



OPTIMIZATIONS ANNUAL REPORT

FISCAL YEAR 2017-18



TABLE OF CONTENTS

A SUMMARY OF ACHIEVEMENTS AND PROGRESS

Through use of technology and human ingenuity, each department has risen to the challenge of continually finding new ways to improve processes, no matter how large or small.

This report includes optimizations completed between July 1, 2017 and June 30, 2018. It also includes progress made on ongoing long-term optimization projects during that time.

The optimizations have been categorized by their main objective or benefit to Central San.





CONTINUOUS IMPROVEMENT

A MESSAGE FROM THE GENERAL MANAGER

In November 2018, Central San was inducted into the Leading Utilities of the World, a global network of the most successful and innovative water and wastewater utilities. This honor recognized a commitment to optimization, which we have been doing for many years and which reflects our aspiration to be the best public agency.

We know cost matters, and we are sensitive when it comes to the use of funds we collect from our customers and stakeholders. Through continuous improvement and increased productivity, we strive to do more with less as we tackle the challenges of aging infrastructure, tight public finances, regulatory requirements, and other challenges facing our organization.

For the fifth consecutive year, we have maintained a relatively flat operations and maintenance (O&M) budget for the next fiscal year (FY). However, while we make the best use of our existing resources, some of our equipment is over 70 years old and no longer the best value for us and our customers.

To maintain the highest level of service, in FY 2019-20, we will be investing more in our infrastructure, essentially doubling the budget of our Capital Improvement Program. To minimize financial impact to our ratepayers, we will review all aspects of our operations to streamline our processes, improve operational resilience, and improve effectiveness and efficiency.

The optimizations in this report show the significant changes we have made toward self-improvement, cost cutting, and keeping our rates as low as possible, while maintaining a high level of service to our stakeholders.

Best Regards,

A handwritten signature in blue ink that reads "Roger S. Bailey".

**ROGER S. BAILEY,
GENERAL MANAGER**

OUR MISSION, VISION, VALUES, AND GOALS

MISSION

To protect public health and the environment.

VISION

To be a high-performance organization that provides exceptional service and regulatory compliance at responsible rates.

VALUES

- People
- Principles
- Community
- Leadership and Commitment

STRATEGIC GOALS

1. Provide Exceptional Customer Service and Maintain An Excellent Reputation in The Community
2. Strive to Meet Regulatory Requirements
3. Be A Fiscally Responsible and Effective Wastewater Utility
4. Recruit, Develop, and Retain a Highly-Trained and Safe Workforce
5. Maintain A Reliable Infrastructure
6. Embrace Technology, Innovation, and Environmental Sustainability



100%

ACHIEVEMENT OF OUR STRATEGIC GOALS AND INITIATIVES IN FY 2017-18

FY 2017-18

STRATEGIC ACCOMPLISHMENTS



CUSTOMER SERVICE

- Hosted the third Central San Academy to educate 39 interested members of our public.
- Celebrated the 20th Anniversary Household Hazardous Waste (HHW) Collection Facility and held a Collection Drive, serving 907 visitors - our highest participation week ever.



ENVIRONMENTAL STEWARDSHIP

- Achieved 20 consecutive years of total compliance with our wastewater discharge permit.
- Executed a memorandum of understanding with local water agencies to collaborate toward an innovative recycled water exchange to augment the region's water supply.
- Increased collection of HHW by 7% (140,594 lbs.) and unwanted pharmaceuticals by 4% (729 lbs.).
- Reduced sanitary sewer overflows by 36%, from 39 to 25.



INFRASTRUCTURE REHABILITATION

- Continued to meet critical needs identified in our Comprehensive Wastewater Master Plan.
- Installed approximately 10,000 feet of 18- to 24-inch trunk sewers as part of our Pleasant Hill-Grayson Trunk Sewer Project.



PHYSICAL AND CYBER SECURITY

- Received Municipal Information Systems Association of California Excellence in Information Technology (IT) Practices Award, as one of only four special districts to do so.
- Completed Security Assessment Master Plan.



CENTRAL SAN

CENTRAL CONTRA COSTA
SANITARY DISTRICT

ABOUT US



Central San is a special district governed by a five-member **Board of Directors**, who are elected by voters within the service area for four-year staggered terms.

