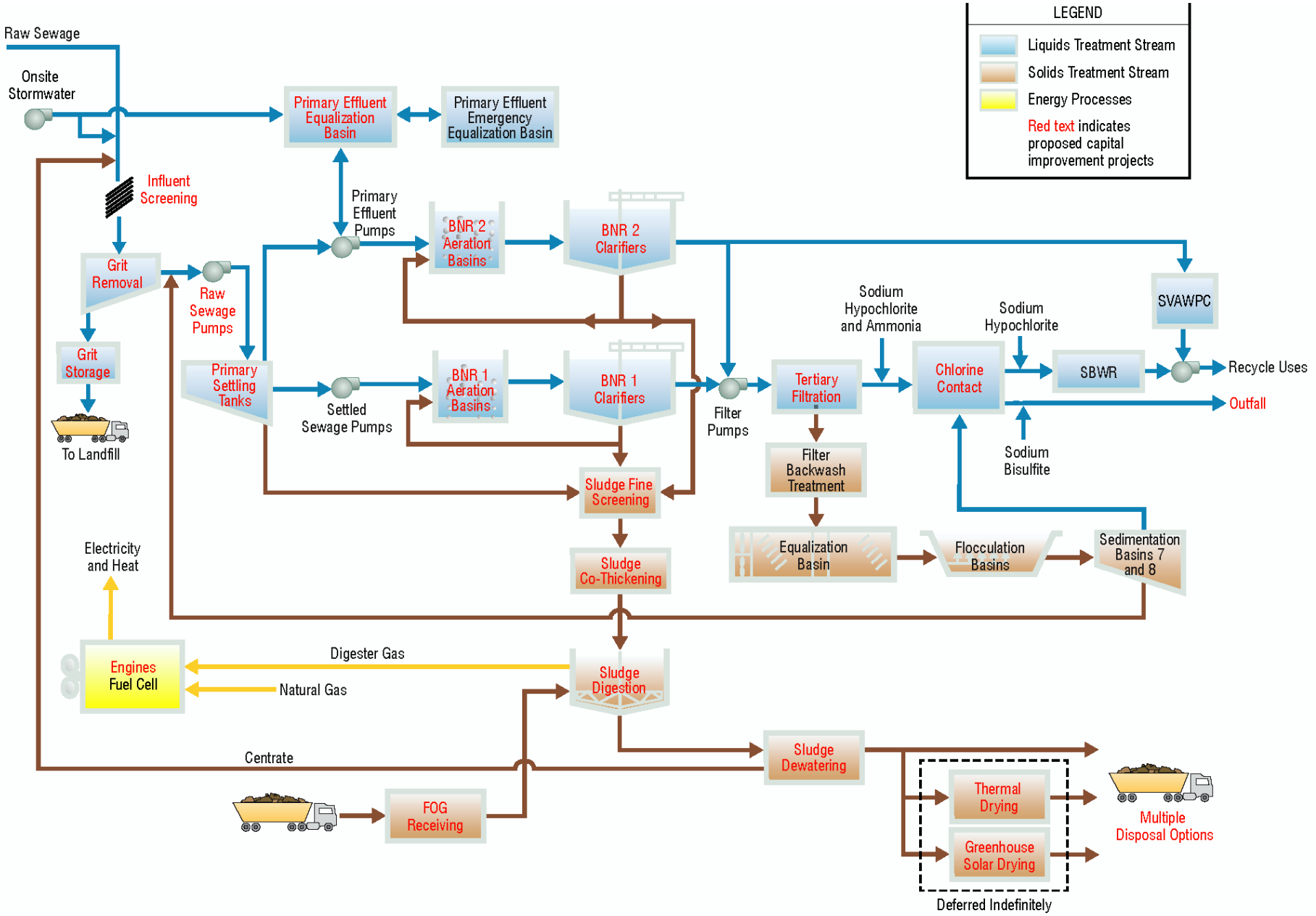


**Figure 6 – Proposed Treatment Process Flow Diagram**

## Active Construction