San José-Santa Clara Regional Wastewater Facility

Capital Improvement Program
Monthly Status Report: November 2016

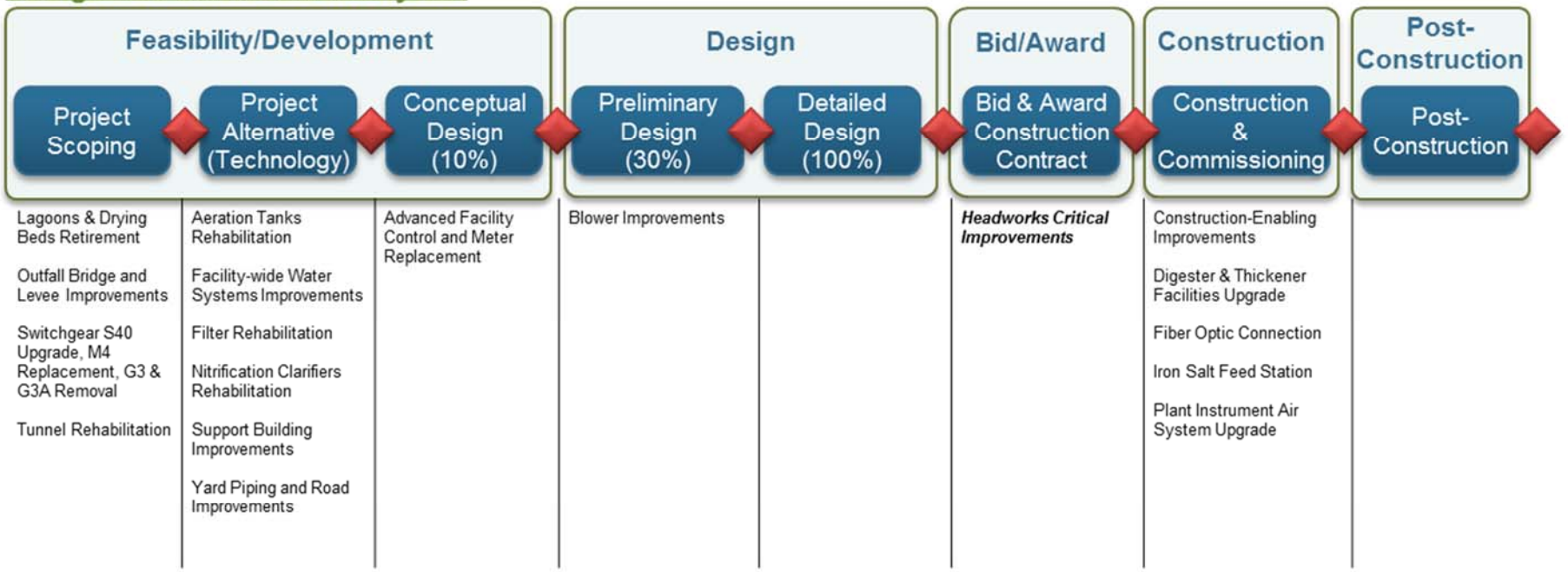
January 5, 2016

This report summarizes the progress and accomplishments of the Capital Improvement Program (CIP) for the San José-Santa Clara Regional Wastewater Facility (RWF) for November 2016.

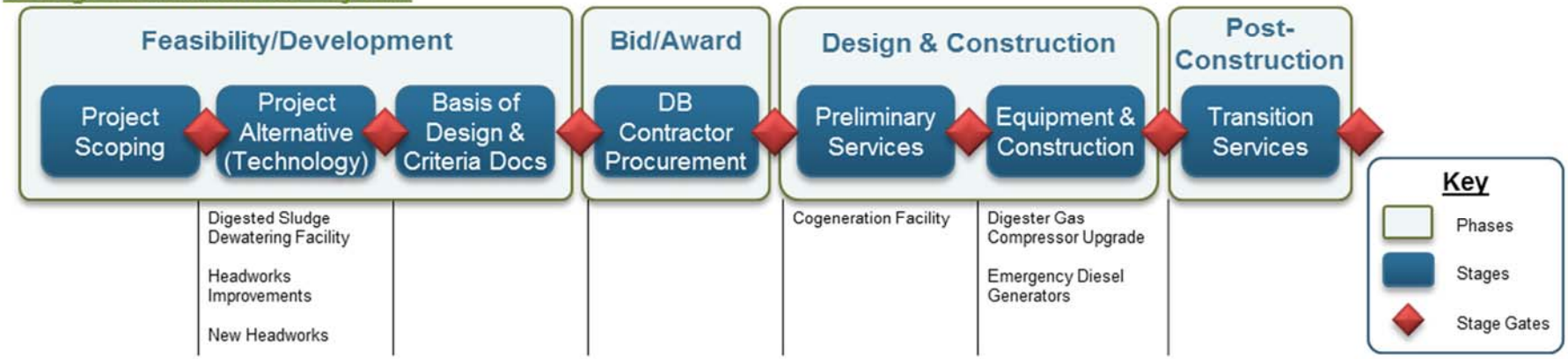
Report Contents

Project Delivery Model

Design-Bid-Build Active Projects



Design-Build Active Projects



*Projects shown in ***bold and italics*** have advanced this reporting period

Program Summary

November 2016

In November the CIP progressed on multiple fronts, with key procurement, planning, design, and construction activities continuing across all phases of the program.