182

-square-mile service area

290

budgeted full-time employees

Established in **1946**

Headquartered in **Martinez, CA**

Serving

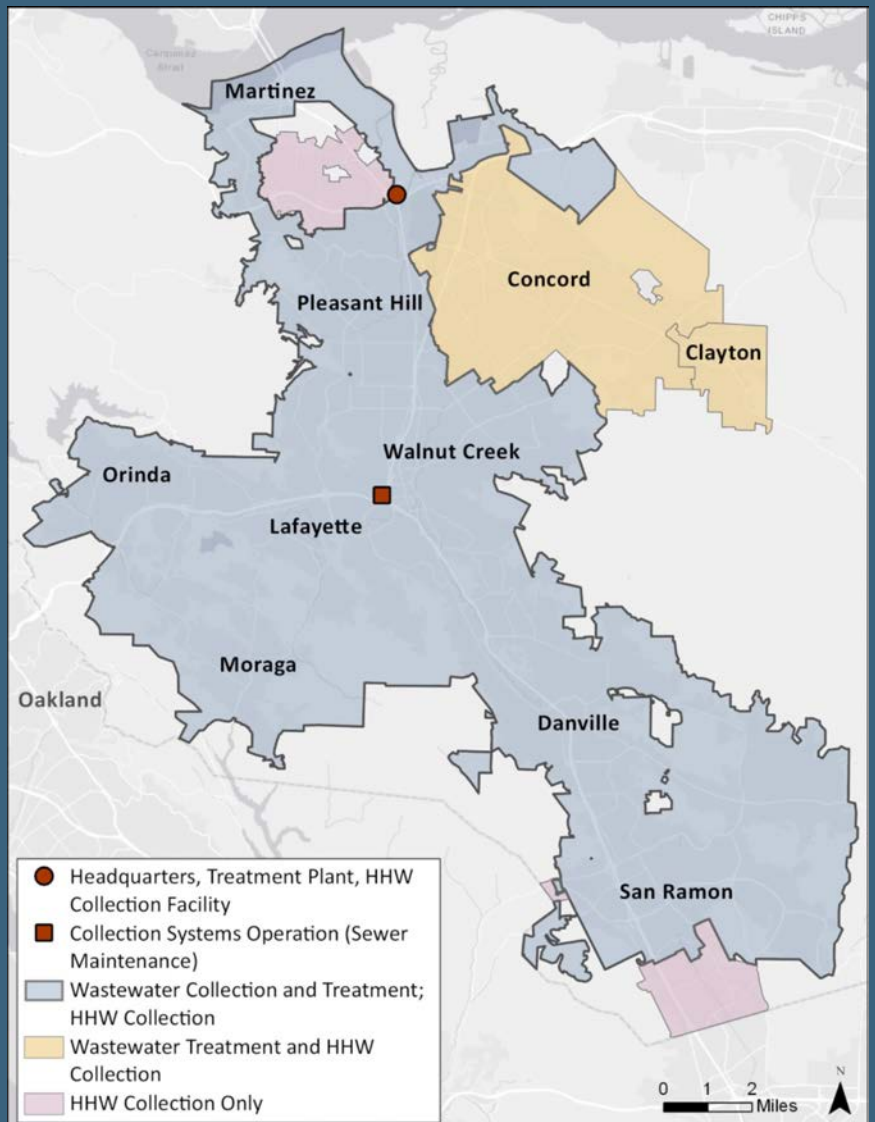
488,900 customers

and

3,000 businesses

1,540 miles of sewer pipelines
operated and maintained

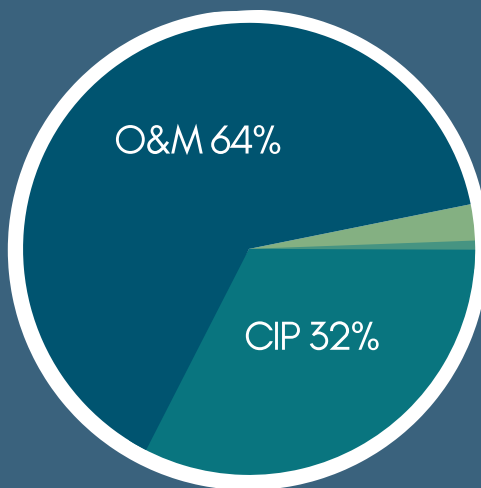
44M gallons of wastewater
cleaned and disinfected per day





\$139.5M TOTAL BUDGET FOR FY 2018-19

\$89.7M for O&M
\$45.3M for Capital Improvement Program (CIP)
\$3.6M for Debt Service
\$0.9M for Self-Insurance



Debt Service 3%
Self-Insurance 1%

2M pounds of hazardous waste per year collected and kept out of landfills and waterways each year



12,500 pounds of unwanted drugs collected each year by our Pharmaceutical Collection Program



11,140 visitors served at the Residential Recycled Water Fill Station



3,433 students educated in pollution prevention programs



BUSINESS PROCESS IMPROVEMENTS



As we prepare for a major project to replace the enterprise resource planning software at the foundation of our operations, we are identifying opportunities for efficiency within our business processes. The improvements made as a result of these efforts have made use of available technology, increased our predictability, and improved the sustainability of our operations.

COMPLETED PROJECTS

BUSINESS PROCESS DOCUMENTATION AND READINESS ASSESSMENT FOR ENTERPRISE RESOURCE PLANNING SOFTWARE

With assistance from the Government Finance Officers Association (GFOA), staff analyzed and documented business processes from Accounting, Asset Management, Benefits, Budget, Community Development and Permitting, Customer Billing, Human Resources (HR), Payroll, Personnel Recruitment, Procure to Pay, Capital Projects Planning, Risk Management, Treasury, and Property and Land Management. We identified opportunities for improvement in workflow, which will be incorporated in our new enterprise resource planning (ERP) software.

ELECTRONIC TIMEKEEPING

IntelliTime® is an automated time-reporting and leave-tracking tool that has eliminated paperwork in the timekeeping process. Employees have online access to their prior timesheets and accrual balances, and supervisors can see their workgroup's schedules at a glance. IntelliTime® went live on July 18, 2018 after testing on a pilot basis. This initiative required a significant investment from IT, end-users from different divisions who gave input in selecting the vendor, and all District staff who were trained on and support the use of the new program.

ENHANCED CUSTOMER WEBSITE

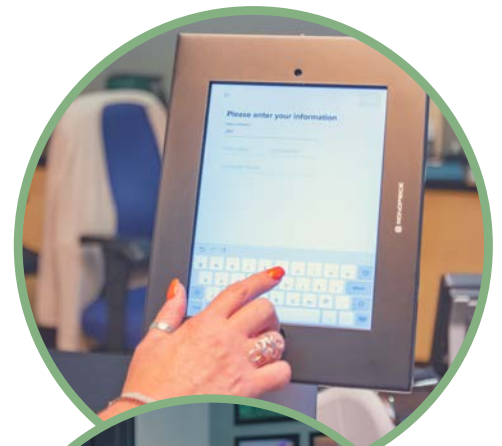
The new centralsan.org improves transparency and has the ease of use that customers have come to expect from us. It minimizes the number of clicks needed to find information and incorporates social media posts to refresh content. We used feedback from staff, the Board, and the public with site statistics to determine what visitors were most interested in seeing and how to best present that information.



