

**Operations Management
and Facilities Services**

2019-2020 Annual Report

Village of Carol Stream, Illinois



Jacobs

Challenging today.
Reinventing tomorrow.

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Letter from Project Manager Nick Lenzi

As we all deal with the global and local impacts of the COVID-19 crisis, we recognize the pressure these circumstances create for the Village. As your long-term partner, we are here to support and assist the Village and the community during this critical time. In the last contract year, we've worked every day to become a reliable partner for the Village. We've tackled challenges with world-class solutions and service, giving you the peace of mind that we can solve the challenges that cross our path. On the following pages, we highlight Jacobs operations and maintenance (O&M) activities at the Village's Water Reclamation Center (WRC). Our accomplishments include:

- Maintaining our outstanding safety track record; working more than 5 years or 2,133 days (as of October 13, 2020) without a recordable incident.
- Working closely with the Village on monitoring the Industrial Pretreatment Program (IPP) and exceeding our customers' expectations.
- Improving our proactive approach to preventive and corrective maintenance (CM).
- Enhancing the appearance of facility grounds by planting native areas and protecting the environment.
- Continuing leadership in innovation and technology by utilizing laser alignment, vibration sensors and infrared imaging for predictive maintenance (PdM) and prolonging the useful life of the assets.
- Providing exceptional advanced wastewater treatment well below our required permitted levels.

At Jacobs, we're proud of the day-to-day work we do and the immediate impact we have in the community and the environment. For the past 23 years, we have operated and maintained the Village's WRC with a sense of dedication and respect. Providing safe, compliant and reliable O&M is our top priority. We value our relationship with you as well as our mutual respect for the industry and those who call Carol Stream home. We are excited to continue our partnership, bring the best operations, technical and economic benefits to the Village and its stakeholders.

Regards,



Nick Lenzi
Project Manager

COVID-19

Onsite, we implemented our Continuity of Operations Plan and provided uninterrupted service demonstrating the success of our plan. This plan was put into place to limit the exposure to COVID-19 that would interrupt or prevent our team from completing our operations. We wear the proper personal protective equipment (PPE), clean all surfaces daily, including disinfecting vehicles after each use, we've also developed a worst-case scenario plan so the WRC can be operated with one associate housed onsite to complete all essential tasks without a disruption in service to the community. We have identified local regional support personnel with knowledge of the WRC to cover any prolonged absences due to COVID-19.

Additionally, we have partnered with Arizona State University to participate in a pilot program for testing for the virus that causes COVID-19 in our wastewater stream in Carol Stream.

Our dedicated team



Front row: Sue Ruta, Trustee Mary Frusolone, Mayor Frank Saverino. Back row: Nick Lenzi, Andy Warmus, Andy Liebmann, Chad Askeland, Kevin Dahl, Trustee John Zalak and William King

The 6-member Carol Stream team is responsible for operating the Village's 6.5 million gallons per day (mgd) WRC 7 days a week, 24 hours per day. Our team, their licenses and certifications, organizations and years of experience is listed below.

Nicholas Lenzi joined the team on January 1, 2019, as the Project Manager. He holds a Class 1 Wastewater license as well as a Certified Reliability Leader (CRL). Growing up in Carol Stream, he started his career as an Operator-in-Training (OIT) in West Chicago while attending Northern Illinois University pursuing a degree in mathematics. He has now worked for Jacobs for 10 years.

Andy Warmus holds both Class I Wastewater and Class A Water licenses. He attended several seminars covering maintenance and reliability and a training course in Basics of Motors and Drives. He is active in several water and wastewater organizations, namely Fox Valley Operators Association (FVOA), Illinois Association of Water Pollution Control Operators (IAWPCO), Illinois Water Environment Association (IWEA) and Central States Water Environment Association (CSWEA). He assumed the role of President of the FVOA for 2019. He also became certified in confined space and arc flash safety. He has been with Jacobs for 2 years but has 31 years in the industry.

Susan Ruta holds a Class 1 Wastewater license. She administers the Village's IPP and is the Laboratory Supervisor. She is active in the FVOA and served as Secretary, Vice-President, President and Executive Officer. She attended several wastewater seminars and has taken on the Northeast/Canada regional role for sustainability for Jacobs. She has 22 years of experience with Jacobs and 27 years in the industry.

Chad Askeland joined the team as a Mechanic-in-Training in October 2018. He comes with a wealth of knowledge in the mechanical space, bolstering 15 years in the field. He has now been part of the Jacobs family for one year.

