



FISCAL YEAR 2019-20

**OPTIMIZATIONS
PROGRAM
ANNUAL
REPORT**



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This report provides the status of optimizations completed and in progress between July 1, 2019 and June 30, 2020. Optimizations can create efficiency, save time, be cost effective, improve safety, or all of the above. The projects have been categorized by their main objective or benefit:

- **Business Process Improvements** - new ways of working to streamline and modernize operations through technology, leverage data to make smart business decisions, and adapt to safely provide exceptional customer service during the COVID-19 pandemic.
- **Infrastructure Maintenance and Upgrades** - improvements to assets to enhance performance, lengthen lifespan, add redundancy, increase resiliency, and simplify operations; studies and pilots to assess ways to optimize infrastructure; and maintenance practices to monitor asset conditions and perform work orders effectively and efficiently.
- **Efficiencies** - actions which save money by reducing staff time on repetitive tasks and by prudently planning financial spending on large-scale capital projects.

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ACHIEVEMENTS
IN NUMBERS

31 OPTIMIZATIONS
COMPLETED

23 PROJECTS
IN PROGRESS



PROGRESS IN A PANDEMIC

A MESSAGE FROM THE
GENERAL MANAGER

Central Contra Costa Sanitary District (Central San) has long emphasized optimizations as a means of realizing our vision of becoming an industry-leading organization in innovation. We believe optimizations can come in all sizes and that even the smallest of adjustments can have a significant impact. Each of the optimizations in this report has helped us become a highly efficient and effective utility with a focus on continuous improvement.

The year 2020 has required us to ask even more of our employees: not only to act quickly and flexibly to ensure each others' safety and the continuation of our service to the public in response to the COVID-19 pandemic, but also to discover creative ways to find cost savings to pass along to our customers during a difficult time in our economy.

I am incredibly proud and grateful for our team's ingenuity, teamwork, and dedication to finding new ways to optimize our work - all while maintaining our high level of customer service and our reputation for being responsive and reliable. To help show our gratitude, we launched our first Innovations Fair in fall 2020, which celebrates and shares stories of innovation at Central San over the last three years. We also launched a Smart Initiative Steering Committee in January 2020 to help implement smart utility projects and leverage data to optimize operation and maintenance; improve asset management; increase energy efficiency, staff productivity, and safety; and reduce facility management costs. This is in addition to the many individuals and workgroups who champion futuristic thinking and innovations, even in a year like this with multiple competing priorities. This report is a celebration of our truly wonderful staff.

A handwritten signature in black ink, appearing to read "Roger S. Bailey". The signature is fluid and cursive, written in a professional style.

GENERAL MANAGER

Roger S. Bailey

ABOUT CENTRAL SAN

Established in 1946, Central San is a special district responsible for the collection and treatment of wastewater for nearly 500,000 residents and more than 3,000 businesses. It is headquartered in Martinez, California, approximately 30 miles east of San Francisco.

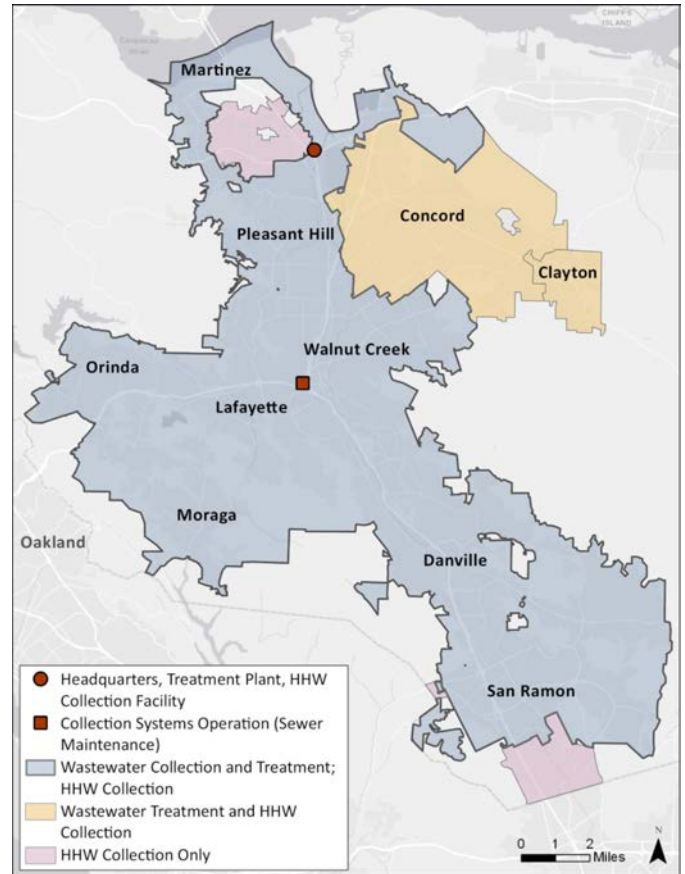
Central San serves the communities pictured in the service area map on the right. Central San maintains 1,540 miles of sewer pipelines and cleans an average of 36 million gallons of wastewater a day.

Central San has 293 budgeted full-time employees led by a General Manager, three Department Directors, and 13 Division Managers.

ENVIRONMENTAL STEWARDSHIP

Since 1997, Central San has operated a Household Hazardous Waste Collection Facility (HHWCF) that serves approximately 24,000 residential and small business customers, keeping more than 1.7 million (M) pounds of hazardous waste per year out of landfills and waterways.

Central San also operates a Residential Recycled Water Fill Station to provide customers with recycled water at no additional charge. Through the fill station and the Recycled Water Program, Central San distributes about 200M gallons of recycled water each year to help augment the potable water supply in the service area.



GUIDED BY A STRATEGIC PLAN

Every two years, Central San adopts a Strategic Plan as a roadmap to accomplish the goals set by the Board of Directors, reflecting the priorities and practices for the following two years. The FY 2020-22 Strategic Plan includes *Goal 6 - INNOVATION AND OPTIMIZATION: Explore new technologies for continuous improvement*, setting forth the strategies, initiatives, and key success measures to drive optimizations and innovations to manage costs and embrace technology. In tandem with the annual Optimization Program Annual Report, the Goal 6 key metrics help track progress in innovations and optimizations across Central San.

MISSION

To protect public health and the environment

VISION

To be an industry-leading organization known for environmental stewardship, innovation, and delivering exceptional customer service at responsible rates

VALUES

PEOPLE

- Respect customers and employees
- Work efficiently and effectively as a team
- Celebrate our successes and learn from our challenges

PRINCIPLES

- Be truthful and honest
- Be fair, kind, and friendly
- Take ownership and responsibility

COMMUNITY

- Collaborate with water sector partners
- Foster community relationships
- Be open, transparent, and accessible
- Understand service level expectations

LEADERSHIP AND COMMITMENT

- Promote a passionate and empowered workforce
- Encourage continuous growth and development
- Inspire dedication and top-quality results
- Provide a safe and healthful environment

STRATEGIC GOALS



BUSINESS PROCESS IMPROVEMENTS

NEW WAYS OF WORKING TO STREAMLINE AND MODERNIZE OPERATIONS THROUGH TECHNOLOGY, LEVERAGE DATA TO MAKE SMART BUSINESS DECISIONS, AND ADAPT TO SAFELY PROVIDE EXCEPTIONAL CUSTOMER SERVICE DURING THE COVID-19 PANDEMIC.

ENTERPRISE RESOURCE PLANNING (ERP) SYSTEM REPLACEMENT

No discussion of Central San's business process improvements would be complete without the impact of the largest optimization project of the year: to replace the dated and inefficient CentralSquare / SunGard HTE enterprise resource planning (ERP) system with **Oracle Fusion Cloud**.

Spanning multiple years, this has been a highly complex and time-consuming effort involving conference room pilots, user acceptance testing, closing of configuration gaps, data conversion system documentation, and training staff.

The project was already on an aggressive schedule when the pandemic impacted staff availability and consumed any padding built into the project timeline. Despite these challenges, the timeline was largely held intact. The Employee Self Service and Time and Labor modules went live, and, after a parallel test period, the financial systems' full cut-over took place on September 1, 2020. There is still more to go to bring all the core business processes into this new software, including the Benefits module for even more employee self-service capability, the Payroll module in January 2021 to launch bi-weekly pay, and the Budgeting module in early 2021.

