San José-Santa Clara Regional Wastewater Facility

Capital Improvement Program

Monthly Status Report: May 2019

July 5, 2019

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 2019.

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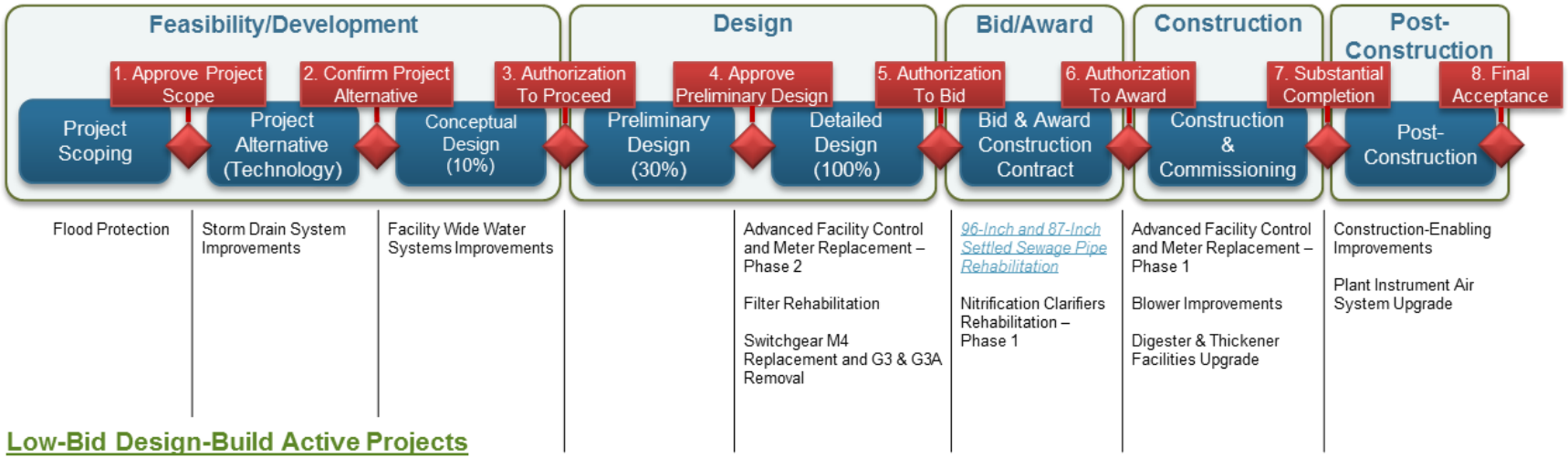
Project Delivery Models

Design-Bid-Build Active Projects



Flood Protection

Storm Drain System Improvements

Facility Wide Water Systems Improvements

Advanced Facility Control and Meter Replacement – Phase 2

Filter Rehabilitation

Switchgear M4 Replacement and G3 & G3A Removal

96-Inch and 87-Inch Settled Sewage Pipe Rehabilitation

Nitrification Clarifiers Rehabilitation – Phase 1

Advanced Facility Control and Meter Replacement – Phase 1

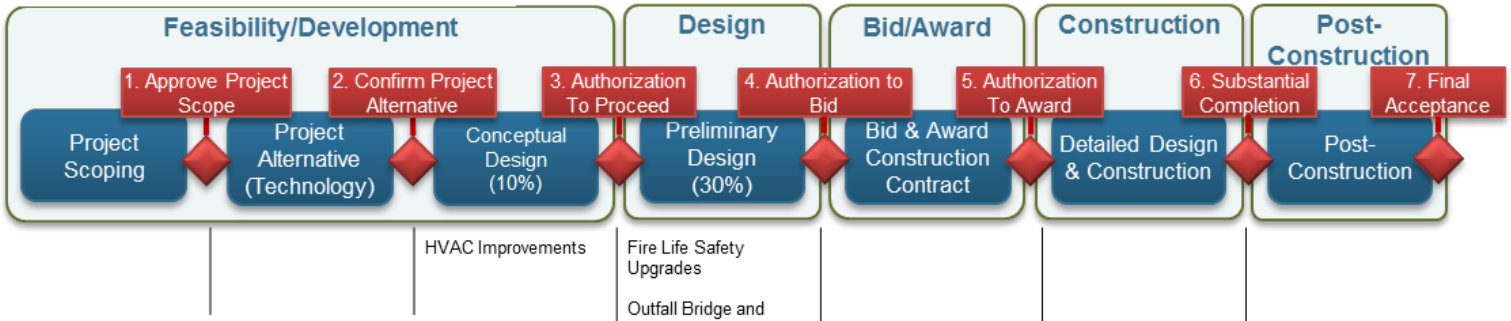
Blower Improvements

Digester & Thickener Facilities Upgrade

Construction-Enabling Improvements

Plant Instrument Air System Upgrade

Low-Bid Design-Build Active Projects

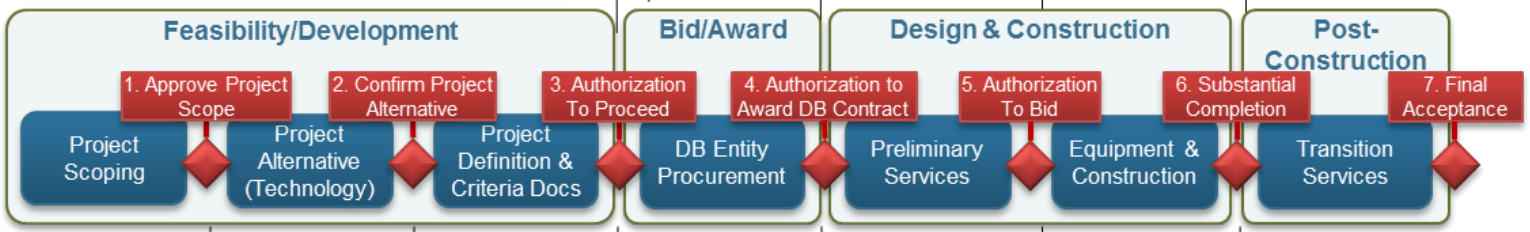


HVAC Improvements

Fire Life Safety Upgrades

Outfall Bridge and Instrumentation Improvements

Progressive Design-Build Active Projects

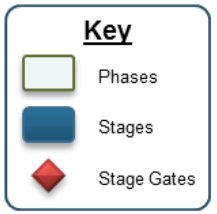


Yard Piping and Road Improvements

Digested Sludge Dewatering Facility

Headworks

Cogeneration Facility



*Projects shown *underlined and in blue and italics* have either been initiated or advanced this reporting period

Program Summary

May 2019

In May, the 96-Inch and 87-Inch Settled Sewage Pipe Rehabilitation Project passed Stage Gate 5: Authorization to Bid of the Project Delivery Model (PDM). The project will repair two critical, large-diameter pipes that convey primary effluent to the secondary treatment process. The project team anticipates advertising the project in July and opening bids in August.