Projects – Aerial Plan

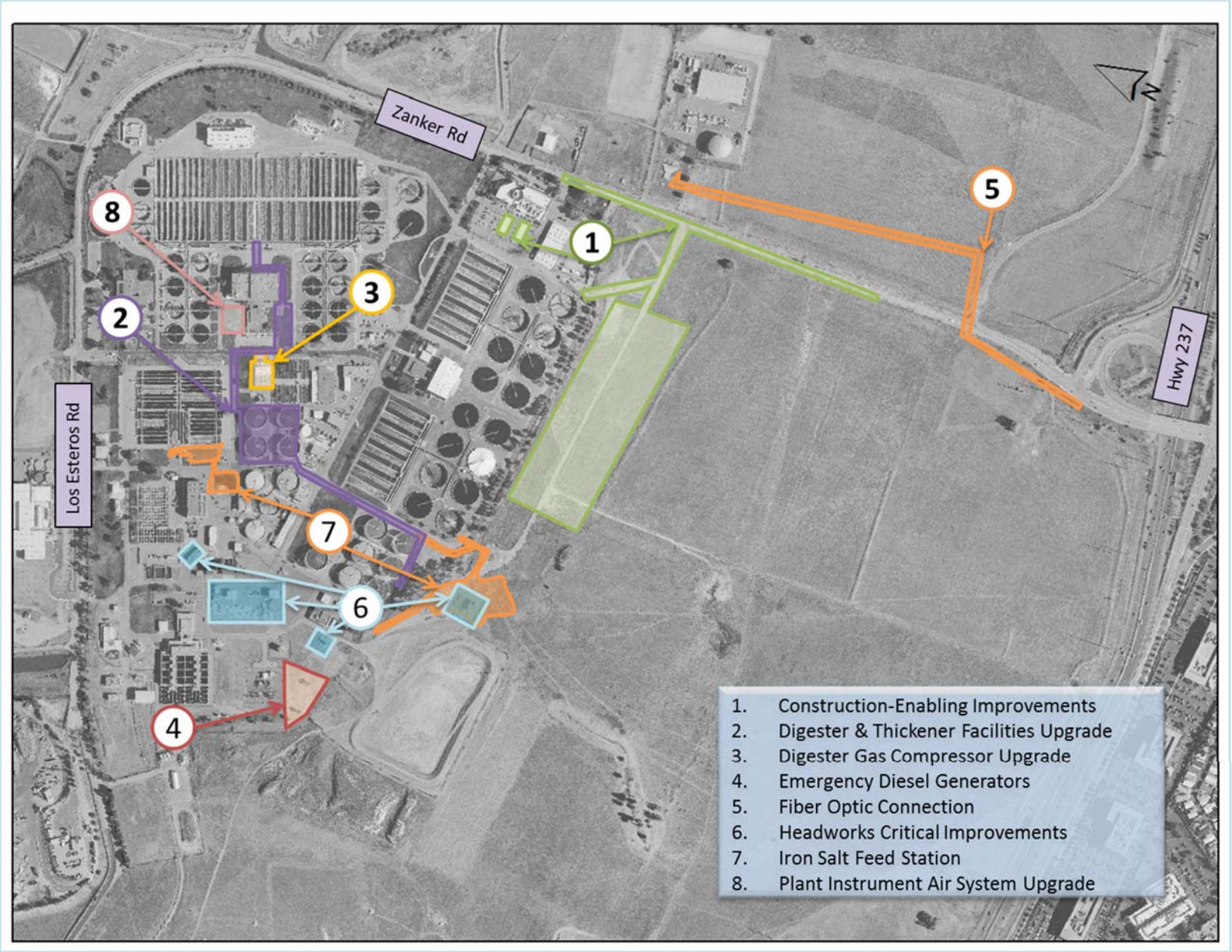


**Figure 7 – Active Construction Projects**