The new, more user-friendly ERP is already increasing automation, making it easier to produce reports, allowing for real-time data entry synchronization and authorization, and centralizing record keeping. Other business process improvements that staff performed with relation to the new ERP were as follows:

- **General Ledger and Sub-ledger Systems Modernization** – Migrating the cash management, fixed assets, payables, projects, receivables, inventory, and purchasing systems out of SunGard and into Oracle significantly enhanced the value of operational information tracked, saves staff time, improves customer service, and improves the quality and reliability of financial information for stakeholders.
- **Chart of Accounts Update** – This update was conducted with the assistance of a Certified Public Accountant consultant who surveyed staff, identified pain-points in the chart, compared the approach to industry best practices, and recommended changes. Now, informational reporting meets the needs of internal staff, Board Members, and the public, and the accounting system design minimizes manual processes.
- **Electronic Signatures and Approvals** – These were first brought to Central San a few years ago with the use of DocuSign, which significantly improved timeliness in document routing and execution, tracked document statuses, and eliminated mail sitting in an inbox. When staff began teleworking, DocuSign became more widespread in administrative processes as an essential tool in keeping Central San's business running – with the added germ-avoiding bonus of reducing the touching and routing of papers during the pandemic. On September 1, 2020, Oracle Fusion Cloud went live, offering all new paperless ways to process and approve important business actions. While DocuSign provided a valuable temporary solution for Finance to facilitate approvals while working in a remote environment, Oracle is taking approvals to a whole new level for the foreseeable future. Now, invoices, procurement card expense reports, travel reimbursements, requisitions, purchase orders, timecards, and many other activities are approved within the ERP, making it a “one-stop shop” system of record. Furthermore, integrated electronic approvals will vastly improve internal controls by preventing transactions from occurring absent proper approval in the system.

With Oracle’s DocuSign integration, Purchasing will be able to continue using DocuSign on contracts for secure and authentic electronic signatures, faster turnaround, standardized business processes, and increased oversight, but in a more streamlined way. This integration will initiate the signing process, and when completed, will automatically store the executed documents within the record in Oracle. The system will also send automatic notifications to appropriate parties. This automation will replace the current manual processes and will provide departments with greater visibility and accessibility into their contract documents all in one centralized location.

ADAPTING TO COVID-19

To maintain customer service standards (from a social distance) and continue to communicate important District messaging, staff quickly implemented these optimizations in response to the COVID-19 pandemic.

- Staff began using new technology to stay connected and effective, including learning to use **Microsoft Teams** to instant message, conduct virtual meetings, and make telephone calls while teleworking.

VIRTUAL OUTREACH AND EDUCATION PROGRAMS

- Staff transitioned Central San’s outreach and education programs into engaging virtual formats. Pairing pre-existing 360-degree photos with recorded audio guides, a **Virtual Treatment Plant Tour** was added to the website. **Plant Tour Q&As** are held periodically online to answer questions from the public.
- **Student education courses via Zoom** have reached over 650 students so far, and a **Virtual Speaker’s Bureau** has presented to 12 groups totaling over 400 people.



- New **distance learning resources** have been posted online which teach hands-on science using common household items, ensuring that nearly everyone has the necessary materials available to participate.

Headworks

0:00 / 1:55

Powered by 360player.io

Click and drag to look around

Wastewater, which is generated by homes and businesses located throughout Central San’s service area, flows through a collection system of underground pipes to our wastewater treatment plant in Martinez.

The first process area that the wastewater encounters upon reaching the treatment plant is known as the headworks. Wastewater also enters the headworks via septage trucks, or “honey trucks.” These trucks deliver their wastewater directly into our system by pumping their contents into holding tanks below ground.

This combined wastewater flow is screened to remove large objects.

Toilet Paper & Non-Toilet Paper

Hi Kids! I'm Toot the Toilet. I'm a Pipe Protector!

You know, people flush lots of different things down the toilet. Some things are supposed to go down the drain and others are not. But it can be really difficult to tell the difference. It's especially hard to know what happens to all that stuff after we flush it. That's because we never get to see that stuff again once it goes down the drain.

Here's an activity you can do that is designed to help us actually see what happens to our toilet paper (and other kinds of paper) after we flush them.

FIRST, make sure you have all of the items you will need for this activity:

- 2 clear plastic or glass containers with lids. Recycled food containers work great! You can use a cleaned jar of peanut butter, or salsa, or jam, or tomato sauce, or milk, or juice.
- 1 square of toilet paper.
- 1 equal-sized piece of paper product that is not designed for the toilet. This could be a tissue, a napkin, a paper towel, a disinfectant wipe, etc.
- (optional) Scissors. You may want to cut your paper towel, napkin, etc. so that it's the same size as a square of toilet paper.
- Water.
- Pen, colored pencils, crayons, or markers for sketching.

Top left: a student education program held via Zoom.

Bottom left: the start of the Virtual Treatment Plant Tour.

Right: an at-home activity to help students understand why some solids are designed to go down the drain and others are not.

BUSINESS PROCESS IMPROVEMENTS

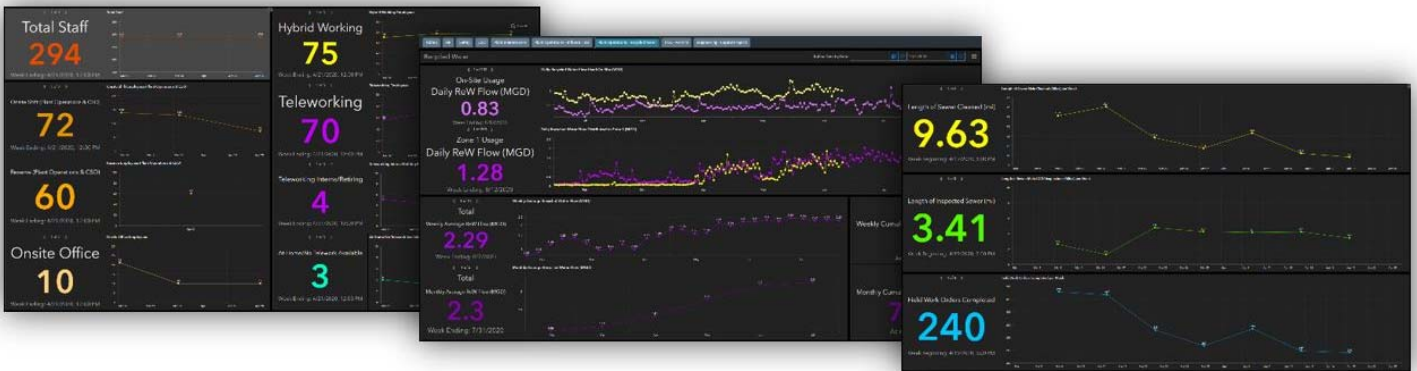
INVOICING VIA PAYPAL FOR PERMIT COUNTER CUSTOMERS



Despite physical closure of the Permit Counter to the public due to COVID-19, the use of electronic invoicing has allowed customer service to continue. As a secure and commonly used method of payment, **PayPal** not only allows customers to pay using their credit cards or bank debit cards, but it also has superior transaction reporting. Permit Counter and Finance staff receive notifications, so each can perform their responsibilities and maintain effective internal controls. Coordinating with Contra Costa County as its Treasurer, the District began accepting payments through PayPal as a successful pilot program during the pandemic. This is also a step towards a more fully integrated permitting and payment system that will be in place with the transition to the Oracle Permitting and Community Development module.

EMERGENCY RESPONSE AND MANAGEMENT DASHBOARDS

When Shelter-in-Place began, Central San had to quickly review and assign work locations to protect critical front-line staff who needed to be at the treatment plant or in the field. It was also important to maintain the same level of productivity and service. The **Emergency Response and Management Dashboards** (pictured below) were launched to provide critical insights to help guide staff allocation and resources; make COVID-19 response decisions; and track metrics such as feet of sewer mains cleaned, daily influent flow treated, plant maintenance activities performed, permits processed, engineering capital projects in construction or out to bid, and safety trainings completed.

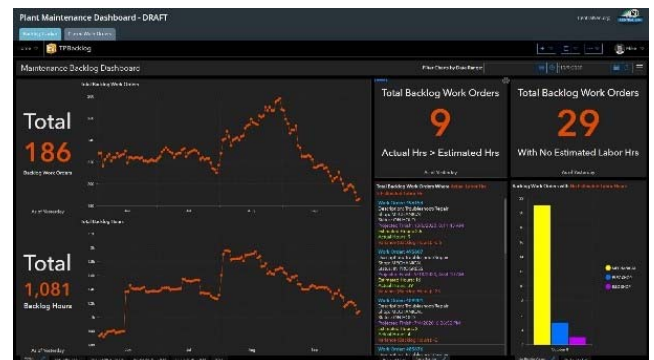


(MORE) DASHBOARDS AND APPLICATIONS FOR DATA-DRIVEN DECISION MAKING

As Central San continues to amass data on its assets, work orders, and inspections, being able to easily digest and understand the data will be valuable for decision-making.

PLANT MAINTENANCE DASHBOARD

The **Plant Maintenance Dashboard** provides work order quality assurance / quality control (QA/QC), which is critical for planning future maintenance work and allocating work. It also provides insights for resource and workforce management, as well as easily accessible and intuitive metrics to track the performance of various Maintenance shops. The dashboard can also compare annual work orders or compare quarterly statistics in 2019 and 2020.



RELIABILITY ENGINEERING TOOL

The follow-up to last year's Asset Lifecycle Tool, the **Reliability Engineering Tool** provides insight into the work being done to maximize the useful life of essential Treatment Plant and Pumping Station assets. It can also be used to filter assets by Process/Sub Process/System, asset class, availability of spare assets, availability of spare parts, Preventive and/or Predictive Maintenance programs, and whether a Reliability Analysis was performed.