The City advertised the Nitrification Clarifiers Rehabilitation – Phase 1 Project for bid and held two mandatory bid meetings for prequalified contractors. Bids will be opened in early July.

The contractor on the Digester and Thickener Facilities Upgrade Project completed seismic ring beam concrete placement on Digesters 5 and 6, with a single lift remaining to be poured on Digesters 7 and 8. The contractor also completed the final mitigation of polychlorinated biphenyl (PCB)-impacted concrete on Digester 7's internal joints. The recently installed digester gas stainless steel pipeline was successfully pressure tested.

The Cogeneration Facility Project design-builder installed column anchors in the main generator building in preparation for installing the bridge crane columns and rails. Concrete slabs were poured for the gas treatment and cooling towers and chillers with preparation work continuing for the electrical and mechanical building.

Figure 1: Digesters 5-8 showing ring beam construction

On the Blower Improvements Project, the City approved the blower motor submittal and continued reviewing other major electrical submittals for the reduced voltage starters and variable frequency drives. The contractor started demolition of existing structures in two of the three blower buildings.

The contractor for the Advanced Facility Control and Meter Replacement – Phase 1 Project began installing new flowmeters, control valves, and associated piping in the Battery B secondary tunnels and returned activated sludge meter vaults.

On the Headworks Project, the design-builder submitted the 30 percent design and cost estimate, both of which are under review by the project team and owner's advisor. The design-builder also started early subsurface investigation work.

On the Digested Sludge Dewatering Facility Project, the project team concluded negotiations with the top-ranked firm on the preliminary services contract. The project team anticipates TPAC and Council approval to award the design-build contract in September 2019 and expects to return with a not-to-exceed guaranteed maximum price (GMP) in February 2021.

The Filter Rehabilitation Project design consultant commenced 90 percent design. The Yard Piping and Road Improvements Project team and Operations and Maintenance (O&M) began planning for the condition assessment of several pipelines over the summer dry weather period. The Outfall Bridge and Instrumentation Improvements Project design consultant commenced the 30 percent design.

Look Ahead

The following key activities are forecast for June and July 2019:

- The City will open bids for the Nitrification Clarifiers Rehabilitation – Phase 1 Project.
- The City will advertise the 96-Inch and 87-Inch Settled Sewage Pipe Rehabilitation Project construction contract.
- The City will advertise the Advanced Facility Control and Meter Replacement – Phase 2 and Filter Rehabilitation projects' contractor pre-qualification documents.
- The CIP will hold stage gates for projects, including:
    - Construction Enabling Improvements Project – Stage Gate 7: Substantial Completion;
    - Storm Drain Systems Improvements Project – Stage Gate 2: Confirm Project Alternative; and
    - Digested Sludge Dewatering Facility – Stage Gate 4: Authorization to Award DB Contract.
    - HVAC Improvements – Stage Gate 2: Confirm Project Alternative
- The Cogeneration Facility Project will install the main generator building roof beams and gantry crane.
- The City will issue Notices of Completion and Acceptance for the Construction-Enabling Improvements and Plant Instrument Air System Upgrade projects.

Program Highlight – Project Delivery Model

As the CIP consists of multiple individual projects, a Project Delivery Model (PDM) is used to ensure that each project is delivered in a consistent manner. The PDM consists of the following key components:

- **Project Phases**: A series of discrete phases laid out in chronological order and aligned with the City budget cost breakdown structure.
- **Project Stages**: Each phase is divided into one or more stages each of which is broken down into individual activities with key deliverables and supporting procedures and templates listed.
- **Governance Framework**: Approval stage gates between each PDM stage that confirm project alignment with CIP mission, vision and objectives.

The PDM was initially developed as part of CIP startup in early 2014 for both design-bid-build (DBB) and low-bid design-build (LBDB) delivery methods. Since that time, the PDM has been updated to add delivery methods for studies and progressive design-build. The program team are currently in the process of issuing the latest version of the PDM which includes updates to terminology and is shown in Figure 2 below. The process for procuring a construction contractor varies depending on the delivery method employed (refer to Monthly Status Report: April 2019).