Andy Liebmann holds a Class 4 Wastewater Operator license. He attended a training course in Vibration Analysis and became recognized as a level 1 for performing work in this field of operation. He worked on thermographic imaging of all electrical assets for the plant. He became certified in arc flash safety and is a Certified Maintenance Reliability Technician (CMRT). He has been with Jacobs for 4 years.

William King is active in the FVOA and works as the group's lead in safety and community involvement. Last year he attended arc flash safety training. Will has been a part of the Jacobs family for nearly 10 years.

Working safely for more than 5 years

Jacobs has created a culture of caring. Our safety culture has been embodied by the term BeyondZero. Work must be healthy, safe and secure for our people and our planet. We go beyond our workplace and into our daily lives, thus creating a safer and healthier future for our families and communities. And because of this focus on the safety, we have worked more than 5 years or 2,133 days as of October 13, 2020, without an Occupational Safety and Health Administration (OSHA) recordable incident.

To keep our focus on safety, in 2019, we implemented the following improvements as part of our safety action plan:

- Updated the facilities site-specific safety plan
- Updated the emergency response plan
- Added a mental health plan and an onsite trained mental health champion
 - Including a 24/7 free assistance hotline for all employees and their families
- Completed weekly BeyondZero observations
- Conducted weekly staff safety meetings and quarterly site inspections to follow all OSHA regulations
- Documented pre-task planning (PTP) for all work activities using mobile technology

To remain accident free from known safety hazards, our team also participated in the following:

- Corrected all safety review findings
- Held at least 40 tailgate sessions, totaling 10 hours of safety training for each employee
- Identified unsafe conditions with monthly inspections by the safety team, and made all project employees aware of unsafe conditions during safety training sessions
- Completed daily job safety analysis and PTPs
- Conducted a minimum of 12 hours technical training per employee, including confined space training and forklift operations
- Conducted monthly inspections of all safety equipment including but not limited to, fire extinguishers, exit signs and eye wash stations

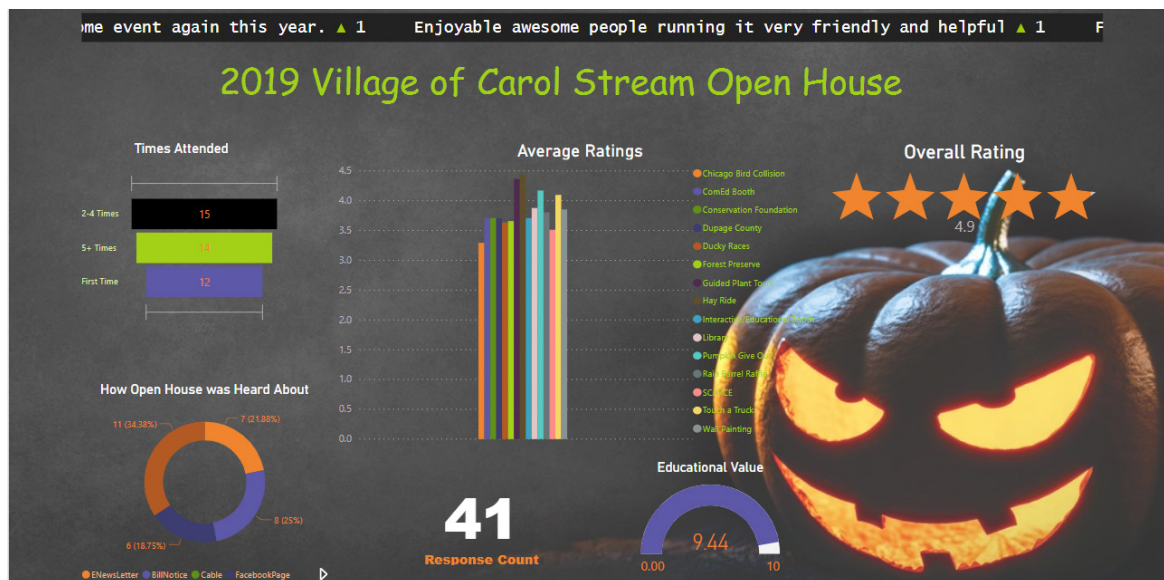
Invested in the community we call home

Our goal is to continue our growth in the Village of Carol Stream as a civic-minded organization, sensitive to the needs of our community. Our concept is to support local projects and embrace the community as it has so graciously embraced us.