ROOM SCHEDULING AND VISITOR CHECK-IN APP

The Teem® app displays a conference room's schedule on a tablet mounted just outside the room. Using the tablet, employees can check the room availability and schedule a meeting directly on the device. More conference rooms will have tablets equipped with this capability in FY 2018-19.

Using the same app, we now have a self-check-in tablet for visitors. Rather than signing a log book, visitors at the front desk now fill out their information on a tablet, which takes their picture and prints it directly onto a badge. Simultaneously, the app notifies our employees that their visitor has arrived via email and text.



PURCHASING REQUISITION TICKET SYSTEM

An electronic ticketing system was set up for Purchasing's internal customers to access their real-time requisitions statuses, as well as to fill out a customer satisfaction survey when their request is fulfilled. Purchasing will use the information to prioritize their workload and establish metrics to improve internal customer satisfaction levels. Because the Requisition Ticket System uses the same platform as IT's Helpdesk, there was no additional training needed.

CONTROL SYSTEMS WORK ORDERS

Our Control Systems group in the Plant now receives work orders through our computerized maintenance management system, Cityworks®. This allows them to manage their requests for improved ability to track their tasks, meet deadlines, and coordinate efforts with the maintenance shops. Their history of completed work orders will serve as a repository of problems and solutions, which will be useful for future troubleshooting and cost tracking related to Control Systems assets. There was no additional training needed since Cityworks® is already used to track Plant and Collection System Operations (CSO) maintenance work.

INTERNAL AUDIT PROGRAM ESTABLISHMENT

Central San developed a program to conduct internal audits on a limited number of high-risk functions annually. In FY 2017-18, its first year, we completed internal audits in payroll, petty cash, and procurement cards with the help of a contracted internal auditor. Suggested improvements have been made to the audited processes to improve efficiency and controls.

DOCUSIGN®

DocuSign® software for electronic signatures was piloted by one workgroup this year. During the pilot, staff realized savings in faster document processing and reduced paperwork; thus, Central San has made licenses and training available to other divisions such as Purchasing and Human Resources for potential future use.

AUTOMATIC VEHICLE LOCATION

Following a pilot in July 2017, Verizon's NetworkFleet® is now fully operational. This automatic vehicle location (AVL) program improves the ability for CSO to efficiently dispatch field crews to work sites based on locality, identifies locations for field site inspections, reduces response time to emergencies, and reduces fuel consumption. Staff is using the vehicle diagnostic reports to set benchmarks and create proactive maintenance plans, which will help control repair costs and reduce downtime.

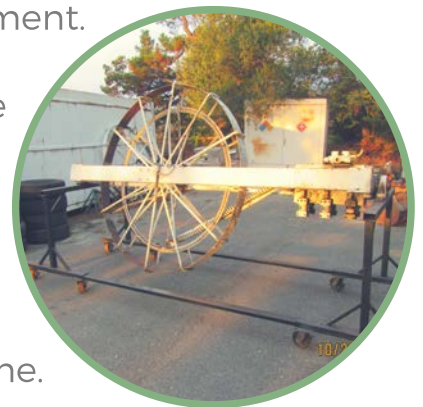


DIG SMART®

Central San also implemented Dig Smart®, which automatically creates a work order in our computerized maintenance management system, Cityworks®, for the approximately 20 Underground Service Alert (USA) locating requests received by CSO every day. In the past, we would have to manually create these work orders one by one from a Microsoft Excel® spreadsheet. Dig Smart® reduces the time spent creating work orders and ensures accuracy of input into Cityworks®.

ROD-STORAGE RACK

To perform maintenance on a rodding truck, staff must remove a heavy coil of metal from the truck to access the equipment. Staff would do this 10 miles away from the Vehicle Shop, at the treatment plant, where there is room to uncoil the many yards of rodding. This year, staff devised a way to repair the vehicle "in house" at the CSO yard. For each repair, staff now disassembles the rodding cage and uncoils the rod onto an empty reel which was manufactured in the CSO yard. This saves staff travel time and makes the process of repairing the truck less cumbersome.



MAINTENANCE HOTLINE

A phone extension was set up for Plant Maintenance staff to efficiently communicate with each other by leaving voicemails regarding callouts, defect eliminations, and other ideas to improve preventative maintenance efforts. The voicemails are automatically emailed to the Plant Maintenance Division Manager and Superintendent.

MECHANICAL SHOP REORGANIZATION

The Mechanical Shop's floor plan has been improved by relocating work-table-mounted grinders and wire wheels to the welding area and consolidating nuts and bolts shelving into proper storage cabinets with bins, thus opening space to create an area reserved for disassembled equipment awaiting parts that had once cluttered the shop work area and tables. Also, the grinder has been relocated to keep the “dirty work” in the already dirty welding area.