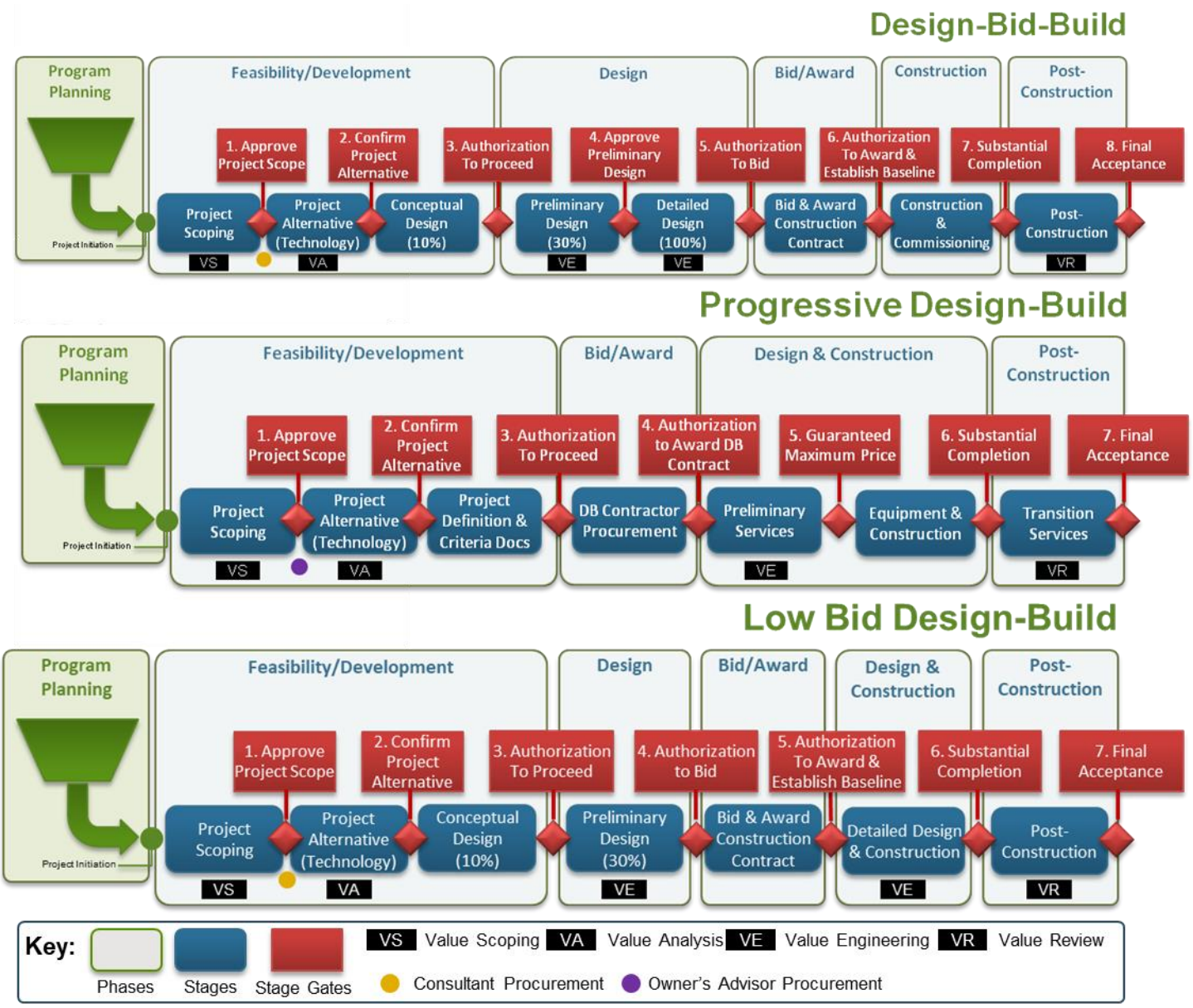


Figure 2: Latest CIP Project Delivery Model

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 2018-2019

KPI	Target	Fiscal Year to Date			Fiscal Year End		
		Actual	Status	Trend	Forecast	Status	Trend
Stage Gates	90%	94% 16/17[1]	●	↑	95% 19/20	●	→
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%	33% 1/3	◆	→	33% 1/3	◆	→
Measurement: Percentage of CIP projects delivered within 2 months of approved baseline Beneficial Use Milestone.[2] Target: Green: >= 90%; Amber: 75% to 89%; Red: < 75%							
Budget	90%	100% 2/2	●	→	75% 3/4	▲	→
Measurement: Percentage of CIP projects that are accepted by the City within the approved baseline budget.[2] Target: Green: >= 90%; Amber: 75% to 89%; Red: < 75%							
Expenditure	$250M[3]	$273M[3]	●	↓	$278M[4]	●	↓
Measurement: CIP FY18-19 committed costs. Target: Committed cost meets or exceeds 70% of planned Budget. 70% of $358M = $250M. Therefore Fiscal Year End Green: >=$250M; Amber: $197M to $250M; Red: < $197M							
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%	19% 16/83[6]	▲	↓	11% 9/83	▲	→
Measurement: Ratio of the number of vacant approved positions to approved positions. Target: Green: <= 10%; Amber: 10% to 20%; Red: > 20%							