The computerized maintenance management system, Cityworks, previously did not have an easy interface to visualize all the Preventive or Predictive Maintenance Program and special Reliability Analysis work orders for a particular asset. This tool does that and saves time by providing a central location to identify the maintenance needs of significant assets and possible failure modes of assets. It also provides the ability to QA/QC the performance of regular maintenance to lessen the likelihood of the asset failing, and it helps Plant Maintenance to monitor assets for future failure and perform preventive maintenance (PM) as needed.

Asset Maintenance Information
Preventive Maintenance Program for AssetId: 468 / LegacyId: 24210 Wet Well 2

The table below will likely only reflect Preventive Maintenance (PM) work orders that are triggered by calendar-based cycles (eg. every n months or n years). PM work orders that are triggered by runtime hour readings from the Dynac SCADA system generally will not be shown. However, if a recent runtime hour reading passed a configured threshold value (eg. n hours) and automatically created a new PM work order (and that work order has not yet been completed and closed), that work order will be shown.

No.	Status	Date	Requested By	Description	Instructions	Comments	Compliance or Safety WOT?
473141	INITIATED	10/21/2021	N/A	PM Plant Motors Lube 1 Year	Perform lubrication per attachment. [PM ID # 870]		NPDES
469311	INITIATED	10/21/2020	N/A	PM Plant Motors Lube 1 Year	Perform lubrication per attachment. [PM ID # 870]		NPDES
498156	INITIATED	10/08/2020	N/A	PM Vulcan Screens 1 Week	Perform PM. See attach SOP. Check the amount of grease left in the auto lubers on both washer compactors. Replace if 10% or under.		N/A
496170	ASSIGNED	09/23/2020	N/A	PM Headworks Primary Log Daily			NPDES
496310	INITIATED	10/19/2019 10:42	N/A	PM Gate Valve Stems 1 Year	Perform maintenance per attachment. [PM ID # 1340]		N/A

Showing 1 to 5 of 5 entries

Treatment Plant Asset Information
Reliability Engineering

Data Selection

Please set at least one of the following criteria:

Process: Filter Plant & RevW | Sub Process: Cleanwell | System: Cleanwell Structure

Asset Class: All | Spare Asset Available: | Spare Parts Configured: | Preventive Maintenance (PM) WOs Configured: 1 or more | Predictive Maintenance (PdM) WOs Configured: | Reliability Analysis (RA) WOs: |

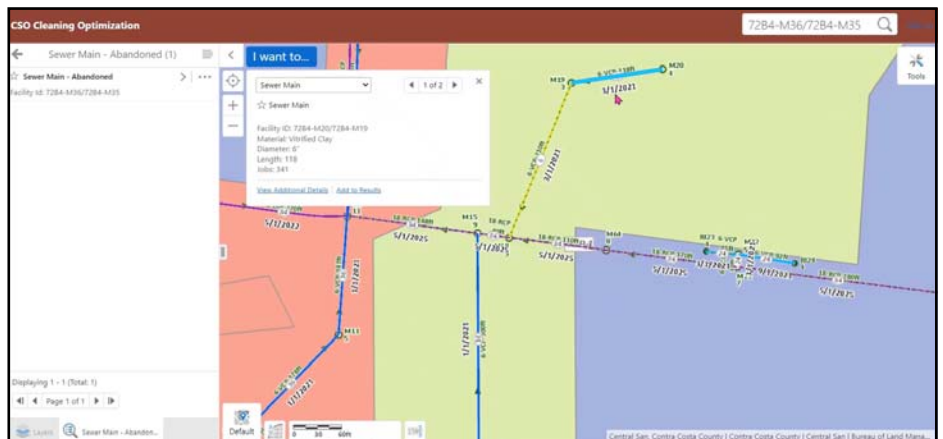
Legacy ID	COF	POF	BRE	Replacement Cost	Process	Sub Process	System	Asset Class	Spare Asset Available	Spare Parts Configured	PM Work Orders Configured	PdM Work Orders Configured	RA Work Orders
47000	3	4	12	\$13,300,000	Filter Plant & RevW	Cleanwell	Cleanwell Structure	Basin	✗	✓	2	0	0
47001	3	6	18	\$12,000	Filter Plant & RevW	Cleanwell	Cleanwell Structure	Valve	✗	✗	1	0	0
47002	3	6	18	\$12,000	Filter Plant & RevW	Cleanwell	Cleanwell Structure	Valve	✗	✗	1	0	0

WORK ORDER TABLE

Another data display was created using data from Cityworks, which records work orders, estimated and actual labor hours, when a work order has been completed or closed, and more. The **Work Order Table** hosts over 470,000 records and organizes assets, work orders, and inspections data by work categories, such as preventive or reactive maintenance, as well as by Maintenance Shops.

WEB APPLICATIONS have also become a useful tool in creating visuals for staff to more efficiently perform their work. Some applications developed this FY include the following:

- **Pipeline Cleaning Schedules Web Application** (pictured), helping staff to use geospatial location information to optimize pipeline cleaning schedules.
- **Septic Parcel Identification Web Application**, assisting staff in identifying parcels that are potential septic conversion candidates.



BUSINESS PROCESS IMPROVEMENTS



RELAYING DATA POINTS FOR TUNING VIA FACETIME

From time to time, an operator and an outside contractor "tune" an auxiliary boiler to fuel the machinery efficiently and within the tight air regulation ranges. This requires knowing how much fuel is used at each step in the tuning process. Without a local read-out at the boiler itself, the Plant Operator must communicate verbally what the fuel flow is to the Control Room via a two-way radio.



Full of fans and motors, the auxiliary boiler room is very loud, making it difficult to hear. On a particularly busy day where other radio chatter made this situation even more challenging, staff devised a solution: to **communicate the data visually through the iPhone FaceTime app**. The Control Room positions the broadcasting iPhone camera at the data point that is needed by the Operator in the field, who can see the data point on his/her iPhone, so the boiler-tuning contractor can get accurate flow measurements (worthy of a thumbs up). This saves staff time by relaying data points instantly and reduces errors in potentially mis-hearing the radio communication. This technique of using FaceTime has since spread to other workgroups and processes when data points that are not available in the field are needed from the Control Room.

USING CITYWORKS FOR RECYCLED WATER CUSTOMER COMPLIANCE ANNUAL INSPECTIONS

Annual inspections performed for the Recycled Water Program have historically been recorded in hard copy, but, this year, staff transitioned the process to an electronic method. When performing the inspection in the field, staff can now **enter the data directly into Cityworks on their mobile device**. Cityworks then archives the reports and allows staff to print them on demand, saving time on data entry and improving record keeping.

ACCESSIBILITY DEVICES FOR TOUR PARTICIPANTS

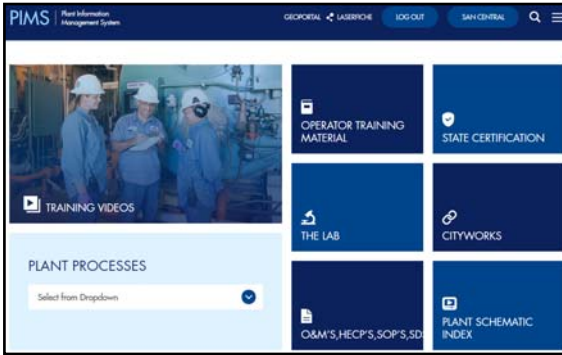
Central San's public plant and operational tours take place in several areas of the campus with loud conditions, such as the Solids Conditioning Building. To make the tours accessible for those with hearing aids or who are hard of hearing, staff acquired **accessibility devices**. This not only provides access to plant tours for those with disabilities, but also helps ensure that tour participants without hearing impairments can have a more comfortable experience.



PRESSURE RELIEF AND WYE DEMOTION

In the asset registry of gravity sewer mains, pipes are segmented by pressure reliefs and wyes as defining structures. This project **combined over 2,000 pressure relief pipe segments and their related work orders** and **combined over 500 wye-related pipe segments and their related work orders**. Doing this enhanced the Geographic Information System (GIS) data structure, optimized the asset registry, and streamlined the cleaning and inspection process. It also eliminated any unintended duplication of cleaning efforts and decreased the numbers of work orders cleaning crews needed to open.

PLANT INFORMATION MANAGEMENT SYSTEM (PIMS) RELAUNCH



The relaunched **PIMS site** is more user friendly, organized, and easily searchable than its predecessor. The site is also accessible from any Central San computer or mobile device and is a comprehensive library for everything Treatment Plant related, including detailed Plant process information; up-to-date training videos; standard operating procedures (SOPs); Hazardous Energy Control Program information; state certification study tools and information; schematics; operations and maintenance manuals; and lab and regulatory information.

DRONE FOR OUTREACH, PROJECT PROGRESS, AND CRISIS RESPONSE

Central San recently acquired a **drone** to 1) produce high-impact content for customers to see their rates and fees in action by highlighting infrastructure and major capital projects, 2) perform progress mapping for projects, and 3) assess damage impacts during crisis response. Getting the drone off the ground was a multi-step project done in collaboration with the Federal Aviation Administration (FAA). Step one – finding a pilot – was easy since Communication Services already had a licensed pilot on staff. The next step was purchasing the drone, which staff did after determining which models would meet the latest FAA guidelines. Finally, in August 2020, the FAA Air Traffic Control Manager granted the District a 24-month special approval to fly in proximity to nearby Buchanan Airport, and staff has begun conducting test flights.