Headworks Critical Improvements Project: The City advertised the construction contract, and staff held a site walk for interested contractors. The Engineer's Estimate for this contract is $2.2 million, with the bid opening scheduled for December.

Cogeneration Facility Project: The project team continues to move the project through preliminary design. The design-builder has made engine and gas purification equipment recommendations. The revised Basis of Design Report is scheduled to be issued in December with recent value engineering recommendations incorporated. The recommended equipment and vendor selection and the final basis for design will be bought forward for stage gate approval in January.

Headworks Improvements and New Headworks projects: The project team continued alternatives analysis work and agreed on the recommended scope for each project. These recommendations will be bought forward for stage gate approval in December.

Other projects: Staff and consultants completed condition assessment work on the Advanced Facility Control and Meter Replacement, Filter Rehabilitation, and Nitrification Clarifier Rehabilitation projects. Alternatives analysis and conceptual design work will now begin on each project. The consultant for the Blower Improvements Project also began detailed design work this month. Construction work continued on the Construction-Enabling Improvements, Digester and Thickener Facilities Upgrade, Digester Gas Compressor Upgrade, Emergency Diesel Generators, Fiber Optic Connection, and Iron Salt Feed Station projects. Staff continued to carry out a number of major process shutdowns to isolate sections of the RWF so that construction could proceed. One such shutdown on the Digester Gas Compressor Upgrade Project allowed staff to make the final tie-in connections to the RWF digester gas system.

Look Ahead

In December, CIP project teams and associated design consultants will move forward with alternatives analysis and design work for the Headworks Improvements, New Headworks, Cogeneration Facility, Blower Improvements, Filter Rehabilitation, Nitrification Clarifiers Rehabilitation, and Advanced Facility Control and Meter Replacement projects. Preliminary design activities, including hydraulic modelling and condition assessment work, will also begin on the Facility-Wide Water Systems Improvements Project.

Three projects will seek to advance through stage gates next month: Headworks Improvements (Confirm Project Alternatives), New Headworks (Confirm Project Alternatives), and Digester Gas Storage Replacement (Final Acceptance).

Staff will receive bids in December for the Headworks Critical Improvements Project and will recommend award of the construction contract in early 2017. Additional recommendations to the Treatment Plant Advisory Committee (TPAC) and City Council (Council) include:

- Award of a consultant agreement to provide broker, administrative, and claims services to implement an Owner-Controlled Insurance Program (OCIP) at the RWF in December, pursuant to Council direction in September to re-advertise for this agreement.
- Award of an engineering services master consultant agreement for the Support Building Improvements Project in January.

Staff will continue with efforts related to consultant procurements and project service orders for the Aeration Tanks Rehabilitation; Switchgear S40 Upgrade, M4 Replacement, G3 and G3A Removal; Digested Sludge Dewatering Facility and Support Building Improvements projects. A Request for Qualifications (RFQ) for Owner's Advisor services for the Yard Piping and Road Improvements Project will be advertised in January.

Applications and discussions with the State Water Resources Control Board relating to Clean Water State Revolving Fund (SRF) funding for the Digester and Thickener Facilities Upgrade and Cogeneration Facility projects will also continue.

Testing and commissioning activities on the Digester Gas Compressor Upgrade, Emergency Diesel Generator, and Fiber Optic Connection projects are now well underway, with each project forecast to achieve Beneficial Use in the first quarter of 2017. A key test to verify the correct automatic operation of the new Emergency Diesel Generators--when the RWF is isolated from PG&E electrical power--is planned for January.

All CIP project managers and engineers will continue formal staff training in tools and techniques to effectively manage projects, based on Project Management Institute (PMI) fundamentals tailored to the CIP, and on RWF-specific technical and regulatory requirements. Future training will focus on regional air quality permits and building code compliance.

Program Highlight – Condition Assessment Results

Last month's report highlighted condition assessment procedures. This month, some recent examples of condition assessments and the value they provide in the development of project solutions are highlighted.

One of the first steps in delivering a capital project is performing a condition assessment of the existing process infrastructure and associated equipment. The results of the condition assessment are used to further develop the project scope prior to design development to ensure that the implemented solution will provide reliable, safe and continued operation for future decades.

The CIP has recently performed condition assessments on five projects:

- Advanced Facility Control and Meter Replacement
- Blower Improvements
- Digester and Thickener Facilities Upgrade
- Filter Rehabilitation
- Nitrification Clarifiers Rehabilitation

Four of these projects are highlighted below, with the benefits of performing the condition assessment highlighted:

Blower Improvements: In order to determine the condition of existing blower motors, one motor was disassembled in each of the three blower buildings (see figure 1). Motor components were found to have minimal wear and were rated by the specialist inspection contractor as being in very good condition. This information enabled the replacement of the motors to be removed from the project scope, resulting in a reduction in the project construction estimate of almost $10 million.

Nitrification Clarifiers Rehabilitation: As-built records indicated that the return activated-sludge lines were constructed of ductile iron pipe. However, the condition assessment discovered that the lines are actually made of reinforced concrete pressure pipe. This information will enable the designer to specify the appropriate connection details during design avoiding potential delay and re-design during the construction stage.