OTHER COMPLETED OPTIMIZATIONS

- Modified the Signature Authority Matrix to be less complicated, easier to read, and more in line with other agencies’.
- Established a new investment account at the County for improved tracking and segregation of funds, as well as better analysis of the adequacy of the reserve fund.
- Began live-streaming Board meetings to the lobby and on web-accessible devices, allowing employees to queue up the part of the meeting of interest in place of attending the meetings.
- Installed smartboards and cameras into conference rooms for improved meeting capabilities, including facilitation of remote interviews and meetings.
- Implemented Microsoft Office® 365 cloud tools including Office, Skype for Business, Microsoft OneDrive, SharePoint, and others.
- Replaced old reports done through our enterprise resource planning software with more than 20 new and improved business and financial reports, which are clearer to read and easier to produce.
- Outfitted Treatment Plant staff with tablets to provide them with mobile access to work orders, schematics, and other data.
- Simplified the Purchasing requisition approval process by establishing authorization levels based on supervisory position criteria, reducing the number of approval levels from 18 to 3.
- Began scoring Request for Proposals (RFPs) online using BidSync®, replacing a manual, labor-intensive process with a streamlined and fully automated process which includes the ability to create reports to substantiate the evaluation committee’s recommendation for award.
- Created online access to safety data sheets through MSDSONline.com.
- Started using iAuditor application to allow safety inspections to be conducted via cellphone or tablet.
- Updated and serialized Safety Directive Manuals and instituted paperless online access.

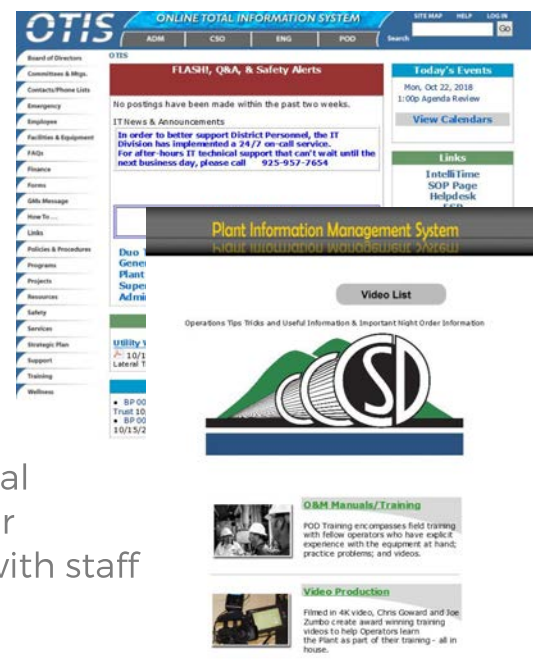
ONGOING PROJECTS

ERP SOFTWARE REPLACEMENT

SunGard HTE® has been Central San's ERP software since 1993. This foundational system manages the data for critical business processes, including Human Resources, Procurement, Accounting, Billing, and related subsystems. At first, staff had planned to perform targeted improvements to extend the life of the software, but when those improvements did not resolve the limitations staff was encountering, the decision was made to replace SunGard® completely. After extensive planning to ensure adequate staff resources, change management, and high-level support, we issued an RFP in May using a detailed list of 1,700 system requirements to ensure that responding vendors can meet all our business requirements. Following vendor selection, implementation is scheduled to begin in early 2019. Staff is now considering staffing augmentation needs to allow current employees to continue doing their daily work in addition to setting up the ERP and learning how to use it.

INTRANET REPLACEMENT

The current platform for the Online Total Information System (OTIS) and Plant Information Management System (PIMS) intranets are outdated, have slow response times, do not function properly on mobile devices, and are difficult to keep updated. The new intranets will allow staff to easily access the policies, procedures, training manuals and videos, and other data on the sites. A selection committee of employees received demonstrations from multiple vendors, and Digital Deployment®, which was also used to update our external customer website, is currently working with staff to complete the project.



RISK INVENTORY

In summer 2017, managers identified business areas presenting inherent risks which may require management and further attention. Those 70 risks, now in an inventory, are being evaluated for existing and planned risk mitigation measures, quantifying inherent and residual risk levels, and in consideration of the development of an enterprise risk management program, where risks are centrally monitored, mitigation measures are tracked, and reports can be made periodically to the Board.

DIGITAL PROJECT PLAN REVIEW

Permit Counter staff and Development Services inspectors are in the process of piloting new paperless technology with City of Walnut Creek staff that would allow engineering project plans to be reviewed and inspected digitally.

AUTOMATED SLUDGE RETENTION TIME CONTROL

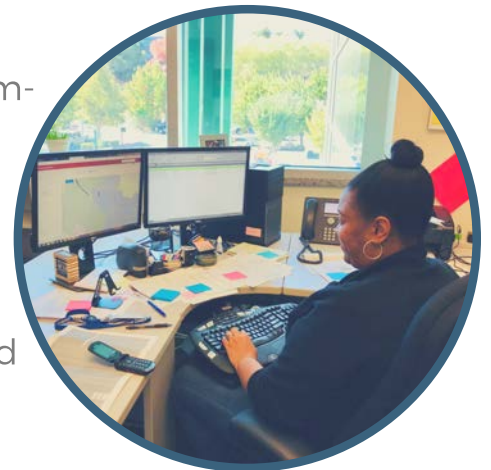
Consistent sludge retention time (SRT) has the potential to improve settling, which improves effluent quality, plant capacity, filter plant operation, and dissolved air flotation operation. To help maintain consistent SRT, an automated controls system was installed to continuously monitor and adjust the activated-sludge process. Before this change, Operators received the sludge age data once a day and manually made adjustments. The control software was tested in late 2017 and will go live in late 2018.

PROJECT MANAGEMENT INFORMATION SYSTEM (PMIS)

Asset Management staff began implementation of e-Builder® to track scheduling and cash flow of engineering projects. It will alleviate repetitive, manual data entry that is inefficient and time consuming and will be able to create reports quickly. Beta teams are currently testing e-Builder®. Training and rollout to all Capital Projects staff is scheduled for January to April 2019, with the goal of full adoption by July 2019.