The following list shares several ways our employees have supported organizations, schools and local groups with environmental efforts and community involvement programs during 2019:

- Conducted three educational tours for several area schools
- Participated and provided sponsorship for Carol Stream 2019 Summer Concert Series that included an informative session for residents about wastewater and sustainability
- Participated in Adopt-a-Highway (Birchbark Trail and the prairie meadow path)
- Members of FVOA
- Distributed gifts to those in need for the Christmas sharing program
- Hosted tours for schools on Earth Day
- Collected more than 25,000 pounds of electronics during community recycling event
- Collected almost 3 tons of pumpkins during our annual recycling event, which is the equivalent to 338 gallons of gas
- Member of the Chamber of Commerce
- Donated to the local charity Brittney Tree that was founded in memorial of a child who passed away from cancer. We displayed the Christmas tree named after her at the facility.
- Held our annual Open House in October for residents including guided plant tours, hay rides, touch-a-truck, exhibits from the Conservation Foundation and the Carol Stream Public Library, stormwater awareness and free pumpkins for children. This year's open house saw record numbers in attendance. A mobile survey was implemented to allow for community feedback (see Exhibit 1).

Exhibit 1
Open house survey



Invested in the community we call home

Community feedback comments





Brittny tree on display at the WRC.



Annual open house.



Jacobs sponsored brick at Memorial Park.



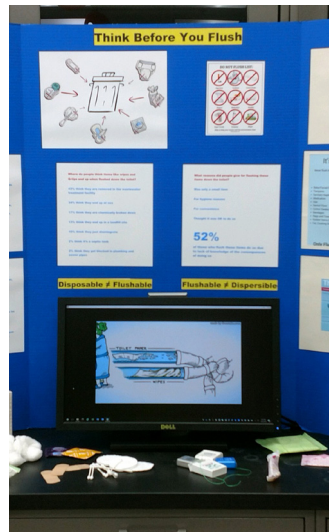
Annual open house.



Annual pumpkin recycling collection.



Electronics collected during the annual recycling event.



Informational display and video for residents to view during the open house.



Mascot 'Mr. Water Drop' on school tours and open house.

O&M overview

The Carol Stream WRC is a conventional activated sludge plant permitted to treat 6.5 mgd average daily flow. The facility is equipped with an automatic dialing alarm supervisory control and data acquisition (SCADA) system to notify plant personnel of any emergencies. During our last contract year, we were 99 percent compliant in our operations.

Exhibit 2 summarizes actual effluent plant performance from May 2019 – April 2020.

As seen in Exhibit 3, our average percent removal for TSS was 99 percent and 98.2 percent for BOD which is significantly better than our permitted levels of 85 percent.

As seen in Exhibit 4, our average influent BOD for the period was 135 mg/l and effluent was <2.5 mg/l during our contract year.

Our average percent removal for TSS and BOD are **significantly better** than the 85 percent permitted requirement.

Exhibit 2
Actual effluent plant performance

Parameter	Average	Limit	Permit Percent
Flow (mgd)	5.8	6.5	89 percent capacity
5-day carbonaceous biochemical oxygen demand (CBOD) [milligrams per liter (mg/L)]	<3.6	10	36 percent permitted discharge
Total suspended solids (TSS) (mg/L)	<2.2	12	18 percent permitted discharge

Exhibit 3
TSS and BOD removal efficiency

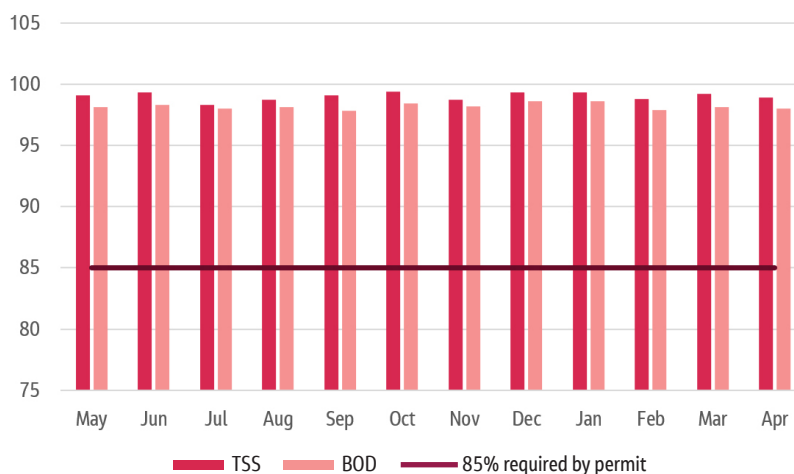
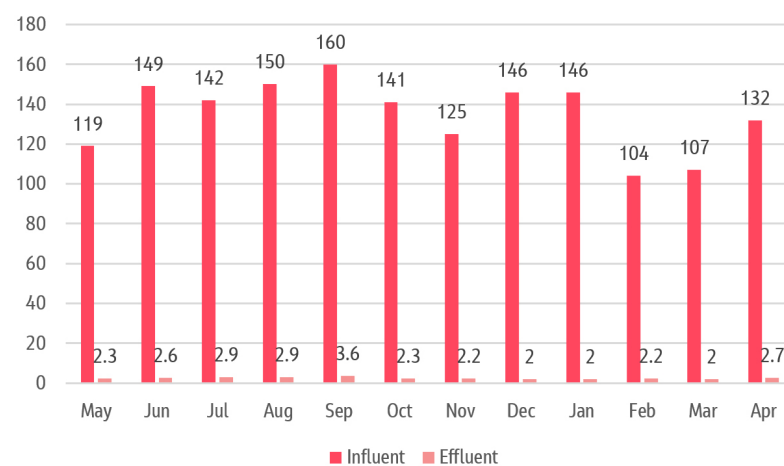