EMERGENCY NOTIFICATION AND COMMUNICATIONS SOFTWARE

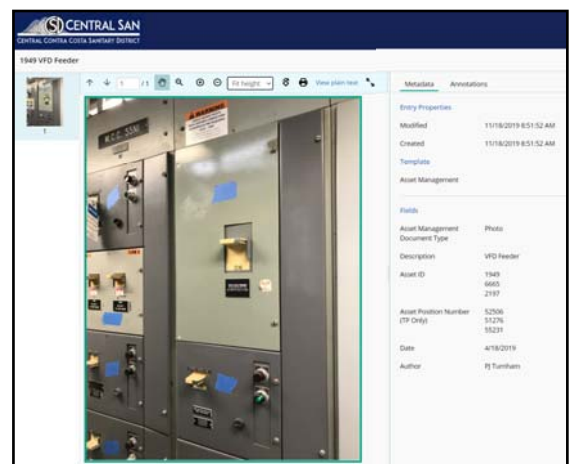
Central San purchased **Everbridge**, a software suite of emergency notification and communication tools that speeds up emergency notifications and check-ins and the provision of incident status reports and field communications during disasters. The software has been used to communicate with individuals and work groups via desktop phones, cell phones, emails and text messages.

ENTERPRISE RISK MANAGEMENT (ERM) PROGRAM

Enterprise Risk Management refers to an organization's ability to understand, express and control the level of risk taken to meet its strategic goals and establishes accountability for those risks. Central San's ERM program began several years ago when managers and staff developed operational risk inventories for their programs, services, and functions. These risks were integrated into a strategic risk inventory developed by the Executive Team. The ERM Team periodically reviews and updates this inventory, monitors the effectiveness of existing mitigations, and considers new mitigation techniques to manage Central San's evolving operational and strategic risks.

LINKING ASSET PHOTOS TO ASSETS IN GEOPORTAL

Staff often take time-stamped photos of assets to record their condition and/or location information. Many of these important photos were stored in private network or computer folders that were neither accessible or searchable to other staff, nor organized or linked to an asset. Treatment plant, collection system, and recycled water distribution asset photos are now stored in Laserfiche with the correct metadata, so all staff can **search for and access the photos in one central location**: Central San's geospatial web mapping software, GeoPortal (as pictured).





COLLECTION SYSTEM OPERATIONS (CSO) INNOVATION WORKGROUP

The CSO Division is so dedicated to finding optimizations that they have created an Innovation Workgroup consisting of members from different sections of the division. They meet regularly to discuss and propose innovation opportunities and have one project under their belts (the Overflow Simulator) and one in progress (an Easement Truck).



SMART INITIATIVE STEERING COMMITTEE

The Central San Smart Initiative Steering Committee was formed to help guide Central San in its evolution as a Smart Utility. Made of Executive Team members, various Managers, and staff, the Committee helps implement smart utility projects by identifying priorities, ensuring appropriate resources are provided, and staying apprised of project progress. The projects completed through this initiative will leverage new and existing data Central San collects through its Information Technology, Asset Management, Plant Maintenance, and other programs to optimize operations and maintenance; improve asset management; increase energy efficiency, staff productivity, and safety; and reduce facility management costs. Several projects have been identified and initiated, including Optimizing the Treatment Plant Asset Handover Process and Developing an Asset Health Indicator Tool.



ASSET CONDITION MONITORING TEAM

Each Plant Maintenance Shop has formed an Asset Condition Monitoring Team to develop and implement procedures for thermography, ultrasound, vibration, laser alignment, high-speed camera motion amplification, fluid analysis, and motor winding analysis to continually monitor essential equipment for proper maintenance. Each technology will be assigned to two to three technicians, who will be meeting on a regular basis to develop procedures for implementing and creating goals. For extra support, a Planner has been delegated to each team. These teams are currently focusing on improving existing programs and developing new ones, discussing standard criteria for inspections and analysis, and incorporating them into Cityworks and GeoPortal. They have determined a tentative monitoring scale for each technology and developed inspection templates. Various staff have obtained certification in the technologies and they continue to implement technologies on various asset classes. Eventual health scores will be configured based on testing/analysis and factored into the Asset Health score.

INFRASTRUCTURE MAINTENANCE AND UPGRADES

IMPROVEMENTS TO ASSETS TO ENHANCE PERFORMANCE, LENGTHEN LIFESPAN, ADD REDUNDANCY, INCREASE RESILIENCY, AND SIMPLIFY OPERATIONS; STUDIES AND PILOTS TO ASSESS WAYS TO OPTIMIZE INFRASTRUCTURE; AND MAINTENANCE PRACTICES TO MONITOR ASSET CONDITIONS AND PERFORM WORK ORDERS EFFECTIVELY AND EFFICIENTLY.

MULTIPURPOSE ROOM (MPR) REDESIGN

The seismic retrofit of the MPR created an opportunity to evaluate the room for possible improvements. Before the redesign, staff had to bring video recording equipment into the MPR, set it up, and take it down, sometimes requiring overtime costs. Additionally, given that the MPR is used by outside agencies and used to host events, it is sometimes the event attendees' only impression of Central San; thus, it is important for the room to project a professional and technologically advanced atmosphere and for the room's features to be easy to use. To that end, staff installed **three projector screens, more microphones, a tablet audio/visual equipment controller, and a slimmer lectern**. Staff also **relocated the sound system** to a less obtrusive area and installed **permanent cameras** to record training sessions, special presentations, Board workshops, the Central San citizens' academy, and other events. This reduces staff time to record videos, eliminates the potential safety hazards of electrical cords on the ground, and broadens the possibilities for video recording and trainings to be held in the room. Thanks to this new setup, Central San was able to continue actively participating in national and state conferences remotely during the pandemic. Above, Director of Engineering & Technical Services Jean-Marc Petit presents at the Water Environment Federation's Technical Exhibition and Conference.



FIELD AND BENCH-SCALE INVESTIGATIONS TO DETERMINE CHANGES TO THE AERATION SYSTEM FOR OPTIMIZATION

Easily biodegradable carbon (food) in Central San's primary effluent is ideally removed in the anaerobic (no air added) selector. If it makes it into the pictured aerobic aeration tanks (where air is added), it can cause problems like high oxygen demand and filamentous flocs. To help understand how to optimize the secondary process as part of the Steam Project, staff investigated if biodegradable carbon makes it through the anaerobic selector and if the removal is time limited (i.e., build the selector bigger and it would be removed). This is a difficult question to answer. Results from **bench-testing and field measurement work** suggested the system is limited by available phosphorous rather than time. Biological treatment processes are dynamic with varying inputs and outputs, so bench-scale testing was set up to try to control those variables (how much food was given to the bacteria and how much time the bacteria has to try to eat the

food). The field measurements helped verify the results of the bench testing. For example, measurements were taken in the aerobic part of the tanks to try to track the easily degradable food during treatment. Overall, it appears that building extra anaerobic tank capacity would not fully prevent easily biodegradable food making into the aerobic zone, so **making changes to the aeration system looks like a more promising path towards optimization**.

INFRASTRUCTURE MAINTENANCE AND UPGRADES

RECYCLED WATER DISTRIBUTION SYSTEM CONTROL VALVE EXERCISING PROGRAM

Last year, staff put into place a valve exercising rotation program on critical valves around the plant that could cause major failures or expenses. This year, a similar **valve exercising program** was established for the recycled water distribution system valves. The type of valves that are in Central San's distribution system often become unreliable if they are not exercised, which can lead to the valve ceasing in position or not shutting or opening all the way. This can create serious operational challenges when there is a need to isolate or open a valve. Also, Central San did not have maintenance routines for the Recycled Water Distribution System, but now work orders are easily scheduled through Cityworks to ensure the valves work correctly.

PREFABRICATION OF BLOWOUT PANELS FOR THE SECONDARY CLARIFIERS

Staff has begun building replacement panels for the secondary clarifiers in advance, so that in the event that a panel needs repair, it can be swapped with a new one instead of having to attempt a repair in-place. In-tank repairs are time consuming and slow down the progress of the PM work. **Prefabricating the panels** have allowed maintenance to complete their annual PMs on the secondary clarifier tanks (pictured) in a five-day work week, which gives Operations greater flexibility and quicker return to service of the tank. This not only reduces the downtime of the tank but also allows more tanks to be completed in a tighter window. Panels are being replaced in an ongoing process as needed and rehabilitated once replaced.



MEMBRANE FILTRATION PILOT PROJECT TO DETERMINE OPTIMAL APPROACH FOR RENOVATING RECYCLED WATER FILTER

In the Recycled Water Facility, renovation improvements are needed to existing Filter No. 3, and eventually, renovation of the other three remaining dual granular media filters will be needed. To ensure Central San uses the optimal approach, proof-of-concept testing and a feasibility evaluation of new tertiary membrane filtration in lieu of renovating the existing filters was completed, using Fibracast membrane as an example membrane to produce recycled water. A business case evaluation was performed to compare renovating the existing filters with membrane filtration for meeting Title 22 requirements, and staff believes there might be potential for reduced disinfection (chlorine contact basins sizing) as part of the current Filter Plant and Clearwell Improvements Project. Favorable bids for that project determined that **Filter No. 3 will be replaced in kind with a dual granular media filter**. A **pressurized membranes pilot** is being evaluated for FY 2020-21 to start, and a consultant has been retained to provide support.