Figure 1: Inspection of Blower Inlet Conditions

Figure 2: Corroded Bell on Backwash Pump No. 1

Figure 3: Collapsed Ceiling of the Chlorinated Filter Effluent Channel

Figure 4: Corroded 78" Pipe Crown

Filter Rehabilitation: During the condition assessment of the filters, the inspection team discovered one of the backwash pump's bell housing was severely corroded (see figure 2) and a collapsed ceiling with exposed structural rebar in the filtration process effluent channel (see figure 3). The rehabilitation and replacement of these components will be incorporated into the design scope of the project.

Digester and Thickener Facilities Upgrade: During inspections of an existing 78-inch reinforced concrete pipe that will be connected into by the project, it was discovered that there was severe corrosion to the pipe crown (see figure 4). This resulted in immediate measures being taken to prevent any further loading above this pipe to avoid potential collapse and impact to RWF operation. Longer term repairs are currently being investigated and are likely to be added to the project scope as the most expeditious way to resolve the issue.

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 will be selected and measured that best reflect the current program.

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%	100% 3/3			100% 23/23		
Measurement: Percentage of initiated projects and studies that successfully pass each stage gate on their first attempt. Target: Green: >=80%; Amber: 70% to 80%; Red: < 70%							
Schedule	90%	NA 0/0			50% 2/4		
Measurement: Percentage of CIP projects delivered within 2 months of approved baseline Beneficial Use Milestone. Target: Green: >=90%; Amber: 75% to 89%; Red: < 75%							
Budget	90%	NA 0/0			75% 3/4		
Measurement: Percentage of CIP projects that are accepted by the City within the approved baseline budget. Target: Green: >=90%; Amber: 75% to 89%; Red: < 75%							
Expenditure	$186M	$183M			$244M[1]		
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%	67% 2/3[2]			100% 5/5		
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[3]	80%	100% 5/5			100% 24/24		
Measurement: Number of planned positions filled for the fiscal year. Target: Green: >=80%; Amber: 70% to 79%; Red: < 70%							

Notes

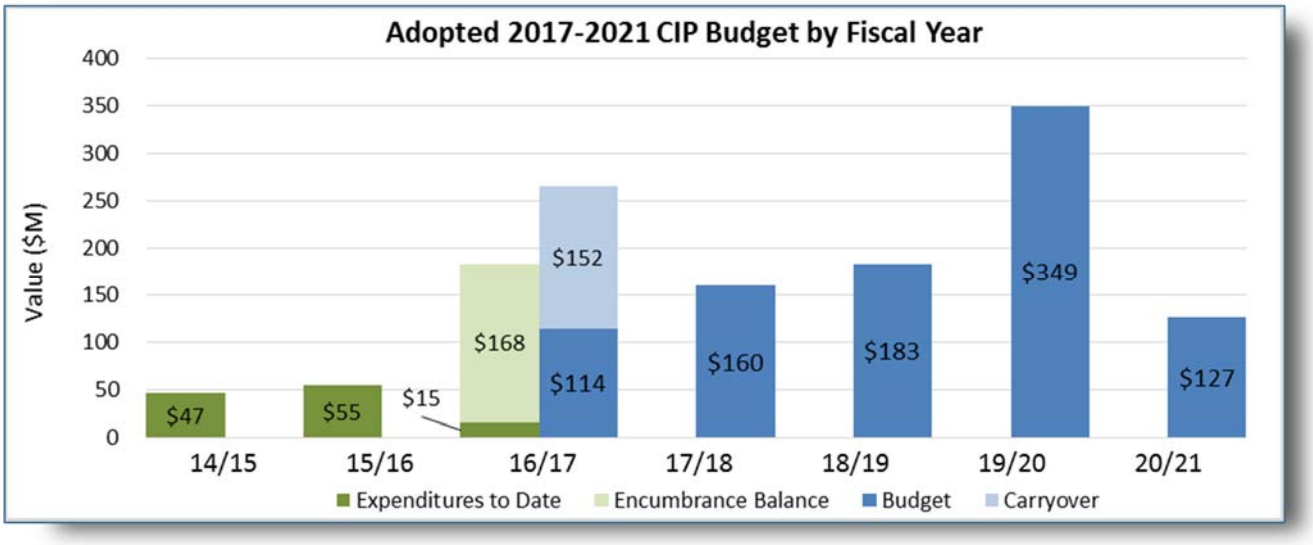
1. The increase in the fiscal-year-end expenditures forecast is due to revised forecasts for the design and construction costs for the Blower Improvements Project and the Plant Instrument Air System Upgrade Project.
2. The CIP advertised the construction contract for the Headworks Critical Improvements Project on November 9. The RFQ for consultant services for the Yard Piping & Road Improvements Project was not advertised as anticipated.
3. The City staffing level KPI for planned recruitments for positions that are vacant at the start of the fiscal year is measured quarterly; all other KPIs are measured monthly. 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

FY14-15 and FY15-16 expenditures have been adjusted to reflect the CIP portion of the Treatment Plant Capital Fund (Fund 512), excluding South Bay Water Recycling and Urgent and Unscheduled Cost ($2.6 million and $1.5 million, respectively).



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. The encumbrance reserves the funding within the appropriation and project.