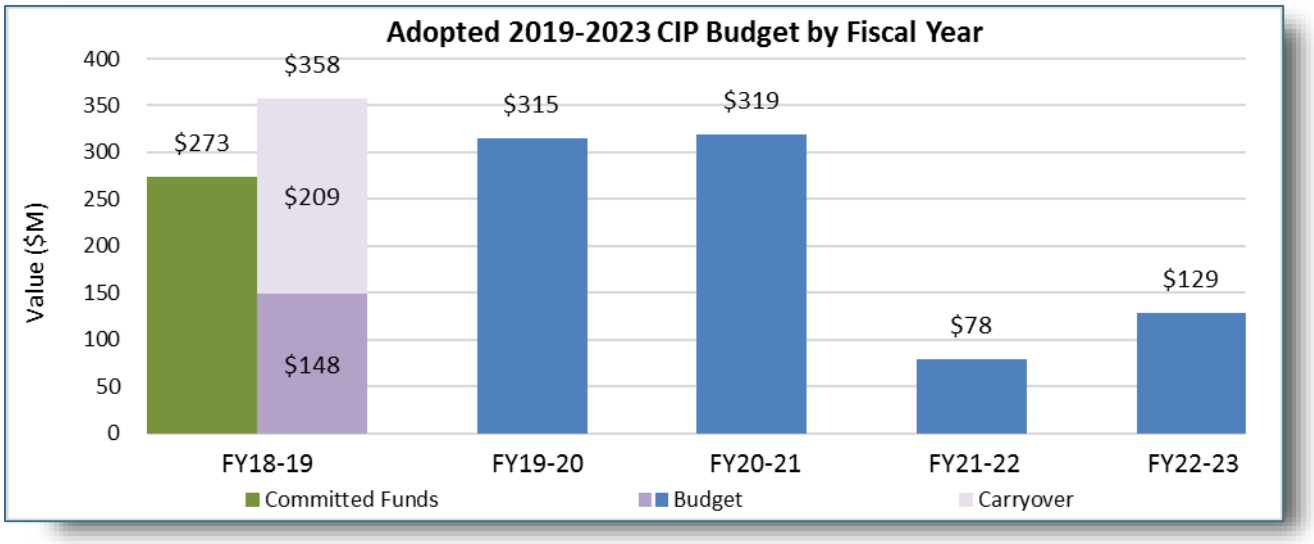
Notes

1. The 96-Inch and 87-Inch Settled Sewage Pipe Rehabilitation Project passed Stage Gate 5: Authorization to Bid.
2. The baseline Beneficial Use date and the baseline budget for each project are established at construction contract award and execution.
3. The expenditure Target and Fiscal Year to Date committed funds decreased due to the liquidation of carryover.
4. The forecasted fiscal year-end expenditure decreased due to revised encumbrance timing and liquidated carryover reducing encumbrances.
5. The Vacancy Rate KPI measures CIP-approved positions (ESD and Public Works) and program management consultant full-time staff.
6. The CIP vacancy count decreased by one.

Program Budget Performance Summary

This section summarizes the cumulative monthly budget performance for fiscal year (FY)18-19 based on the Adopted 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.

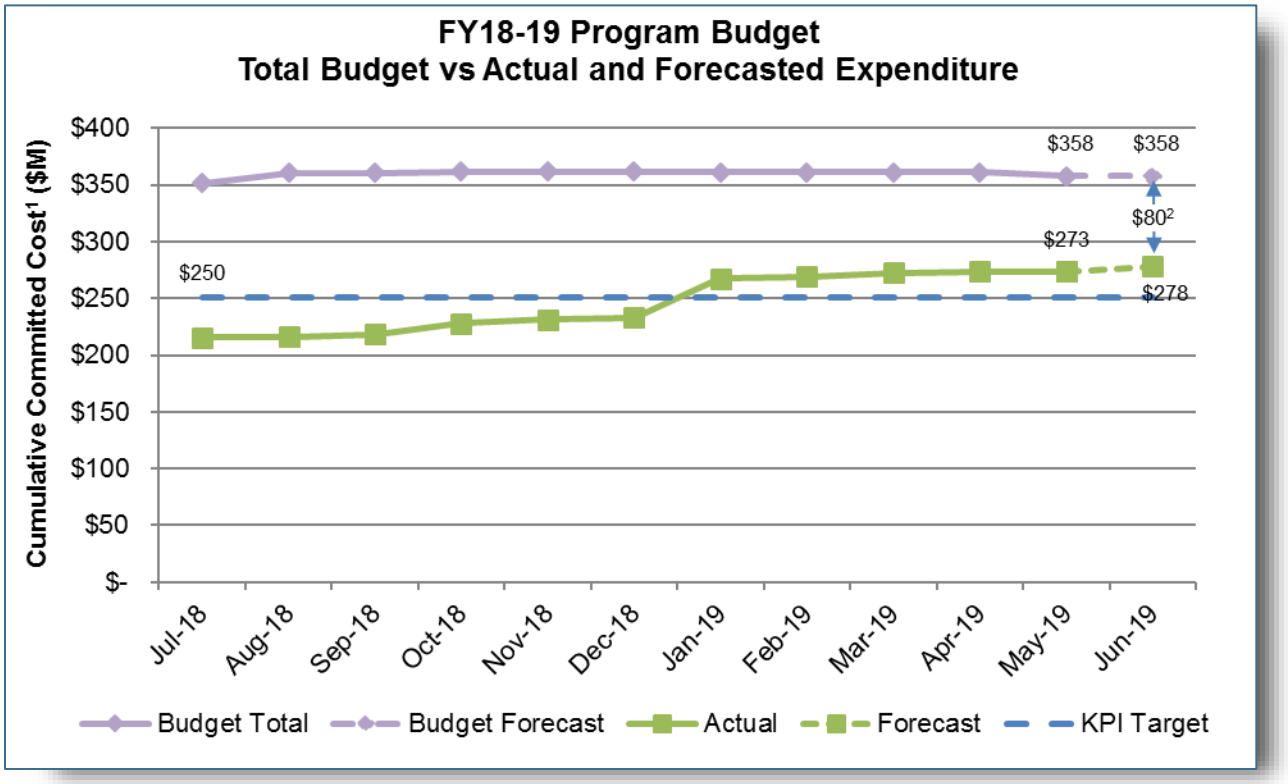
The FY18-19 budget is $185 million, which consists of $131 million in new funds and $54 million in rebudgets. For purposes of this monthly report, the adopted FY18-19 budget is adjusted from $185 million to $148 million due to the exclusion of certain appropriations that are not measured as part of the 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; Public Art; SBWR Extension; State Revolving Fund Loan Repayment; and Urgent and Unscheduled Treatment Plant Rehabilitation. Similar adjustments have been made to the budgets for FY19-20 through FY22-23.

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 $209 million.

Budget of $148.3 million and carryover of $209.4 million totals $358 million for FY18-19.

Fiscal Year 2018-2019 Program Budget Performance

The FY18-19 CIP budget is comprised of approximately $148.3 million in new funds, plus encumbered carryover of $209.4 million, for a total of $358 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; Public Art; SBWR Extension; State Revolving Fund Loan Repayment; and Urgent and Unscheduled Treatment Plant Rehabilitation items. Overall, the forecasted fiscal year-end committed funds exceed the fiscal year-end target by $25 million.



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. Two 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. Switchgear M4 Replacement and G3 & G3A Removal 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 Digested Sludge Dewatering Facility Project preliminary services contract and associated owner's advisor services are now anticipated to be awarded in FY19-20.
    d. The Digester and Thickener Facilities Upgrade Project design consultant services amendment is now expected to be executed in FY19-20.
    e. The Blower Improvement Project construction bids came in under budget.
    f. Several other minor encumbrances for consultant services are either lower than budgeted or are anticipated to be awarded in FY19-20.
    g. Several authorized positions remain vacant, resulting in lower predicted personal services expenses than budgeted.
    h. The FY16-17 payment budgeted for the annual Owners Controlled Insurance Program premium covered the period through FY17-18. Funds rebudgeted from FY17-18 will be programmed in FY19-20.