INFRASTRUCTURE MAINTENANCE AND UPGRADES

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. They make it a regular practice not to just perform the PM or repair, but also to ask what more can be done.

Work orders that are categorized as "Don't Just Fix It; Improve It" (DJFI) typically meet one or more of the following criteria:

- 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 one reactive work order with a priority of one or two on a specific asset between PM tasks.

In total, **18 DJFIs** were completed in FY 2019-20 that resulted in energy cost savings, staff time savings, added redundancies, improved resiliency, simplified operations, and/or made adjustments needed for regulatory requirements.



QUALITY ASSURANCE/QUALITY CHECK (QA/QC) PROCESS IMPROVEMENTS

When Plant Maintenance technicians are fulfilling a work order, they sometimes identify a need to update the work order to reflect a better way of performing the task than prescribed. Within Cityworks, Maintenance staff can check a box that sends an email to a Maintenance Planner to request a QA/QC or improvement to the work order, SOP, or asset.

The Planners then review and update the work orders accordingly. This practice ensures that the work orders which form the basis of all maintenance tasks are kept updated both by staff doing the work and staff scheduling the tasks. This leads to increased PM program effectiveness and efficiency.

Staff is constantly QA/QCing and improving the work orders in Cityworks, which dictate current and future maintenance tasks and how they are done.

Staff completed **111 QA/QC updates** in FY 2019-20.



PLANT MAINTENANCE TESTING PROGRAMS

In addition to the DJFI work orders and QA/QC process improvements, the Plant Maintenance Shops have been ramping up the use of testing programs in order to supplement asset condition management efforts. Successful testing and monitoring can avoid equipment downtime, increase reliability, increase the effectiveness of the PM program, enhance the acceptance testing program, and allow advanced diagnostics and trending on key assets and safety and protective devices.

- **BREAKER/OVERLOAD TESTING** protects circuits from damage using a device that can test molded case circuit breakers over current relays and current transformers. These protective devices will open shutoff power if excessive current flows are in the circuit, thus protecting the equipment from damage. Staff fully implemented the Breaker/Overload Testing program and is performing primary current injection on all low and medium voltage circuit breakers in the plant to test trip units. It is also being used as a troubleshooting tool to confirm failure in suspected defective molded case breakers.
- **ULTRASOUND TESTING** is aimed at energy savings, potentially in air and steam, and is currently being used as a diagnostic tool on induced draft fans, centrifuges, and return activated sludge pump motors. Staff have been trained on the basics of ultrasound testing, are looking to get certified, and are working on creating a predictive maintenance task for the steam assets.
- **ACTIVE ELECTRIC MOTOR TESTING/TROUBLESHOOTING** tests motors before the winding goes out through motor circuit analysis. Staff chose 21 motors to pilot this technology, and baseline readings were completed for assets identified as good candidates. The program is fully implemented with staff using a motor circuit analyzer as a troubleshooting tool and comparing readings to the baselines that were established.

MAKING ROOF ACCESS SAFER

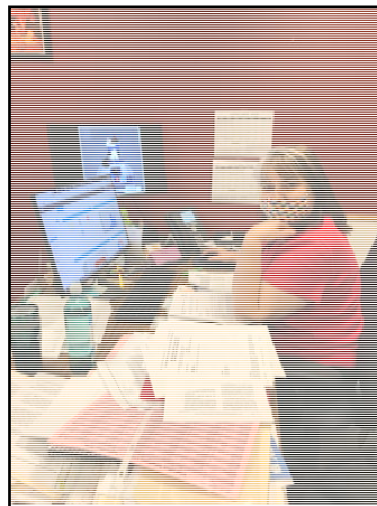
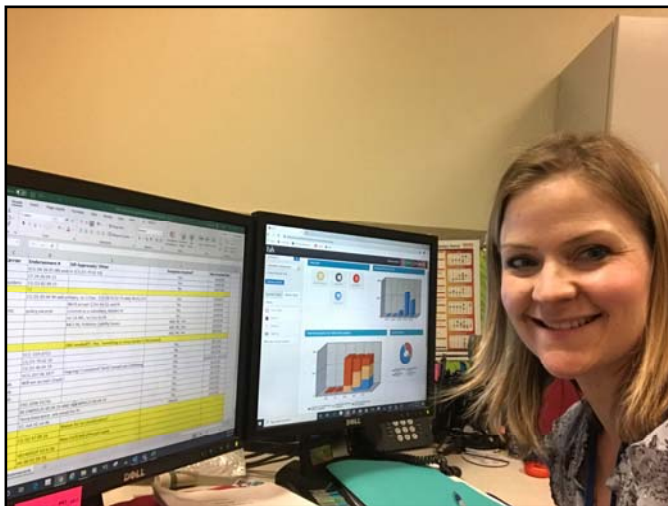
The lid on the roof of the 9000 Structure Building in the plant is made of heavy steel. For years, when staff needed to access the building, it would be tied open with a rope which could break or become untied at any moment. Even a strong gust of wind could unforeseeably blow the lid shut, causing a severe injury to anyone trying to enter or exit at the time. The fix was a simple yet powerful safety improvement, which also won the 2019 Safety Suggestion of the Year: to **replace the rope with steel chains**. This will ensure technicians can safely enter and exit the roof for many years to come.



ACTIONS WHICH SAVE MONEY BY REDUCING STAFF TIME ON REPETITIVE TASKS AND BY PRUDENTLY PLANNING FINANCIAL SPENDING ON LARGE-SCALE CAPITAL PROJECTS.

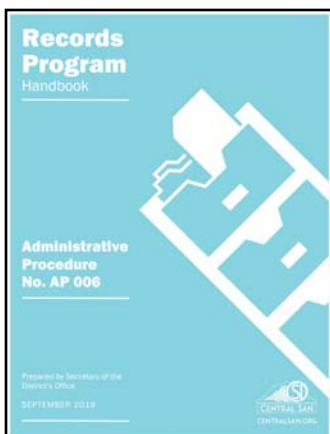
INSURANCE DOCUMENTATION CONTRACTED TO EBIX

With over 300 vendor contracts and numerous bids, awards, and other documents requiring parties to submit certificates and insurance documentation, staff spends a great deal of time requesting, reviewing and tracking compliance with these requirements. Central San contracted with **EBIX**, a company that automates a portion of this work, and Risk Management (seen below using the software) has trained staff in Purchasing, Capital Projects and Planning to use the service. This has reduced the amount of staff time spent on these tasks while increasing the level of compliance, which further protects the District.



ON-SITE REMOTE DEPOSIT MACHINES

Finance staff used to make bi-weekly deposits by traveling to the bank, a manual process that did not take advantage of technology available and used by the County (the District's Treasurer). Additionally, an internal audit recommended greater segregation of duties in the processing of permit counter receipts. Due to these reasons and the urgency to limit staff's exposure to COVID-19, **remote deposits** were implemented. To accommodate this much needed change, Central San adopted a cash handling administrative procedure outlining protocols for the safe handling of currency, which necessitated collaboration with and approval by the County's Auditor-Controller and Treasurer offices. This efficiency saves staff time, allowing staff to focus on more critical analytical procedures; improves customer service with faster and more secure payment deposits; and lessens staff exposure resulting from driving deposits to the bank.



RECORDS PROGRAM HANDBOOK

The Records Program administrative procedures were transformed into a user-friendly **Records Program Handbook** to be used for staff training and as a reference tool. The handbook covers all Records Program services, not just destruction procedures and records retention schedules, and was made in response to a lack of clarity on the procedures for managing destruction and disposition of departmental records. Making the procedures clearer helps ensure adherence to Central San's records retention policy and assists staff in realizing savings with the timely and orderly destruction of departmental records, which in turn will reduce on-site and off-site storage space needs for non-permanent records.

SAMPLER SUSPENSION RINGS FOR INSTALLATION OF AUTOMATIC SAMPLERS

When Environmental Compliance (EC) staff deploys samplers in the collection system, they typically install them within the maintenance hole. While several companies make products to suspend the sampler off the maintenance hole, EC found them to be overcomplicated to use and lacking key safety features. Many of these off-the-shelf products also have minimal contact with the maintenance hole ring when installed, which increases the potential for the device to fail and cause the sampler to fall into the sewage flow, which could cause overflows and blockages. After years of internal coordination and personalized design, staff created a new style **sample ring** which allows EC to either install by hand or use the truck-mounted crane. The sample ring improves installation safety, expands sampling abilities, and drastically reduces the installation time. Since it is such a good design, other agencies, and even the sampler manufacturer, have come to look at the sampler ring to try and recreate it for themselves.