PIPELINE CLEANING SCHEDULES

CSO continues to optimize cleaning schedules by combining workorders geographically to minimize visits to the same vicinity, which decreases drive time between job sites and increases productivity. Part of this effort is to convert approximately 23,000 lines of “routine” work orders into “scheduled” work orders, so each pipe will have a scheduled date for cleaning, and staff will be able to better manage the crews’ work schedules and reduce overdue cleaning work orders.



WINNER

CityWorks® Excellence in Departmental Practice Award, recognizing exemplary users who use CityWorks® creatively and contribute to the continued improvement of the platform.



REFINING USE OF CITYWORKS®

We continue to refine our use of CityWorks® at CSO by adding custom templates to better automate the internal reporting process.

Staff also collaborated to troubleshoot weak data signals to our crews' field tablets. We recently installed an upgrade to the CityWorks® mobile app for the added ability to cache maps. Crews can now access and enter information in the field by using the pre-loaded maps on their tablets, which syncs to the cloud.



INFRASTRUCTURE UPGRADES

Through responsible and robust maintenance practices, we have extended much of our infrastructure - originally built in the 1970's - well beyond its typical useful life. Therefore, we completed several optimizations this year to upgrade our equipment for reliability, safety, and compliance with current and future regulations.

COMPLETED PROJECTS

HEADWORKS SCREENING UPGRADES

Our Headworks Facility is the first stage of our complex treatment process and removes inorganics from the wastewater stream to protect and reduce wear on the downstream process equipment. To improve performance at this important step, as part of the planned CIP, we installed new bar screens, rehabilitated two standby screens, and added new odor control ducts and gas detection equipment. The enclosed design connects to the odor control system, which will assist with Health Risk Assessment compliance.

Overall, the project was a success with a very good rate of removal at an average of 23 tons of materials being collected monthly. We have also seen less plugging downstream and reduced the need to clean the ultraviolet lamps at the end stage of treatment.



ENHANCEMENT TO LUBRICATION PROGRAM

All Plant Maintenance staff uses oil and grease in their work, so it is important to have an efficient system in place for staff to have easy access to lubrication. Staff inventoried the grease guns and zerk fittings in the Mechanical Shop, assigned color codes, and distributed a chart to all Maintenance staff to help them easily identify the lubrication equipment by sight. This was a small investment to guard against possible cross-contamination of grease and save staff time in being able to quickly identify the greases by color.



VULNERABILITY/SECURITY STUDY

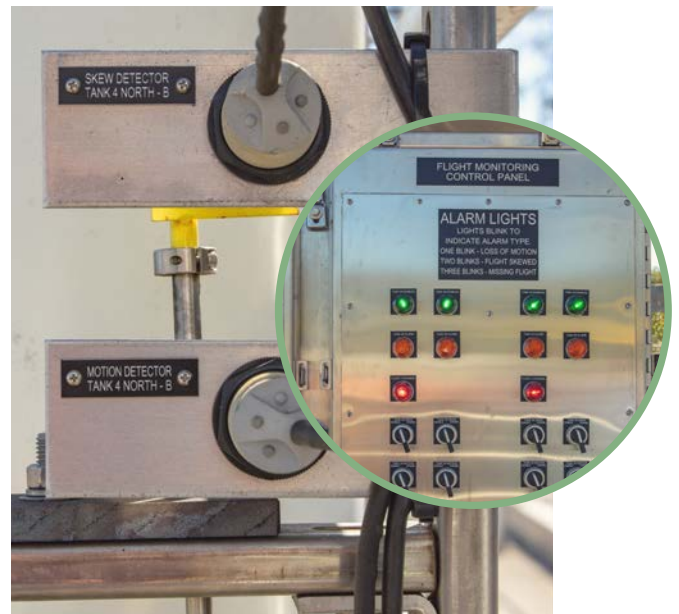
This was a multi-departmental effort to evaluate District-wide vulnerabilities and physical security improvements, including taking natural hazards like earthquakes and flooding into consideration. In FY 2017-18, staff evaluated 20 facilities and completed the study. A Security Coordination Committee has been formed to implement the recommended improvements in phases and develop recommended policies and programs.

PROXIMITY SWITCH PILOT AT PRIMARY SEDIMENTATION TANK

A proximity switch was installed at the Long Flight Collector #3 gearbox as a pilot to replace the mechanical limit switch. The mechanical limit switch was used to stop the motor if the chain binds up but was vulnerable to the corrosive environment. If the pilot succeeds, the proximity switch will be installed in all 4 long flight collectors when the tanks are down for maintenance in 2019.

LONG FLIGHT COLLECTOR MONITORING SYSTEM

A programmable logic controller (PLC) was installed to monitor normal operation in the sedimentation tank flights. The system includes a pivot arm stationed on each of the drive shafts, which protects flights from damage caused by a broken chain, skipped chain, or damaged flights. The PLC can sense when a flight is broken, so it can 1) shut off the drive motor to prevent further damage to the flights or chain and 2) alert Operators with local and remote alarms.



HYDRAULIC IRON WORKER

The Mechanical Shop now has a Hydraulic Iron Worker to fabricate small brackets, guards, pipe stands, racks, and custom tooling for around the plant, since manual fabrication methods are labor intensive. With this equipment, we now have the ability to shear instead of saw, punch instead of drill, cope and notch parts instead of torching, and to grind and drill by hand. This also eliminates a substantial amount of environmental hazards, such as fumes from a cutting torch and atmospheric particulates from grinding.