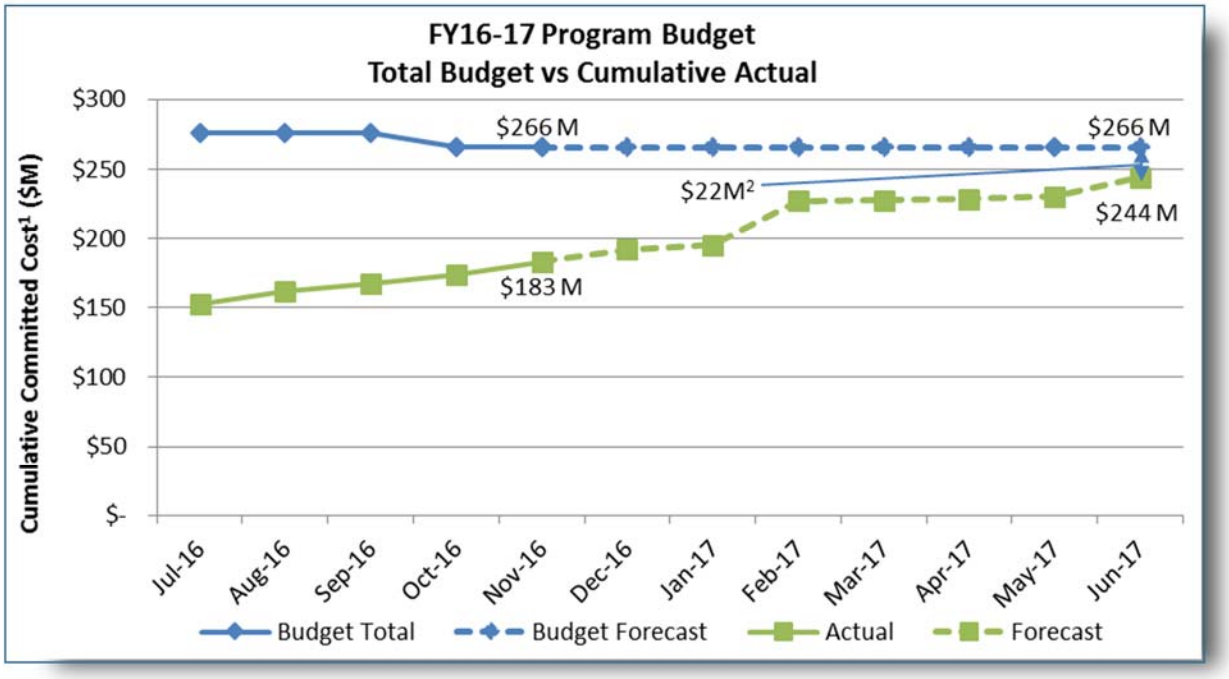
Encumbrance Balance: The amount of the remaining encumbrance committed after payments.

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

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 $152 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. Expenses anticipated for the pre-purchase of blowers for the Blower Improvements Project are no longer required this fiscal year. Originally, the project had identified a potential need to pre-purchase blowers to meet schedule constraints. As design progressed, this pre-purchase was deemed unnecessary. The equipment will now be purchased in FY17-18 as part of the construction contract.
    b. Several encumbrances for consultant services are either anticipated to be lower than budgeted or are no longer anticipated this fiscal year.
    c. Estimated personal services are anticipated to be under budget. Several authorized positions are currently vacant, resulting in lower than budgeted personal services expenses.
    d. Recurring appropriations such as Equipment Replacement and Plant Infrastructure Improvements are included in the budget, but not anticipated at this time to be expended.

Project Performance Summary

There are currently seven 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. Digester Gas Compressor Upgrade	Construction	Mar 2017[3]	◆	◆
2. Emergency Diesel Generators	Construction	Mar 2017	●	◆
3. Fiber Optic Connection	Construction	Feb 2017	●	●
4. Construction-Enabling Improvements	Construction	Mar 2017	●	●
5. Iron Salt Feed Station	Construction	Sep 2017	●	●
6. Plant Instrument Air System Upgrade	Construction	Apr 2018[4]	●	●
7. Digester and Thickener Facilities Upgrade	Construction	Apr 2020	●	●

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. Project automation system testing has been delayed and as a result the project Beneficial Use date has slipped two months.
4. The Beneficial Use date has been updated following the baseline of the schedule.

Project Performance – Pre-Baselined Projects

Project Name	Phase	Estimated Beneficial Use Date[1]
1. Headworks Critical Improvements	Design	Oct 2017
2. Cogeneration Facility	Design & Construction	May 2019
3. Blower Improvements	Design	Mar 2020
4. Adv. Facility Control & Meter Replacement	Feasibility/Development	Jan 2021
5. Headworks Improvements	Feasibility/Development	May 2021
6. Switchgear S40 Upgrade, M4 Replacement, G3 & G3A Removal	Feasibility/Development	Jul 2021
7. Digested Sludge Dewatering Facility	Feasibility/Development	Feb 2022
8. Outfall Bridge and Levee Improvements	Feasibility/Development	Jun 2022
9. Facility-wide Water Systems Improvements	Feasibility/Development	Aug 2022
10. Filter Rehabilitation	Feasibility/Development	Aug 2022
11. New Headworks	Feasibility/Development	Oct 2022
12. Nitrification Clarifiers Rehabilitation	Feasibility/Development	Nov 2022
13. Support Building Improvements	Feasibility/Development	Jun 2023[2]
14. Aeration Tanks Rehabilitation	Feasibility/Development	Apr 2024
15. Tunnel Rehabilitation	Feasibility/Development	Nov 2025
16. Yard Piping and Road Improvements	Feasibility/Development	May 2026[3]
17. Lagoons & Drying Beds Retirement	Feasibility/Development	Apr 2027