CAPITAL FINANCING PLAN

The **Capital Financing Plan** is a working plan to specify which projects are good candidates for lower cost financing options, when processes for obtaining the funds will commence, and how efforts will be staffed. This is an ongoing process to specify and obtain the optimal mix of financial resources (rate financing, revenue bonds, and possibly other sources like the State Revolving Fund, Water Infrastructure Finance and Innovation Act, and grants) to support the Capital Improvement Plan over multiple years with consideration of cost, flexibility, and timing of needs of projects.

In FY 2018-19, Central San was included in the Intended Use Plan funding for \$89.6M for the Solids Handling Facility Improvements Project. This application was upsized in August 2020 to \$173.1 million to reflect the revised project cost and request funding of other project costs not in the original application. In the meantime, Central San continues to enjoy cost savings from optimizing the use of alternative funding in the form of savings from interest rates used in the current financing plan and from interest rates used in revenue bonds as a cost-advantaged financing source, as opposed to standard alternatives at the time of issuance of the bonds.

FASTRAK FLEX FOR POOL VEHICLES

Part of Central San's mission is to protect the environment. This goes beyond keeping just the waterways clean; Central San believes in keeping the air clean too. To help keep vehicle emissions down, **Fastrak Flex devices** were installed in the pool vehicles, allowing two or more people in a pool vehicle to travel in the 580/680 high-occupancy vehicle (HOV) lanes for free, saving staff time on travel. Prior to the pandemic when more than one person was allowed to use a car at once, this helped staff travel to and from outside and within the service area in faster HOV lanes for free and further encouraged ridesharing to and from meetings.

OVERFLOW SIMULATOR

When an overflow occurs, Central San is required to report it to the state. To train crews to estimate flow rates by sight under different conditions, CSO staff designed and constructed an **overflow simulator** which can precisely create overflows at rates from 1 to 200 gallons per minute through various structures, including a maintenance hole, rodding inlet, and a lateral. By having variable rates of discharge and multiple possible overflow sites, staff can practice in multiple real-world scenarios. In addition to the training, crews will carry a chart of each type of maintenance hole they may encounter in the field. This innovation results in more accurate data being reported to the state, time saved in being able to train staff on site, and, as one of the few wastewater agencies to have its own permanent, on-site simulator, Central San will continue to build relationships with its partner agencies by sharing its simulator with them. The simulator is even environmentally friendly; water flows down the drive into permeable concrete, so there is no runoff into the storm drain system.



Left: Staff with their completed and working simulator.

Right: Photos of the construction.

OPTIMIZATIONS IN PROGRESS

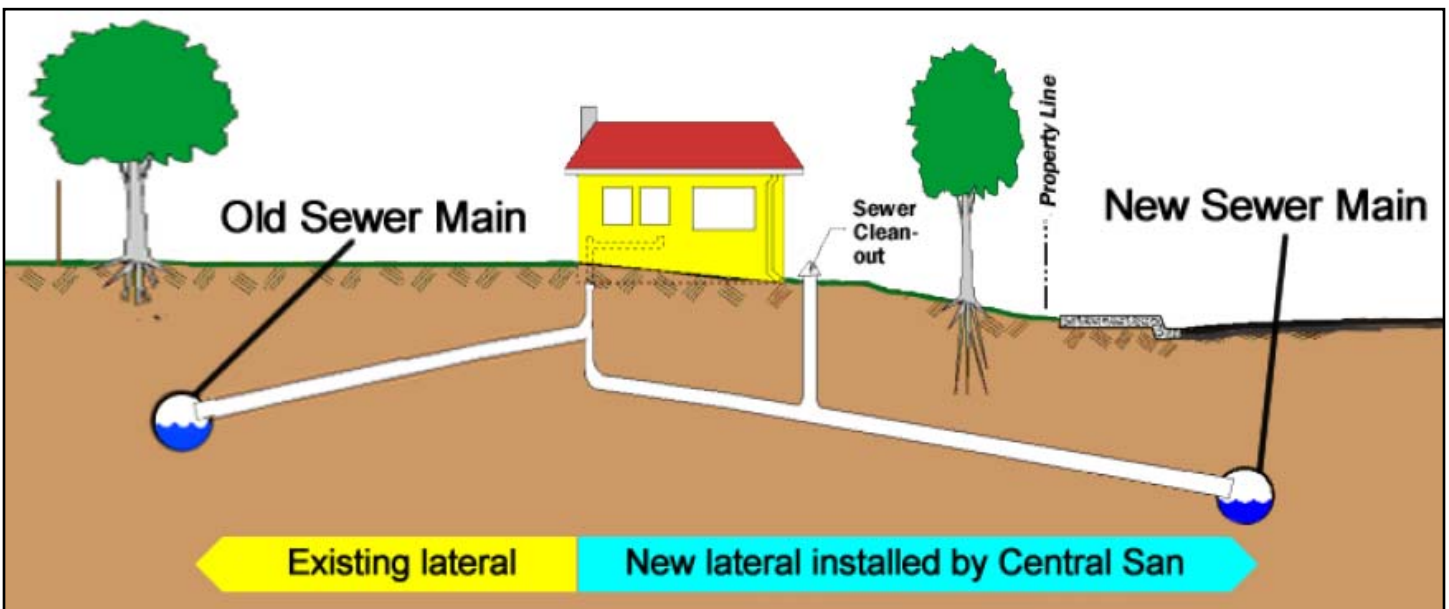
OPTIMIZATION PROJECTS WHICH ARE CURRENTLY UNDERWAY OR IN THE WORKS.

PIT-LAUNCHED HORIZONTAL DIRECTIONAL DRILLING



Staff is currently working to save Central San and its customers money via the construction of District Project 8456, Danville Sewer Renovations, Phase 3. The project is abandoning 4,300 feet of sewer mains in easements and replacing them with 1,700 feet of sewer mains in the street, as seen below. This may sound like a typical collection system construction project; however, optimization lies in the **installation of 47 private sewer laterals by pit-launched horizontal directional drilling**, to reverse the flow from the backyard mains to be abandoned to the new mains installed in the streets. This method uses a small drill rig that can start the drill path at the downstream elevation, eliminating the need for a set-back and significantly reducing the required construction footprint, resulting in a cost-effective and non-invasive way to eliminate easement sewers. Through this project, Central San is saving \$1 million in capital costs by reducing the amount of pipe needing to be replaced and about \$15,000 annually in future cleaning and maintenance. Residents in the area will save money on a new sewer lateral, see their property values increase by eliminating their easements and offering the opportunity to build accessory dwelling units or additions, and will no longer need Central San crews to perform maintenance on their property.

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MOBILE DEVICES FOR INSPECTORS AND DIGITAL PROJECT PLAN REVIEW

For years, Development Services inspectors carried paper with them on their jobs. In the last few years, they have followed in the footsteps of the CSO crews, Plant Maintenance technicians, and EC inspectors by **piloting the use of mobile devices** in their work. They first tested it in conjunction with the City of Walnut Creek staff in the development of the new Walnut Creek Bay Area Rapid Transit station. Having the plans available digitally is saving time and money in running hard copies, and soon, inspectors will transition to full use of mobile devices. The ongoing progress is being coordinated with the implementation of the Oracle Permitting Module. Development Services staff is also reviewing Bluebeam software for plan review.

STEAM AND AERATION BLOWER SYSTEM IMPROVEMENTS (STEAM PROJECT)

Central San’s steam system is complex and aging, requires significant maintenance, and has the potential to perform more energy recovery. This year, staff completed a challenging two-year **condition assessment effort** to estimate the remaining useful life of the existing boiler feedwater, steam, and aeration systems as well as associated structural, electrical, and instrumentation and control systems. The assessment included reviewing each of the assets' records and inspecting and testing the equipment – some of which is over 40 years old – in person. The team (pictured, below left) used **non-destructive methods** to test the boilers and the steam piping, allowing them to put equipment immediately back into service after testing. For 100 feet of steam piping, an advanced method called **guided ultrasonic wavelength inspection** was used. The results of the assessment will help develop lifecycle costs for evaluating future alternatives, including steam vs. electric-driven blowers, and confirm the best energy recovery and aeration system alternative to address both current and potential future needs, such as nutrient removal and supporting the Refinery Recycled Water Exchange. The assessment effort culminated in workshops with consultants and Central San staff (pictured, below right) to discuss the results and was a strong first step in the Steam Project. The second phase of the project will be to evaluate options to improve safety/reliability, enhance ease of operation, extend useful life of equipment, and reduce operating costs.



STANDARDIZING DAILY CONSTRUCTION INSPECTION REPORTS

Not all inspectors, internal or external, have field equipment, so they use office time to submit their **daily construction inspection reports** in Microsoft Word. To save time, expedite completion of the reports, and improve consistency in reporting, staff recently began using the construction management module in e-Builder to make this process more efficient and mobile. After a beta team tested the new reporting process within e-Builder, staff has been continuing to work toward standardizing these daily construction inspection reports used by outside consultants, internal engineers, and inspectors. They have been experimenting on a couple of projects and hope to implement it fully.