DON'T JUST FIX IT; IMPROVE IT

Our Plant Maintenance staff is constantly rehabilitating our assets to extend their useful life and optimize their performance, going beyond simply performing the preventive maintenance (PM) or repair, but also asking what more can be done. Work is categorized as a "Don't Just Fix It; Improve It" (DJFI) in the following situations:

- Proposal of an optimization idea
- Failure before an asset's useful life
- Repeat failures showing on the Bad Actors list
- Multiple reactive or corrective work orders on a high-criticality asset
- More than 1 reactive work order with a priority of 1 or 2 on specific asset between PM tasks.

In total, **14 DJFIs were completed in FY 2017-18**, including those on the following pages.

WINNER 2018 Uptime Award for Best Reliability Engineering for Maintenance Program recognizing excellence and leadership in reliability and asset management.



FURNACE NO. 2 CENTER SHAFT DRIVE

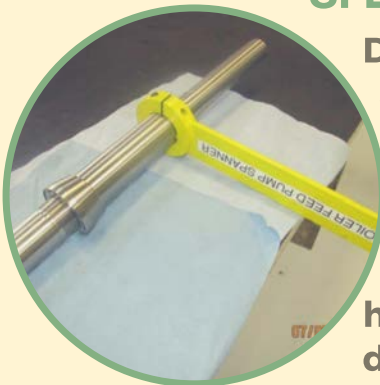


The old center shaft drive in our Multiple Hearth Furnace No. 2 had multiple issues. Its replacement parts were no longer available for purchase, and the hoses and hydraulic fluid were maintenance and failure points that could be removed with an updated design. Thus, a new design, involving an electric motor directly driving the gearbox, was constructed, and a variable frequency drive now controls the speed of the motor, which was not possible before. The new design not only reduces the possibility of failure, but also allows for easier maintenance and more system control.

REPLACED CONDUIT AT PRIMARY SEDIMENTATION TANK

Staff replaced a fiberglass conduit which was installed as a pilot with stainless steel rigid. The old conduit allowed water to drain into motors and other devices, causing water intrusion damage or shock hazard. The new conduit resolved the safety hazard and improves the reliability of the equipment.

SPLIT COLLAR WRENCH



Disassembly of the boiler feed pump nut sleeves was a constant challenge, as the wrench that was prefabricated for use was not properly designed. Staff machined a wrench from a split collar for the ability to apply greater torque. This made the disassembly task easier; reducing downtime, man hours, and components; and eliminating the risk of damage to the nut sleeve. This worked so well that staff is now designing a split collar wrench for the shaft as well.

ACCESS HATCH



A hatch was created for easier and safer access to a three-way valve at the pre-aeration basin. Prior to its installation, to reach the valve, Operators had to remove a panel and railing and perform a confined space entry, which took 2-3 hours.

OTHER COMPLETED DJFIS

- Modified the shear hub for South Clarifier No. 3's gearbox by adding a grease port to lube the hub, reducing the risk of a back injury for staff.
- Modified and rebuilt the long flight shear hubs at the primary sedimentation tank, simplifying operations by taking the guesswork out of installing the pin by adding a stop in the correct position.
- Added a manual blowdown feature for the cogeneration (cogen) differential pressure by installing piping testing/maintenance configuration to better maintain and increase uptime of equipment. This creates the ability to remove any possibility of condensation or plugging in impulse lines without powering down the cogen or the possibility of cogen falling offline due to a false reading.

OTHER COMPLETED OPTIMIZATIONS

- Replaced core networking switch to provide automatic redundancy through built-in failover mechanisms and a higher level of reliability of data delivery for every device with access to the network.
- Expanded network monitoring tools to proactively notify IT staff of outages.
- Installed shaft grounding rings on certain motors to minimize premature motor bearing failure.
- Designed and fabricated a weir basin for the pH probes for the wet scrubbers.
- Designed and fabricated a jib-style lifting device to facilitate removal of clarifier shear hubs to increase task efficiency and effectiveness.
- Modified auto-lubrication systems: a lid in the furnace for ease of refilling, ports and pumps for additional lubrication areas, and installed an auto-lubrication system on the induced draft fans to protect the split bearings.
- Designed, fabricated and installed new grit chutes with a smooth transition from a square port to a round flange, eliminating clogging up the grit washer conveyor.
- Improved resiliency against the ultraviolet (UV) disinfection bypass events by installing shutdown-delay timers and enhancing the outlet gate logic.
- Piloted sludge blanket detectors in the primary sedimentation basins and secondary clarifiers.
- Transitioned control of the induced draft fan from an obsolete local controller into the modern furnace PLC.
- Enhanced furnace oxygen control by improving automatic rate control of the air ports for Hearth No. 10.
- Implemented cogeneration British thermal unit control to save energy and simplify operation.
- Streamlined and cleaned Dynac® historian server to relieve storage space.



ONGOING PROJECTS

SECURITY DRONE

Central San has contracted with an aerial security vendor, Aptonomy®, to fly a drone around the property to supplement security personnel. The drone will be able to access and patrol areas quickly and easily. This project is currently pending Federal Aviation Administration approval.

STEAM AND BLOWER REPLACEMENT PROJECT

The current steam system is complex and aging. It requires significant maintenance and has the potential to perform more energy recovery. One of the issues is that the blowers do not operate reliably in parallel with the electric blower. Secondly, while they are sized for peak air demands, the blowers do not have adequate turndown for low-air-demand conditions, which triggers use of the air waste valve. Thirdly, the electric blower is a backup for emergencies but is undersized for the full range of air demands, so there is no redundant second electric blower.