Project Performance Summary

There are currently six projects in the construction and post-construction phases and an additional 14 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

Project Name	Phase	Estimated Beneficial Use Date[1]	Cost Performance[2]	Schedule Performance[2]
1. Construction-Enabling Improvements	Post-Construction	Aug 2018[3]	●	◆
2. Plant Instrument Air System Upgrade	Post-Construction	Nov 2018[3]	◆	◆
3. Cogeneration Facility	Design & Construction	Sep 2020	●	●
4. Digester and Thickener Facilities Upgrade	Construction	Nov 2020	◆	◆
5. Advanced Facility Control & Meter Replacement - Phase 1	Construction	June 2021	●	●
6. Blower Improvements	Construction	Sep 2022	●	●

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 pages 11 and 12.
3. Actual Beneficial Use date.

Project Performance – Pre-Baselined Projects

Project Name	Phase	Estimated Beneficial Use Date[1]
1. 96-Inch and 87-Inch Settled Sewage Pipe Rehabilitation	Bid/Award	Oct 2020
2. Digested Sludge Dewatering Facility	Bid/Award	Jan 2023
3. Nitrification Clarifiers Rehabilitation – Phase 1	Bid/Award	Oct 2023
4. Outfall Bridge and Instrumentation Improvements	Design	Dec 2021
5. Switchgear M4 Replacement and G3 & G3A Removal	Design	Feb 2022
6. Advanced Facility Control & Meter Replacement - Phase 2	Design	Nov 2022
7. Fire Life Safety Upgrades	Design	Nov 2022
8. Headworks	Design and Construction	Dec 2022
9. Filter Rehabilitation	Design	Apr 2023
10. HVAC Improvements	Feasibility/Development	Mar 2023
11. Storm Drain System Improvements	Feasibility/Development	May 2023
12. Flood Protection	Feasibility/Development	Jul 2023
13. Facility Wide Water Systems Improvements	Feasibility/Development	Aug 2024
14. Yard Piping and Road Improvements	Feasibility/Development	Nov 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.

Project Significant Accomplishments

Biosolids Package

Digested Sludge Dewatering Facility

- The City concluded negotiations with the top-ranked design-build firm for preliminary services. The project team anticipates going to Council for contract approval in September 2019.
- Environmental subconsultant ESA completed the project's Environmental Impact Report addendum and submitted it to the City's Planning Department for review.

Digester and Thickener Facilities Upgrade

- Contractor Walsh Construction conducted a successful pressure test of the recently installed digester gas stainless steel pipe from the remote digesters to a new temporary connection near the existing flare.
- Walsh completed the final mitigation of PCB-impacted concrete at the 13 internal joints on digester 7. All PCB-impacted waste materials have been transported off-site to landfills approved for this purpose.
- Walsh excavated the digester load center foundation and completed backfill; installed conduits in the east electrical building; completed T-lock installation and testing at digester 8; completed digester 5 and 6 ring beam concrete placement; and completed concrete pours for the polymer tank and pumps foundations.

Facilities Package

96-Inch and 87-Inch Settled Sewage Pipe Rehabilitation

- Design consultant Black & Veatch (B&V) completed the 100 percent design.
- The project team passed Stage Gate 5: Authorization to Bid. The City will advertise the project for bids in July.

HVAC Improvements

- Design consultant Kennedy/Jenks started a hazardous material survey and completed sampling work. The draft survey report will be submitted to the City in early June.

Storm Drain Improvements

- Design consultant AECOM completed the condition assessment and alternative analysis reports. In July, the project team will seek approval to proceed to conceptual design at Stage Gate 2: Confirm Project Alternative.

Liquids Package

Advanced Facility Control and Meter Replacement – Phase 1

- Contractor Overaa Construction began installing new flowmeters, control valves, and associated piping in the Battery B secondary tunnels and the secondary returned activated sludge meter vaults.

Blowers Improvements

- Contractor Monterey Mechanical Construction (MMC) began demolition of the workshop in Building 40 and the baghouse structures in the tertiary blower building to create space for the new electrical rooms.
- The City facilitated a second partnering session with MMC, design engineer Brown and Caldwell (B&C), CIP, and O&M to discuss project priorities and approaches.

Headworks

- Design builder CH2M Hill Engineers, Inc (CH2M) submitted the 30 percent design submittal and cost estimate, held workshops for the 30 percent electrical and instrumentation design, and presented the 30 percent design to O&M. In June, the project team will complete reviews of the 30 percent design submittal.

Nitrification Clarifiers Rehabilitation – Phase 1

- The City advertised the construction contract for bids and conducted two mandatory pre-bid conferences. The project team anticipates opening bids in July.

Power and Energy Package

Cogeneration Facility

- Design builder CH2M installed column anchors in the main generator building in preparation for the installation of the bridge crane columns and rails and poured the concrete pads for the gas treatment equipment, cooling towers, and chillers.

Explanation of Project Performance Issues

Construction-Enabling Improvements Project

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 on several occasions between October 2016 and April 2017. Teichert was granted extra work days for weather-related delays and for extra work associated with several contract change orders. A new contract completion date of June 8, 2017 was established. However, Teichert's subcontractor, ModSpace, was slow to respond and regularly submitted late and incomplete documentation. This resulted in very late delivery of required portable trailers, which arrived in January 2018, approximately nine months later than the contract completion date.

Teichert experienced additional delays completing installation of the trailers and submitting complete and acceptable documentation for access ramps and canopies. In early August 2018, the contractor completed installation of the electrical, communications, and wastewater utilities. Also in August, the City of San José Building Division issued the Certificate of Occupancy permit for the trailers, and the construction management group issued the Notice of Substantial Completion, which indicated that the project had reached Beneficial Use. The project team provided Teichert with a list of remaining contract work to be completed. The project team has reached agreement with Teichert for liquidated damages and completion of outstanding tasks for project closeout. The project team anticipates accepting the project in June 2019.