REORGANIZATION OF BOARD POLICIES (BPs) AND ADMINISTRATIVE PROCEDURES (APs)

There are 42 BPs that have been adopted by the Board and 11 related APs approved by the General Manager. Behind-the-scenes issues with maintaining the electronic BPs and APs have become unwieldy and difficult to manage, with version control as an ongoing concern. This inefficient and unsustainable process can be compounded with a high potential for error and missed biennial reviews. The solution is the development of a **standardized electronic file folder structure** for the different stages of BPs and APs (draft, biennial review, obsolete/outdated), a comprehensive tracking log with adoption/review statuses, a tickler system, and implementation of a biennial AP review process to coincide with the related BP. This project is about 75% complete, and, once established, staff will be able to keep on top of multiple moving parts of this important process and reduce errors.



GROUPING PIPELINE CLEANING SCHEDULES BY LOCATION

Cleaning and performing maintenance on sewer lines effectively and on schedule prevents overflows and uses staff resources efficiently. Using the Pipeline Cleaning Schedules Web Application described at the bottom of page 6 of this report, CSO staff can view cleaning based on schedule frequency intervals and by location. In addition, staff can see information on each pipe, project out seven years, and schedule mains or groups of mains to manage distribution of schedules by month. Last year, staff completed grouping the one-, two-, and three-month pipeline cleaning

schedules by location. Now, staff has moved on to optimizing the cleaning schedule frequencies for the **six-month, one-year, two-year, three-year, five-year, and seven-year schedules**. Grouping cleaning schedules by location is an ongoing effort which can reduce overflows, help meet Central San's ambitious Strategic Plan target of completing $\geq 98\%$ pipeline cleaning schedules on time, increase productivity, and reduce vehicle wear-and-tear.

FUELING THE CSO FLEET WITH RENEWABLE DIESEL

One of the projects identified by CSO's Innovation Workgroup is the potential use of **renewable diesel instead of regular diesel** to fuel the fleet at CSO. Because the trucks are refueled often, optimizing this process will have a large impact. Using renewable diesel will reduce greenhouse gas emissions by about 90% compared to fossil diesel, which makes it better for the environment with cleaner emissions. There will be greater reliability for the trucks with less downtime due to maintenance to clean out the diesel particulate filter. Additionally, CSO crew members will become less exposed to diesel particulates, fuel filters will be replaced less often, and the cold start performance will increase. The fuel contract has been bid, and implementation will be based on the bid results. Depending on the cost difference, CSO will pilot renewable diesel in the fleet's heavy-duty trucks.

EASEMENT TRUCK

Another CSO Innovation Workgroup project is a **dedicated truck for easement maintenance activities**, to make this work more efficient and to use mechanical cleaning methods as much as possible to reduce overflows. Staff ordered the new utility bed and was going to recommission one of the existing field operation trucks for this purpose when the pandemic began, and the need for social distancing and one person to a vehicle meant that there was no longer a truck to spare. The Easement Truck will come to fruition when new fleet trucks are received in FY 2020-21.

SODIUM HYPOCHLORITE USAGE FOR #3 WATER

This Mentorship Project from the 2018 cycle of mentees identified the ability to **reduce or eliminate the use of bleach to disinfect #3 (tertiary-treated) water** as a potential cost savings. Staff sought input from multiple divisions, tested samples, and gathered data to confirm that there is not a chlorine residual requirement for in-plant water use within Central San's National Pollutant Discharge Elimination System Permit, and the #3 water for on-site use is a Title 22 exemption Central San provides for itself. 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. A chlorine analyzer will be installed in the Piping Renovations, Phase 10, Project, which will provide the necessary hardware to establish this feature. After that, staff can perform program modifications to adjust the pump speed to maintain a desired chlorine dose.

ORACLE CLOUD ERP SYSTEM OPENS THE DOOR FOR MORE OPTIMIZATIONS

The transition to Central San's new ERP system is a complex project with benefits that affect every Central San employee. Much has already been completed in this effort, but still to come are the following optimizations made possible by this continuing large-scale project.

- **PERMITTING / COMMUNITY DEVELOPMENT SYSTEM**

The **Permitting and Community Development System** will be modernized and migrated from the dated and inefficient legacy SunGard system to a new Oracle system – the same Oracle that is implementing the new ERP system. This will improve internal processes, add new tools for public access and mobile inspections, save staff time, and improve customer service. It will also integrate with EC / Source Control permits such as dentist office and pool forms, and it has the potential for a billing module, which will be considered after the Permitting module goes live.

- **AUTOMATIC NOTIFICATIONS OF EXPIRING CONTRACTS**

Automating notifications to project managers to inform them of an approaching contract expiration will help ensure contracts remain in place or are terminated so that materials and services can be purchased as needs arise with limited delays. Once the Oracle configuration is completed, the system will send automatic notifications to the appropriate parties, notifying them in advance of the upcoming expiration date so they may plan accordingly.

- **ELIMINATING PAPER PERSONNEL ACTION FORMS (PAFs)**

PAFs are an internal tool for HR staff to make changes related to pay and statuses, and significant staff time is spent scanning and distributing these paper forms to department directors and administrative assistants. In addition, the amount of information included in each PAF exceeds what is actually needed, and the PAF itself is not needed as an informational document on its own since staff also distributes an action log as a cover sheet. **Eliminating this paper PAF process** will save staff time and reduce information being passed in interoffice mail through a slower and less secure routing process. So far, the PAFs have been streamlined through the deletion of signature lines to just the amount needed for internal controls. PAFs can be completely eliminated when the full HR ERP module goes live.

- **PAYROLL MODULE**

The **payroll module** in the new ERP system will make administering payroll easier with built-in internal controls, such as automatic legal compliance updates, installed through automatic patches to the software on the cloud server. An added bonus is that staff will be paid bi-weekly instead of monthly at the beginning of 2021.

- **CENTRALIZED LEARNING MANAGEMENT SYSTEM**

Having a **centralized learning management system** will fill an existing need to track District-wide training consistently and in a centralized place for reporting purposes such as benchmarking and strategic planning. Staff had previously identified NeoGov to fulfill this purpose, as the system can not only track spending and hours, but also course content. Staff can potentially use a module with similar capabilities in the new ERP system to track training across all divisions.

OPTIMIZATIONS IN PROGRESS



BOOST
CENTRAL SAN
MENTORSHIP PROGRAM

MENTORSHIP PROGRAM PROJECTS

Central San's BOOST Mentorship Program offers a development opportunity for staff to receive coaching, experience career paths outside their normal line of work, meet others, and champion a project with the guidance of their mentor. In the current cycle of the Mentorship Program, four of the seven mentees are working on optimization projects that will help Central San manage data in an effective way and help maintain important assets for decades to come.

ASSET HEALTH INDICATOR TOOL

The **Asset Health Indicator Tool** will use data and analytics to optimize maintenance schedules to supplement Central San's condition-based maintenance program. The Maintenance Shops have already started utilizing the software and held their first meeting to provide feedback.

DIGITIZING OPERATOR ROUTES

On each "round," Plant Operators fill out nine paper information sheets with data to pass along to the Control Room. Digitizing these "**Operator Routes**" into an online form within Cityworks will provide the ability to trend and analyze data to improve operations (as seen below), standardize the format of the data provided, enable access via iPads, and keep track of the workflow between different departments. It also simplifies the process for the Operator as it also removes the need for in-person contact and paper processes. Operators are piloting the online form in Cityworks; the next steps will be acceptance testing and implementation.

The image illustrates the digitization of operator routes. It shows a paper information sheet on the left, a digital form in the center, and a manager dashboard on the right. The paper sheet contains handwritten data for various parameters. The digital form is a structured version of this data, with fields for 'Influent Pump VFD Check' including Pump No., RPM, Frequency, Hour Meter, AC Volts, DC Amps, % Speed, Room Temp, and W.W. Level. The manager dashboard displays key performance indicators (KPIs) such as Daily Influent Flow (MGD) at 36, Weekly Average Influent Flow (MGD) at 35.5, and Monthly Average Influent Flow (MGD) at 37.9, along with other metrics like Weekly Total Influent Volume (MG) at 248.5 and Monthly Cumulative Total Influent Volume (MG) at 143.3.

TREATMENT PLANT ASSET HANDOVER PROCESS OPTIMIZATION

Central San is all about customer service - not just externally but also internally. When Capital Projects completes a project, they are handing it over to their "client": Plant Maintenance, who needs a lot of information on each asset to be able to efficiently and accurately maintain it over its full lifespan. Some of this information might include as-builts, as-is drawings, hazard energy control procedures, manuals, spare parts, and asset registries. To ensure proper communication and record keeping when Capital Projects transfers assets to the Plant, staff is working on **optimizing about ten asset handover processes**. Flowcharts depicting each process have been developed and reviewed with key stakeholders, and staff is working on identifying the best software to facilitate the handover process and how this will integrate into the larger Information Technology (IT) Strategic Plan.

MENTORSHIP PROGRAM PROJECTS (CONTINUED)

CATEGORY ONE OVERFLOWS DATA INTEGRATION BETWEEN THE LAB AND CSO

Category One Overflows are all discharges of sewage resulting from a failure in the sanitary sewer system that is $\geq 1,000$ gallons, or result in a discharge to a drainage channel and/or surface water, or discharge to a storm drainpipe that was not fully captured and returned to the sanitary sewer system. When these overflows occur, the Lab and CSO need to coordinate to report information to the appropriate regulatory agencies. By using CSO's existing Cityworks program, staff is working on setting up an **automatic notification to the Lab** when these Category One Overflows occur. Lab staff can then obtain pertinent information such as Workorder ID, location description, and project name. In turn, linking the Lab Reports in GeoPortal will allow CSO staff to access the information in the field. This creates a data repository for Lab, administrative, and CSO staff and standardizes the process for consistent results.