The Steam and Blower Replacement Project, in the works as part of the planned CIP, aims to assess the condition and remaining useful life of the existing boiler feedwater, steam, and aeration systems as well as associated structural, electrical, and instrumentation and control systems. It will also confirm the best energy recovery and aeration system replacement alternative that addresses both current and future needs. The new equipment will be flexible and optimal for addressing potential future permit requirements for nutrient removal and supporting collaborative efforts to expand the use of recycled water such as the Refinery Recycled Water Exchange.

PORTABLE LOAD BANK

Pumping Stations recently purchased a portable pocket load bank for testing fixed and portable generators to verify operation under load. This unit will be used at the Concord Industrial, Clyde, Acacia, Flush-Kleen, and Crossroads Pumping Stations. The load banks will improve our existing maintenance program with standby power by being able to use a portable device for routine maintenance and troubleshooting.

The load banks will also be used on the two generators that have particulate filters. Getting the particulate filters hot enough will theoretically yield a good burn off, which will reduce the number of times they will need to be sent out for cleaning.





EFFICIENCIES

As we look to double our capital program budget next year and continue in our fifth year of keeping our O&M budget flat, we have implemented efficiencies to manage and reduce costs without sacrificing the high level of service our customers expect from us.

COMPLETED PROJECTS

WET SCRUBBER PILOT

One of our most significant endeavors was a wet scrubber pilot, which confirmed a new technology's performance and design criteria for reliable compliance with current and potential emission requirements. Staff from across multiple departments collaborated on this successful project, whose findings resulted in an estimated savings of \$14M for our ongoing Solids Handling Facilities Improvement Project.



WINNER

San Francisco Bay Area and statewide California Water Environment Association (CWEA) Engineering and Research

Research Achievement of the Year Award



OTHER COMPLETED OPTIMIZATIONS

- Refinanced debt to save approximately \$8.2M through 2029 on gross interest costs, compared to the interest payments on the old bonds, while maintaining the same overall term of the debt.
- Negotiated rate decreases to save \$297,130 in benefits costs through medical and dental providers.
- Saved \$50,000 by purchasing plant control systems hardware for the Input/Output Replacement Project at a discounted rate.
- Repaired two rodder assemblies in-house at CSO, which reduced the downtime for the vehicle from 4 weeks to 2 weeks per truck and saved about \$8,000 per truck in mechanics' fees. In total, for two rodders, we saved \$16,000 and one month of downtime for the truck.
- Enrolled in the Bureau of Automotive Repairs Smog Program to have our smog requirement waived by sending in the data from our AVL program. This saves us \$9,300 per year on smog costs for our 83 vehicles and staff time spent taking the vehicles to get smogged.

- Added a decanting and filtration system to the hot oil re-circulation machine to save and reuse re-circulated oil, saving about \$2,600 this year on the cost of new oil for the clarifiers.
- Continued to recirculate oil from furnace center shaft gearboxes and dissolved air flotation gearboxes.

ONGOING PROJECTS

LIME REDUCTION TESTING

Lime is added to the sludge in the Sludge Blending Tank before incineration to help condition the sludge for optimal dewatering in the furnace. Reducing the amount of lime added would have the potential to save hundreds of thousands of dollars per year in chemical costs and relieve capacity in the furnace.

Therefore, an ongoing collaborative effort across multiple departments has been ongoing to test the effects of reducing lime, including whether it will cause ash melting in the furnaces. The first phase, bench-scale testing, was completed in FY 2016-17. The second phase, full-scale testing, was postponed until after the furnace burner and burner control are upgraded.



SODIUM HYPOCHLORITE USAGE FOR #3 WATER

Before the UV systems were constructed and placed into service around 1998, the tertiary-treated (#3) water was secondary-treated water without any disinfection. It was not until after the UV system was implemented that Central San started adding sodium hypochlorite (bleach) to the high and low #3 water. Identifying the ability to reduce or eliminate the use of bleach in this instance as a potential efficiency, staff sought input from multiple divisions, tested samples, and gathered data.

Staff confirmed that there is not a chlorine residual requirement for in-plant water use within our National Pollutant Discharge Elimination System Permit, and the #3 water for on-site use is a Title 22 exemption we provide for ourselves. Thus, Central San could either eliminate sodium hypochlorite feed to the high and low pressure #3 water or significantly reduce the current amount used by as much as 50%. While there is not a capital cost associated with elimination, there is a capital cost with reduction that has a payback of approximately eight months. Plant Operations staff is working with Capital Projects to potentially carry out this optimization the future.

SOLIDS HANDLING FACILITY IMPROVEMENTS

The Solids Conditioning Building was built in the mid-1970's and has four levels. As part of the planned CIP, the project to improve the facilities addresses regulatory drivers with new air emission control equipment, improves employee safety with seismic improvements, increases resiliency, and replaces aging equipment.

Some of the components will optimize operations and result in lower O&M costs by reducing chemical, electrical, maintenance repair, and/or fuel expenses, including the following:

- New sludge blending tanks sized for better mixing of primary sludge and thickened waste activated sludge, improving sludge dewaterability.
- New polymer system, high-efficiency centrifuges, and cake pumps for increased reliability and more cake solids using less polymer, requiring less fuel for the furnace.
- New burners, controls, and combustion air blower system for the furnace, improving air emission (lower nitric oxides) with less fuel.
- New wet scrubbers, multiple hearth furnace emergency bypass, and ash slurry drain system with potential future treatment to reduce metals to ensure compliance with both existing and expected regulatory requirements.
- New wet ash loadout system, wet ash collection system, and ash slurry pump system to create less dust for increased employee safety.