Plant Instrument Air System Upgrade Project

Project construction was delayed by seven months due to four issues: 1) The project team discovered that the planned construction site access route crossed a large, settled sludge pipeline, requiring development and construction of an alternative access route; 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; 3) development of the 28-day commissioning test procedure took longer than anticipated; and 4) during the eight-hour functioning test, the project team discovered oxidized (rusted) carbon steel shavings in an existing condensate tank unrelated to the project construction. The material was removed, and the test was successfully completed. The project achieved Beneficial Use in November 2018. The project team anticipates project acceptance in June 2019.

Digester and Thickener Facilities Upgrade Project

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 have amounted to 273 working days. The original construction completion and Beneficial Use date of September 2019 has been delayed to November 2020.

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

- Major corrosion of an underground, 78-inch settled sewage pipeline and junction structure required the construction of a temporary re-route 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 replacing the 78-inch settled sewage pipeline. This work was completed in late September 2018.
- A 36-inch biochemical oxygen demand pipe was found to be obstructing the new sludge screening building foundation. The contractor removed this pipe and relocated several gas drain vaults and associated piping before the 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 required design changes.
- Bay Area Air Quality Management District venting restrictions also delayed digester work. The contractor completed the temporary digester gas connections and the temporary system became operational in February 2018.

The City has negotiated contract change orders for the following issues discovered in 2017 and 2018:

- Digester structural redesign: The design consultant revised the structural drawings to address seismic concerns 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 final, global change order to cover work activities.
- Distributed control system architectural changes: The design guidelines for the distributed control system were developed after the project plans were completed. Several changes were required for fiber optic cable, electrical wiring, patch panels, converters, communications instrumentation, and emergency power supply. Drawings, color-coding labeling, and process diagrams had to be revised to reflect these changes.

- Fire Department requirements: Fire permit requirements changed after the design was completed. The Fire Marshal required additional alarms and electrical connections. A new electrical fire suppression system was installed to meet current environmental requirements. At one structure, the Fire Marshall requires a full discharge test of the system.
- Structural issues: Designer B&C modified the west electrical building foundation design to avoid an unforeseen conflict and protect the structural integrity of an existing underground tunnel; provided a new design to anchor the pressure flow pipes in the DAFT gallery to the ceiling and floor slabs to avoid conflicts with multiple existing pipes; and redesign structural supports to meet code for the foul air and thickened sludge pipes attached to columns holding up the canopy over the thickened sludge pumps.
- During construction, Walsh discovered the DAFT gallery underslab drains were not functioning properly. The City directed Walsh to replace the drain and pump system; and
- Construction delays required the contractor to pay to extend a warranty on six liquid ring gas compressors.

Testing of soils and concrete for PCBs was completed, and the federal Environmental Protection Agency (EPA) issued a final conditional approval. In compliance with the EPA-approved, risk-based management plan, removal and disposal of all contaminated materials in all four affected digesters and all tunnel joints has been completed. All contaminated soils have been removed and disposed of and most of the impacted concrete has been encased or removed. The last portion of the work will be finished in June 2019. The project team anticipates submittal of final work reports to the EPA in August 2019.

In November 2017, Council approved a construction 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 construction contingency increase of $25 million for additional costs associated with the seismic redesign, hazardous material remediation, and extended construction duration.

To minimize further delays, the contractor is executing several tasks concurrently that originally had been planned in series.

Project Profile – DCS Upgrade – Phase 3

The O&M PCS (Process Control and Systems) group oversees the administration, configuration, and maintenance of the RWF's Distributed Control System (DCS). The system is comprised of both software and hardware components including servers, workstations, a graphical user interface, distributed control units (DCUs), field connections known as input/output points, and a fiber optic communications network along with various other ancillary equipment. The DCS is connected to operational equipment that control and monitor electrical, hydraulic, biological, and chemical processes throughout the Facility on a 24/7 basis. The existing System Six DCS, originally installed by ABB Inc. (ABB), has been in service for 29 years and is built on software and hardware that are nearing obsolescence. Replacement hardware is difficult to obtain, and the software does not support many advanced functions that are needed to manage new process equipment.

In 2011, the City determined that a system upgrade, completed in three phases, was necessary:

- Phase 1: DCS hardware and software upgrade
- Phase 2: Infrastructure and configuration updates
- Phase 3: DCU upgrade

Phase 1 was completed by ABB in December 2015. Since that time, staff has been working on Phase 2, along with supplemental services provided by ABB, to update wiring, cabinetry, and input/output modules. Incompatibility between the two DCS systems meant that nearly 8,000 instruments throughout the RWF required rewiring or reconfiguration. In preparation for Phase 3, the PCS group also upgraded the fiber optic and network wiring. This work adds significant capacity for all fiber-dependent facility networks, including closed-circuit television, management information systems, and voice-over internet protocol networks. Phase 2 is still in process and is expected to be completed by September 2020.

Figure 3: Old System Six controller (left) and new Harmony controllers (right)

For the DCS Upgrade - Phase 3 Project (Project), in May 2019, Council adopted a resolution to execute an agreement with ABB to upgrade the 18 existing System Six DCUs with new Harmony DCUs for approximately $6.4 million (See Figure 3).

Figure 4: Operator trends and graphic examples

The project will be completed in nine stages. Each stage addresses the conversion of a specific process area or subsystem and requires the complex conversion of more than 500 computer applications to a new programming language. In addition, the new hardware setup will require configuring data presentation and analysis tools including more than 3,000 display graphics and 1,500 trend graphs (See Figure 4). After this conversion the new controllers will be deployed, input/output modules will be transferred, new networks will be activated, and 17 existing System Six controllers will be removed.

Upgrading each DCU requires a several-month freeze on additions, subtractions, and modifications of field instrumentation. Considering there are several concurrent projects in various stages of development, the freezes could potentially impact CIP projects with instrumentation connected to affected controllers. To mitigate this potential impact., PCS is closely coordinating with other CIP projects on upgrade timing and scheduling.

The project team is planning a project kickoff meeting in July 2019 and expects Beneficial Use in July 2022. At the end of the project, the last of the System Six controllers will be disconnected. The Harmony DCS will take full control of the RWF's automation needs, ready for the next 25 years of innovation, and capable of supporting all new CIP projects and instrumentation technologies.