Notes

1. Beneficial Use is defined as work that is sufficiently complete, in accordance with contract documents, that it can be used or occupied by the City. Beneficial Use dates are reviewed as part of project schedule reviews.
2. Staff have redefined the Support Building Improvements Project scope and currently envision the project reaching Beneficial Use in June 2023.
3. Staff broke the Yard Piping and Road Improvements Project into multiple phases. The reported Beneficial Use date in previous months has been for phase 1 only. Staff modified this report to show the Beneficial Use date of the last phase of the project.

Significant Accomplishments

Biosolids Package

Digester and Thickener Facilities Upgrade

- Construction contractor Walsh Construction completed the demolition of two of the four digester roofs. The contractor will complete demolition of the remaining two roofs and then begin cleaning the structures.

Facilities Package

Cogeneration Facility

- The project team continued its value engineering work to keep the project within budget.
- Design-builder CH2M is preparing a revised Basis of Design Report to be submitted in December.
- The design-builder has begun negotiations with gas purification and engine generator vendors.

Construction-Enabling Improvements

- Contractor Teichert Construction completed the slurry sealing and temporary traffic striping along Zanker Road. Next, the contractor will install electrical conduits and perimeter fencing.

Fiber Optic Connection

- Contractor Aegis ITS, Inc. completed pulling the fiber optic cable through conduits. All significant construction has been completed and only final connections and testing remain. The project is expected to reach Beneficial Use by the end of February 2017.

Outfall Bridge and Levee Improvements

- The project team conducted a value scoping workshop with O&M staff. The project team will continue developing the project scope and prepare for the Approve Project Scope Stage Gate, scheduled for February 2017.

Tunnel Rehabilitation

- The project team conducted a workshop with O&M staff to review findings from the preliminary inventory. The team will continue developing the project scope and will prepare for the Approve Project Scope Stage Gate anticipated in March 2017.

Liquids Package

Advanced Facility Control and Meter Replacement

- The project team held a kickoff meeting workshop with design consultant Black & Veatch.
- The consultant completed all of the onsite condition assessment activities and is now compiling the collected data.

Blower Improvements

- The project team held a kickoff meeting workshop with design consultant Brown & Caldwell to initiate design.
- The project team also coordinated a site visit focused on electrical equipment.

Filter Rehabilitation

- Design consultant Kennedy/Jenks held a workshop to present the results of the tertiary process energy evaluation.
- The design consultant completed the effluent channel condition assessment using an underwater diving team. The consultant also completed the electrical and instrumentation condition assessment.

Headworks Critical Improvements

- The project team advertised the project on November 9. Bids are due December 8.

New Headworks

- Staff and owner's advisor CDM Smith held an alternative review workshop with O&M staff to evaluate project alternatives and an environmental workshop with environmental staff to discuss environmental permitting.

Nitrification Clarifiers Rehabilitation

- For the clarifier mechanisms, design consultant HDR submitted the alternative analysis technical memorandum and together with staff, held the alternative analysis workshop.

Power and Energy Package

Emergency Diesel Generators

- Contractor Anderson Pacific's subcontractor, CAT/ISO, verified synchronizing of the generators via switchgear isolated from the RWF.
- PG&E approved the Third Party Protection Control Report, which allows scheduling of the PG&E witness testing.
- The contractor installed the PG&E Telemetry Panel in Building 40.

Digester Gas Compressor Upgrade

- Contractor Anderson Pacific completed the tie-in of the new compressor building digester gas inlet and discharge pipe to the existing piping located in the Sludge Control Building.
- The manufacturers tested the control system of the chiller and cooling system. The system was found operable and ready for startup.
- The contractor completed the supply and exhaust fan controls to each of the compressor rooms; corrected the water piping to gas generator number six; tested the main PLC instrument loop; and installed the cooling tower chemical metering pumps.

Studies and Program-wide Services

- Staff conducted a non-mandatory RWF site visit related to procurement of a program-wide industrial hygienist. The deadline for proposals is next month. Staff anticipates awarding a master consultant agreement in April 2017.

Explanation of Project Performance Issues

Emergency Diesel Generator

The project completion schedule has been delayed approximately nine months due to the following three 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 completed Level 1 testing and started Level 2 startup process testing to test and verify that all issues have been corrected.
- Additional time is required for Pacific Gas & Electric (PG&E) to schedule the witness test of the emergency diesel generator equipment installation and commissioning to connect to the RWF grid. PG&E approved the third-party testing of the switchgear, power, and controls. The project team submitted and PG&E has approved the proposed onsite inspection and witness testing dates for the emergency diesel generator equipment commissioning.
- A no-cost time extension change order has been processed and fully executed to split the commissioning sequence into two periods and ensure RWF backup power during engine modification work. The City's phase 1 existing engine modification has been completed; testing is ongoing.