IMPROVE SLUDGE PROCESSING BY OPTIMIZING SELECTOR

A good selector improves the performance of the secondary treatment process, hopefully resulting in a more consistent sludge volume index, reduction in bulking, and an increase in treatment and filter capacity, with the ultimate goal of achieving the wet weather capacity needed using existing infrastructure through improved performance.



If successful, the ongoing selector optimization, related to the Automated Sludge Retention Control optimization on page 11, could help avoid over \$10M of future capital improvements needs for another secondary clarifier for reliable peak wet weather capacity. Testing, currently in progress, will need to be conducted on a long-term basis to acquire reliable results for determining next step optimization actions.

ADOPTION OF UNIFORM PUBLIC CONSTRUCTION COST ACCOUNTING ACT (UPCCAA)

In May 2018, the Board adopted the UPCCAA to be effective September 1, 2018. With the UPCCAA, Central San can use informal bidding procedures for construction contracts of \$45,001 to \$175,000. For simpler, lower-cost projects, this has the potential to significantly reduce the administrative costs of bidding and allow for faster project completion, while retaining a competitive process and containing project costs.

REPLACE EXISTING LIGHTING WITH LED LIGHTS

A significant, District-wide effort was been initiated to upgrade high-intensity and other energy-inefficient lights to LED fixtures to save energy and maintenance costs. This has been going on for a few years, and, this year, the lights in the HHW Collection Facility sorting area, the high bay lighting in the Standby Power Building, and the Headworks Pump Room were all been replaced.

ON THE HORIZON

FORMALIZATION OF OPTIMIZATIONS PROGRAM

This fiscal year, we created a structure for our optimizations program which tracks progress, establishes executive oversight, and ingrains optimizations into the company culture as an everyday mindset. Each division has identified at least one critical process to consider optimizing in FY 2018-19, listed below.

OPTIMIZATIONS CONSIDERED TO BEGIN FY 2018-19

As we move into the 2018-19 fiscal year, staff will continue to work on the ongoing optimizations projects from FY 2017-18, including significant District-wide efforts such as the replacement of our ERP software, adoption of the UPCCAA, and use of the PMIS, in addition to the following:

- Install permanent cameras in the Multipurpose Room to record training sessions, special presentations, Board workshops, Central San Academy, and other events. This will reduce staff time to record videos, eliminate the potential safety hazards of cords running along the ground, and broaden the possibilities for video recording in the room.
- Enhance our performance evaluation system to make the process less cumbersome and emphasize the delivery of meaningful feedback.
- Switch to CalPERS health for more cost-effective employee and retiree healthcare plans, which will provide the same coverage at a reduced cost to Central San through membership in a larger risk pool.
- Adopt unified communication tools across mobile and desktop phone systems to possibly reduce the number of telephone licenses and hardware. This will also streamline Emergency Operations Center activities by simplifying the establishment of a live phone line.
- Increase staffing versatility and improve efficiency at the HHW Collection Facility by adjusting the contracted staffing levels.

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- Develop a system for Board Policies and Administrative Procedures management, including a standardized file folder structure, comprehensive tracking log, and biennial administrative procedure review process to coincide with related the related Board Policies.
 - Link photos to assets in our geographic information system, so staff can better identify what and where specific pieces of equipment are within the treatment plant.
 - Analyze the results of the AVL program to identify any vehicles that could potentially be decommissioned with minimal impact to staff.
 - Implement various testing programs to avoid equipment downtime, increase reliability, and increase effectiveness, including breaker / overload testing to protect circuits from damage, active electric motor testing / troubleshooting, and ultrasound testing programs for bearing testing / re-greasing and energy savings.
 - Replace the Furnace No. 2 oxygen analyzer, which often becomes clogged with fine furnace ash, with a new analyzer that is more robust and will not need the same amount of maintenance. Staff will perform side-by-side oxygen testing on the new analyzer, then complete a Relative Accuracy Test per regulatory requirements to certify the new oxygen analyzer as a compliance monitoring instrument.
 - Establish valve exercising program to ensure that valves do not stop functioning due to lack of use, to avoid unforeseen delays in capital projects.
 - Install grit washer auger exercise timer to operate auger briefly but on a fixed schedule. This prevents grit drying out inside the equipment and causing current overloads on the auger motor.
 - Improve reliability of the UV disinfection basins by replacing obsolete control hardware, pilot testing on low transmittance, and coordinating with the Capital Improvement Program to eventually replace the UV system with a new one with variable power controls.

ACKNOWLEDGEMENTS

Central San is made of a diverse group of employees with varying skills and duties, yet we have found opportunities to optimize processes across our organization and will continue to do so as we move into FY 2018-19. Committing to optimize often means changing our past practices or routines, and, at times, it also requires a significant amount of work to launch and maintain. We are grateful to have staff who recognize the importance of laying this groundwork for long-term success.

None of the accomplishments in this report would be possible without the hard work, ingenuity, and collaboration of our staff; the oversight of our managers and executives; and the support of our Board of Directors.



ACRONYMS

FOUND IN THIS DOCUMENT

- AVL - Automatic Vehicle Location
- CIP - Capital Improvement Program
- CSO - Collection System Operations
- DJFI - Don't Just Fix It; Improve It
- ERP - Enterprise Resource Planning
- FY - Fiscal Year
- HHW - Household Hazardous Waste
- IT - Information Technology
- O&M - Operations and Maintenance
- PLC - Programmable Logic Controller
- PM - Preventative Maintenance
- PMIS - Project Management Information System
- RFP - Request for Proposal
- SRT - Sludge Retention Time
- UPCCAA - Uniform Public Cost Construction Accounting Act
- UV - Ultraviolet