Regional Wastewater Facility Treatment – Current Treatment Process Flow Diagram

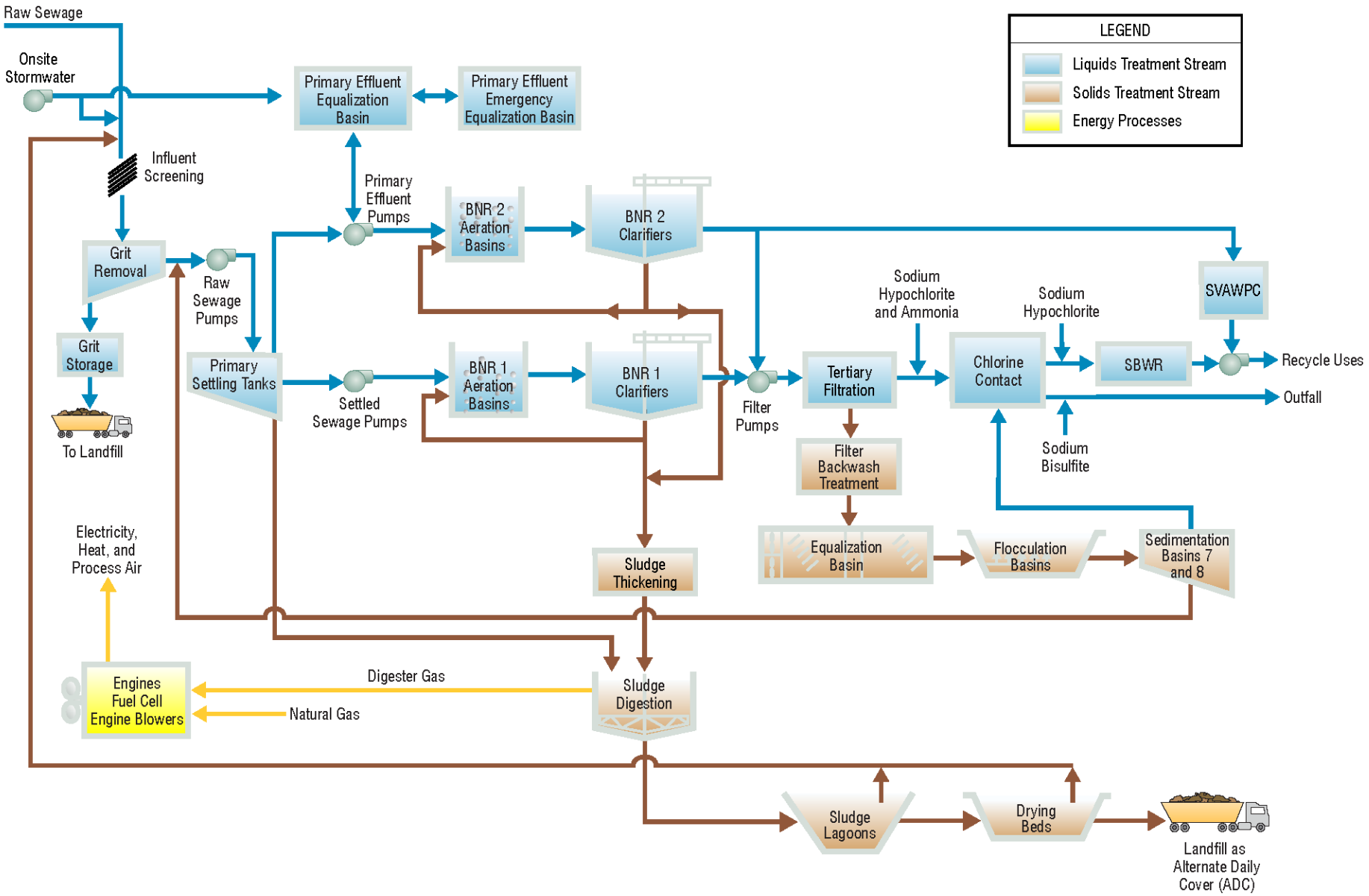


Figure 5 – Current Treatment Process Flow Diagram

Regional Wastewater Facility Treatment – Proposed Treatment Process Flow Diagram