Digester Gas Compressor Upgrade

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

The project Beneficial Use has been delayed primarily due to the following reasons:

- The compressor skids needed to be reclassified from Class 1 Division 2 to Class 1 Division 1; and
- The Bay Area Air Quality Management District (BAAQMD) delayed approval of the digester gas flaring during the tie-in of the new gas piping.
- Commissioning of the automation system has taken longer than anticipated.
- The schedule has been delayed due to other conflicting process shutdowns.

Staff have resolved the reclassification and the gas flaring issues at this time.

Project Profile – Advanced Facility Control and Meter Replacement Project

The RWF relies on equipment such as meters and valve actuators for accurate measurement and effective process control. These meters and actuators allow RWF operators to automate and remotely operate many unit processes, and to maintain compliance with the National Pollutant Discharge Elimination System Permit. Consequently, reliable and accurate equipment operation is paramount to the RWF's day-to-day success. Many existing meters and actuators were installed in the 1970s and are becoming less accurate due to wear. In addition, these units are increasingly difficult to repair or replace due to decreased availability of outdated parts, as well as manufacturers' reductions in component support.

In 2014, CIP and O&M staff inventoried and analyzed all the existing meters and actuators, prioritizing them for repair or replacement. This collaborative effort, recommended as part of the Plant Master Plan, brought together O&M experience and a technical engineering approach to validate the need for a capital improvement project. CIP staff initiated this project to replace meter and valve actuators around the RWF.

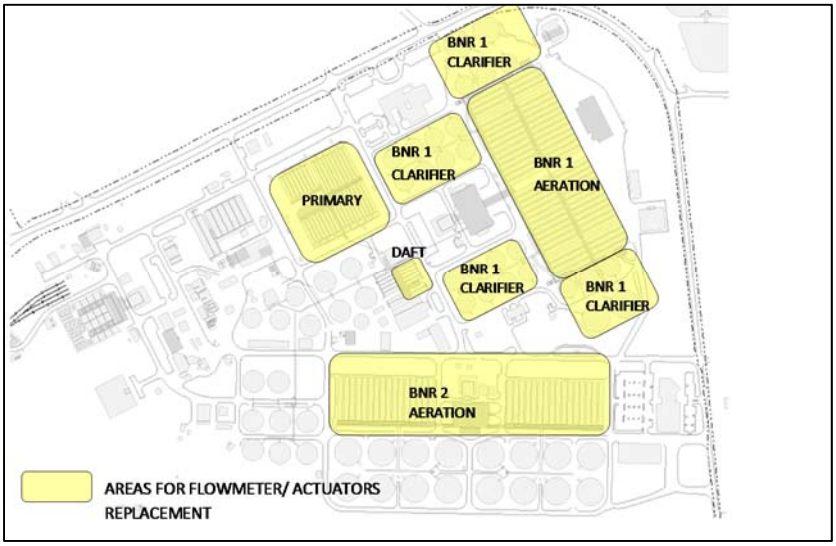


Figure 5: Facility Location Map

The project's objective is to improve reliability, mitigate failure risk, and leverage new technology to improve automation and process control, while replacing obsolete equipment. The project will result in operational costs savings by minimizing ongoing maintenance requirements.

In 2016, Black & Veatch was engaged to provide engineering services throughout all phases of the project, from feasibility development to construction. The feasibility development phase began in October 2016 with an assessment to determine the condition of existing infrastructure around the equipment to be replaced, and identify required improvements. The next step is to complete the conceptual design by spring 2017. The consultant is anticipated to complete the detailed design in early 2018. The City will then advertise the project for construction in summer 2018. The project team currently anticipates substantial completion in spring 2021. The estimated project cost at the planning level is $16.8 million.

Figure 5 identifies specific areas within the RWF that have been designated for meter and actuator replacement. Figures 6, 7, and 8 illustrate the type of existing equipment to be replaced as part of this project.