OPTIMIZATIONS IN PROGRESS (CONTINUED)

AS-BUILTS CATALOGING

In a related effort to the Treatment Plant Asset Handover Optimization, Capital Projects has made great strides in **cataloging as-builts**, which are critical for staff to troubleshoot and understand systems, apply Asset Management principles to upgrade or replace equipment, and perform capital design and construction. Over 7,000 Treatment Plant and 3,400 Electrical, Instrumentation and Controls Program sheets are now scanned and stored in various databases. Staff is also establishing minimum requirements and 3-D CAD standards for future projects, keeping in mind the potential of using 4-D, 5-D, and 6-D in the future. Standards assure consistency in drawing production and uniformity in file structure for all drawings.

HAZARDOUS MATERIALS TRACKING DATABASE

Hazardous materials tracking is currently handled in a Microsoft Access database that is not easily searchable or accessible from multiple locations. A more sophisticated **hazardous materials tracking database** will automate the tracking of hazardous materials and locations throughout District facilities. When launched, the new database will be linked from the San Central intranet to make it easy to find and use.

UNIFIED COMMUNICATION TOOLS ACROSS MOBILE AND DESKTOP PHONE SYSTEMS

The current desk phones are not intuitive to use and have limited and outdated features. Even before the pandemic shifted the way staff communicates toward using Microsoft Teams, staff was already looking at **upgrading the existing telephone system** to the latest version to provide advanced features, increased accessibility, and new collaboration tools. A new system can also help streamline Emergency Operations Center operations by simplifying the process of establishing live phone lines, and it can potentially reduce the number of phones for cost savings. The project is currently part of the IT Strategic Plan.

EMPLOYEE ENGAGEMENT SURVEY

A key strategic goal for Central San is to empower and engage its employees. In order to understand where efforts should be focused towards meeting this goal, Central San contracted with a consultant to conduct an **employee engagement survey**. The goal of the survey was to take the "pulse" of Central San's employees' overall engagement levels and establish baseline data to help Central San assess its strengths, identify gaps, and develop and implement an action plan to ensure high levels of engagement at all levels of the organization. Because the survey was active during the beginning of the pandemic, a significant portion of the data gathered may be not necessarily be reflective of general engagement levels during normal operation. For that reason, the project is currently on hold.

CELEBRATING INGENUITY: CENTRAL SAN'S FIRST INNOVATIONS FAIR

To share stories of optimization and innovation across Central San, the first-ever Innovations Fair took place online in November 2020. The Innovations Fair website (below) featured a virtual showcase of 22 projects, as nominated by staff. Videos, PowerPoints, and pictures helped show the impacts of each optimization. The nominated projects represent ingenuity, dedication, and creativity from all over Central San. Over several weeks, staff visited the fair and cast virtual ballots for their favorites in four categories. The winners were announced during a virtual awards ceremony on December 11.

Winners:

- Innovation of the Year - *Overflow Simulator*
- Most Creative - Tie:
Bar Screen Grinder Lifting Tree and
Using FaceTime to Gather Data Points for Tuning
- Most Efficient - *CSO Cleaning Optimization Application*
- Most Inspiring - *Hot Oil Recirculation System*

Other projects featured in the fair:

- Easily biodegradable food (for bacteria) in Central San's wastewater
- Electronic Approvals and Routing (DocuSign and Oracle Cloud Fusion)
- Electronic Invoices for Permit Counter Customers
- Emergency Response, Management, and Plant Maintenance Dashboards
- Furnace Oxygen Monitor Replacement
- Hatch to Access a Three-way Valve at the Pre-aeration Basin
- Horizontal Directional Drilling to Eliminate a Pumping Station
- Insurance Documentation Contracted to Ebix
- IT Helpdesk and Technology Workflow Improvements
- Pit-Launched Horizontal Directional Drilling
- Plant Energy Optimization
- Reliability Engineering Tool
- Remote Recycled Water Meter Reading Pilot
- Sampler Suspension Rings for Installation of Automatic Samplers in Maintenance Holes
- Sewer Summits
- Spare Parts Management Application
- Virtual Outreach and Education Programs

2020 Innovations Fair Virtual Fair Vote for Your Favorites! The Incubator FAQs

Welcome to Central San's First Innovations Fair!

A virtual showcase of just some of the cool projects Central San'sers have accomplished over the last three years.

At the end of the fair, please click on the link to vote for your picks in the categories of "Innovation of the Year" "Most Creative" "Most Efficient" and "Most Inspiring"

It is impossible to thank everyone who played a part in bringing these innovations to life, but know that we are grateful for the ingenuity, flexibility, and enthusiasm of every single member of the Central San team that helps us become an innovative utility that best serves our customers and each other.

After you visit the fair, vote for your favorites by clicking here or the button at the end of this webpage

Bar Screen Grinder Lifting "Tree"

Our bar screen grinders are often unseen tools which crush inorganic material before it enters our treatment process. As you can imagine, lifting such heavy devices can be a challenge, especially in the inlet channels atmosphere of our Headworks. With this in mind, Don Rotelli invented a **grinder lifting "tree"** a few years ago to simplify the process of replacing any worn-out grinders. With the tree, a grinder and its gearbox can be removed and replaced as a preassembled monolithic piece instead of being handled separately, making it easier to transport and simplifying the rigging required. This shortens the job time from around three to four hours down to about one hour for removal of the defective unit and reinstallation of the pre-assembled replacement unit, reduces the technician's exposure time to the inlet channels atmosphere, and reduces the need to manhandle the individual components, thus reducing the probability of incurring back injuries for staff. The use of the lifting tree is a timesaving and safer way to approach lowering and removal of the heavy grinders from hard to get to elevations.

CSO Cleaning Optimization Application

Central San has a proactive approach to preventive maintenance. All lines that are 38 inches in diameter or less are cleaned on a 4 to 64 month interval. For most of the 2000's, scheduling was done using an Excel spreadsheet, and CSO staff couldn't efficiently assess how to effectively schedule pipe cleaning while considering adjacent pipes. Best practice is to set adjacent pipes on coordinated schedules to reduce cleaning crew's wait/hold time. However, this was effectively not possible for most of CSO's history.

That was before 2018, when Ian Morales, Carl Yoo Shrestha and Mike Matthews developed an application to provide a visual representation of cleaning based on location, existing frequencies, and type of cleaning. CSO's Maintenance Scheduler, Mary Reynolds, uses this webmapping application to align cleaning schedules within a specific geographic or neighborhood area to increase footage of pipe cleaned, by enabling crews to efficiently clean adjacent or nearby pipes in fewer visits to the same area and decrease driving time. Improved scheduling has the added benefit of reducing personnel overtime by enabling more cleaning in normal working hours and assist CSO meeting its Strategic Plan goal of completing greater than 95% of schedule cleanings on time.

To the left, watch a video interview between Ian and Mary (click the play icon, then click the next play icon that will appear to start the video).

Below the video, view a PowerPoint (scroll within the window or click the arrow at the top right to make it full screen) in a new tab to learn more about the history, development, functionality, use, and benefits of this application.

Easily biodegradable food (for bacteria) in Central San's wastewater: A story of field and bench-scale investigations

Easily biodegradable carbon (food) in Central San's primary effluent is ideally removed in our anaerobic (no air added) selector. If it makes it into the aerobic aeration tanks (where air is added), it can cause problems like high oxygen demand and filamentous floes. In 2019, as part of the Stream Project, to help inform how to optimize the secondary process, Nitin Grewal, Michael Cunningham investigated if biodegradable carbon makes it through the anaerobic selector and if the removal is time sensitive (i.e., build the selector bigger and it would be removed). This is a difficult question to answer. Results from bench- testing and field measurement work suggested the system is limited by available phosphorous rather than time. Biological treatment processes are dynamic with varying inputs and outputs, so **bench-scale testing** was set up to try to control those variables (how much food was given to the bacteria and how much time the bacteria has to try to eat the food). The **field measurements** helped verify the results of the bench testing. For example, measurements were taken in the aerobic part of the tanks to try to track the easily degradable food during treatment. Overall, it appears that building extra anaerobic tank capacity would not fully prevent easily biodegradable food making into the aerobic zone. Making changes to the aeration system looks like a more promising path.

APs	Administrative Procedures
BPs	Board Policies
CSO	Collection System Operations
DJFI	Don't Just Fix It; Improve It
DO	Dissolved Oxygen
EC	Environmental Compliance
ERM	Enterprise Risk Management
ERP	Enterprise Resource Planning
FAA	Federal Aviation Administration

FY	Fiscal Year
GIS	Geographic Information System
HOV	High Occupancy Vehicle
IT	Information Technology
M	Million
PAFs	Personnel Action Forms
PM	Preventive Maintenance
QA/QC	Quality Assurance / Quality Control
SOPs	Standard Operating Procedures