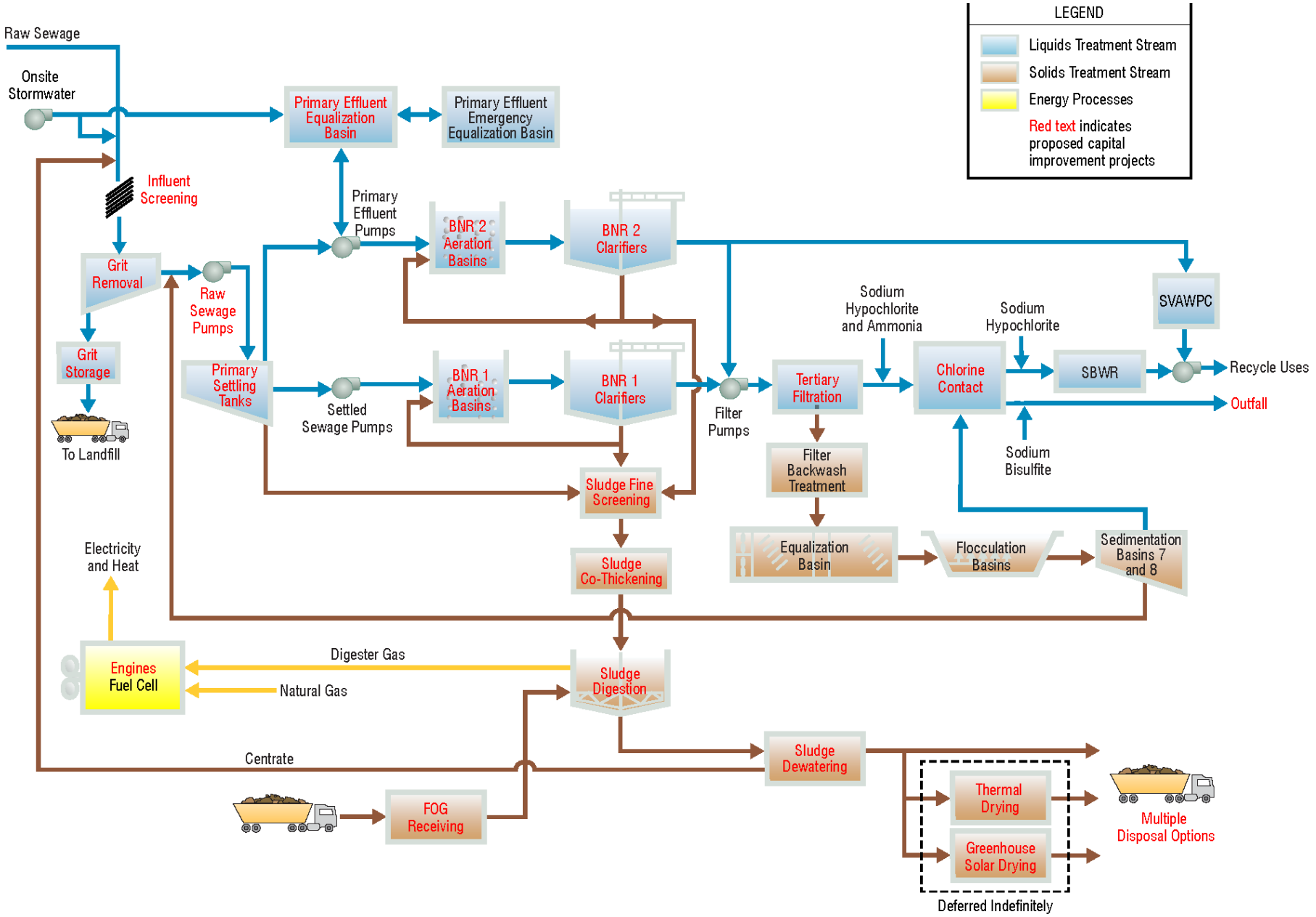


Figure 6 – Proposed Treatment Process Flow Diagram

Active Construction Projects – Aerial Plan

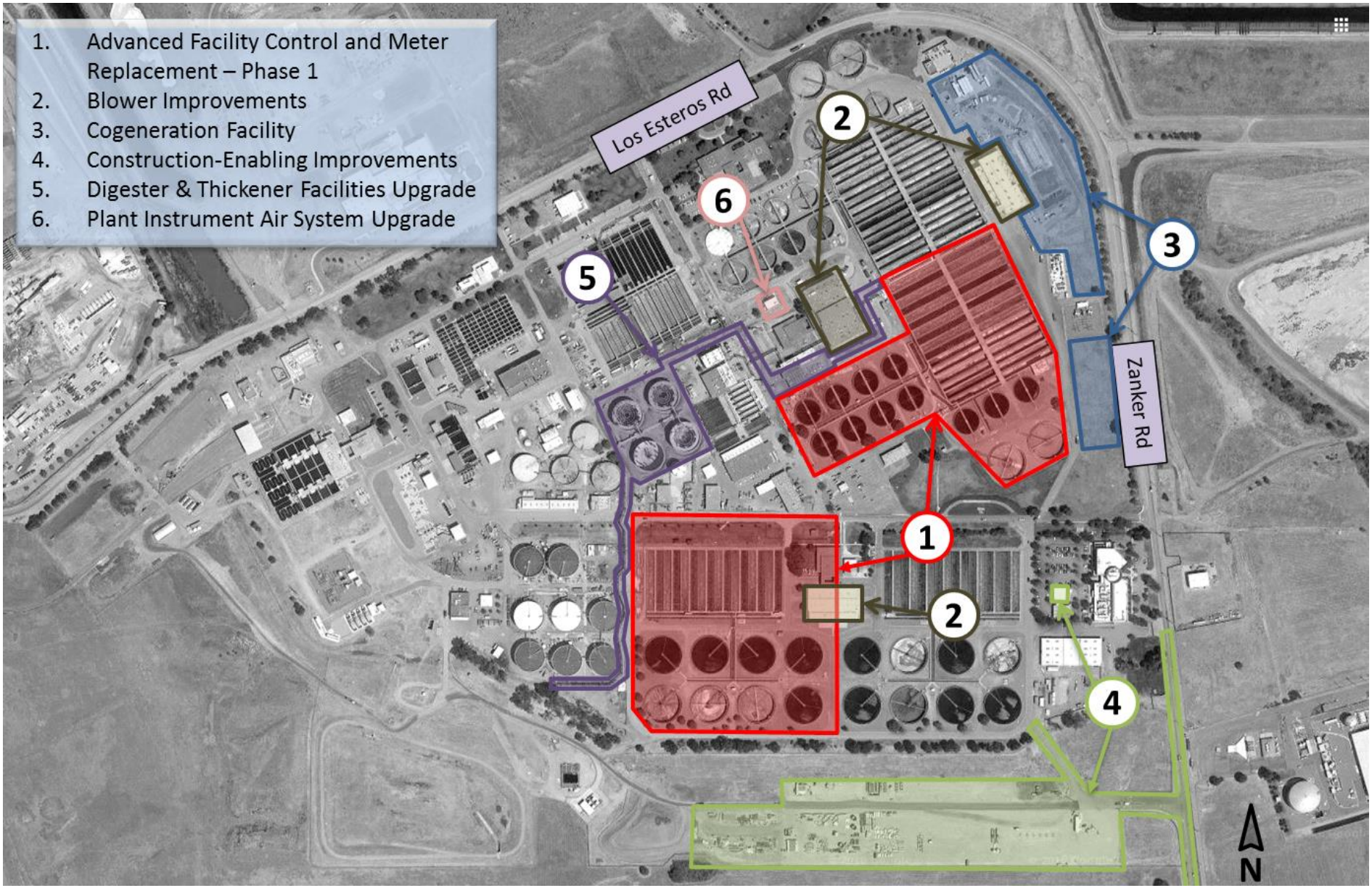


Figure 7: Active Construction Projects