Figure 6: Secondary Settled Sewage Influent Meter and Valve

Figure 7: Secondary RAS TSS Meter

Figure 8: Filter Building Chlorine Analyzer

Regional Wastewater Facility Treatment – Current Treatment Process Flow Diagram

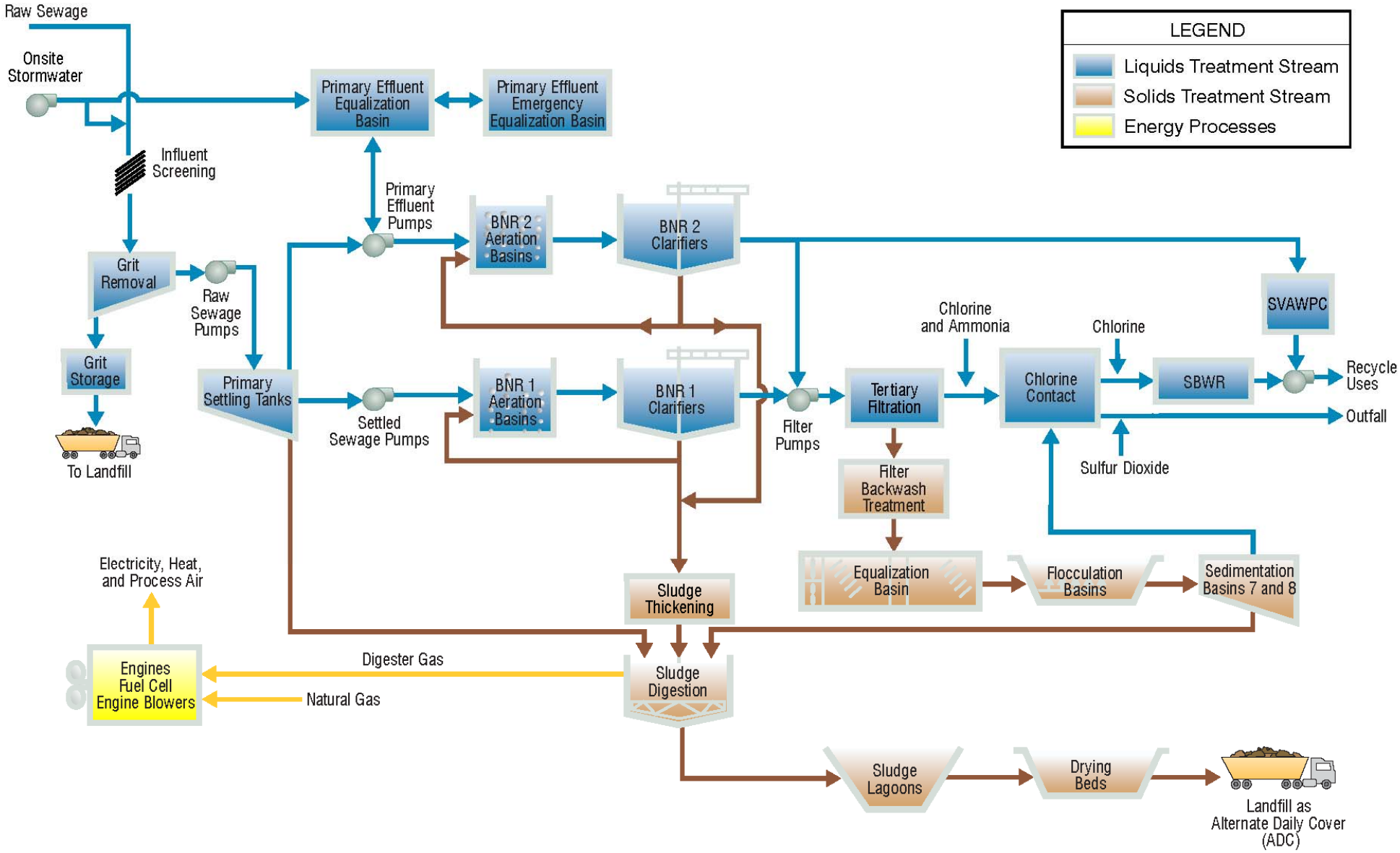


Figure 9 – Current Treatment Process Flow Diagram

Regional Wastewater Facility Treatment – Proposed Treatment Process Flow Diagram

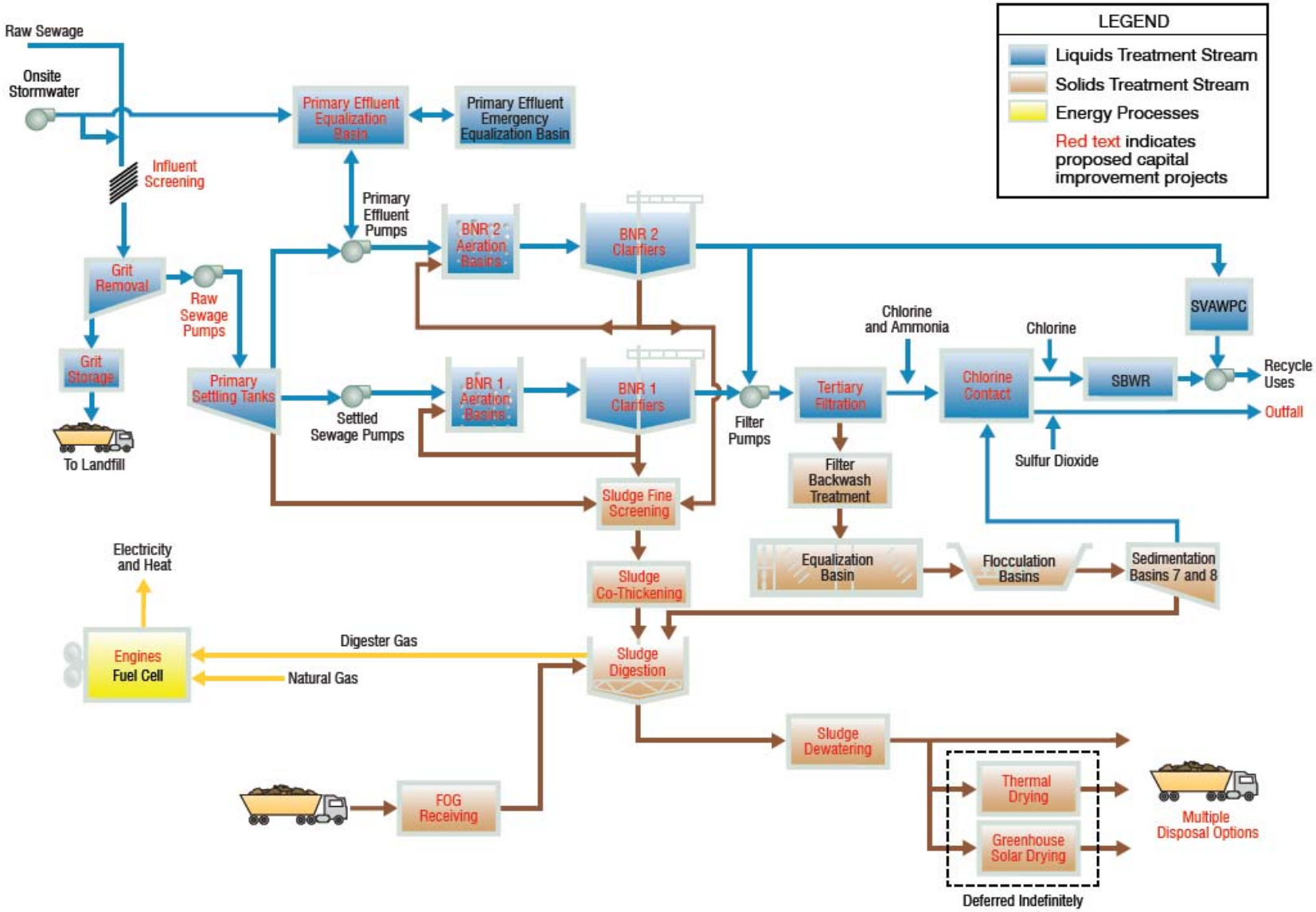


Figure 10 – Proposed Treatment Process Flow Diagram

Active Construction Projects – Aerial Plan

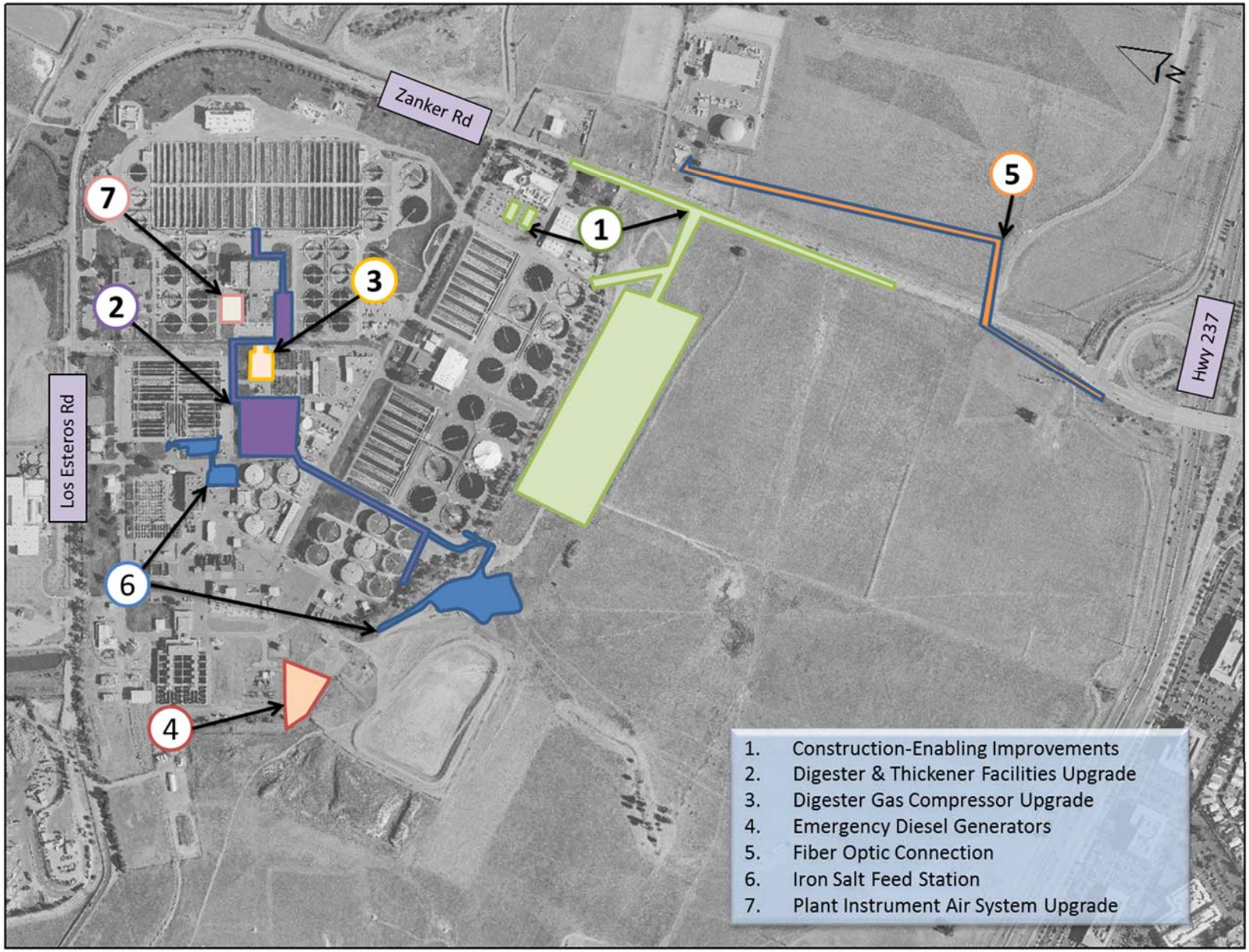


Figure 11 – Active Construction Projects