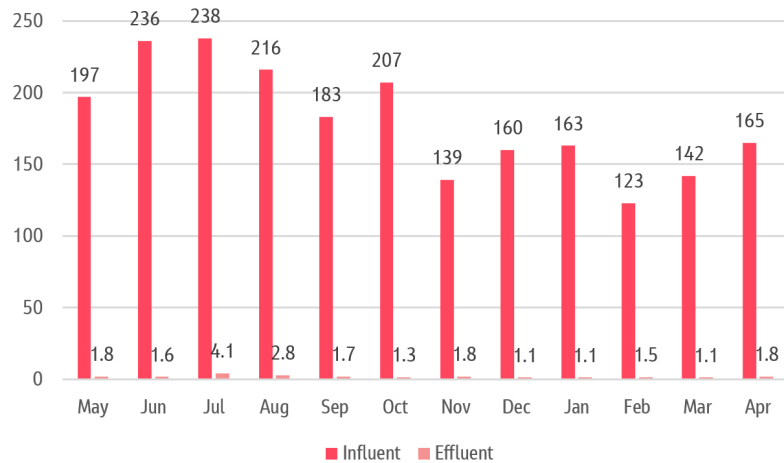
Exhibit 4
BOD influent and effluent concentrations



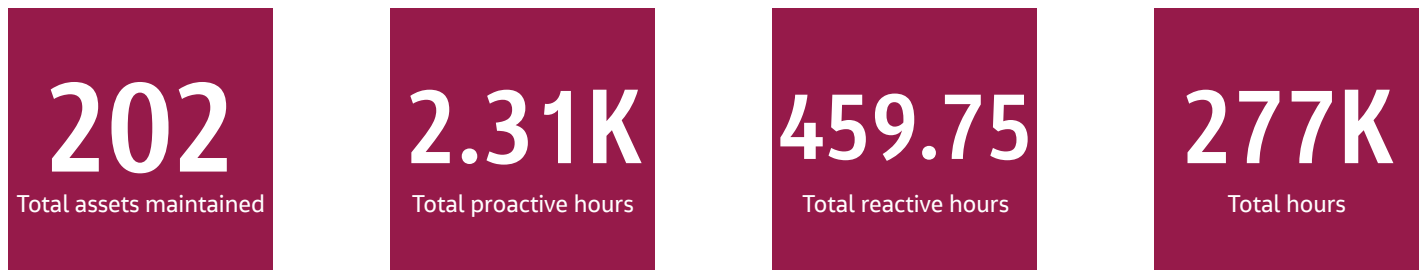
As seen in Exhibit 5, average influent TSS for the period was 181 mg/l and effluent was <1.8 mg/l.

Statistical process control procedures were established to ensure continuous compliance with National Pollutant Discharge Elimination System (NPDES) permit limitations. The mean cell residence time, sludge age, food to microorganism ratio and sludge volume index are tracked daily to monitor plant performance. Upper and lower control limits have been established to provide guidance when approaching critical stages in the facility's operation.

Exhibit 5
Average influent TSS concentrations



Our proactive maintenance program



Jacobs has always held a high standard in managing maintenance programs and performing the respective maintenance. We recently introduced the Maintenance Excellence Initiative (MEI). The MEI is a long-term strategy that helps significantly reduce maintenance costs, and improve safety, reliability and compliance. Maintenance excellence is more than just a set of maintenance plans and best practices, it is an attitude towards maintenance that encompasses everything that will extend the useful life of the Village's assets by routinely performing service on a pre-determined schedule, also known as preventive maintenance (PM). As a team, we are moving toward significant improvements that can and will provide the tools needed to bring our maintenance practices to the next level.

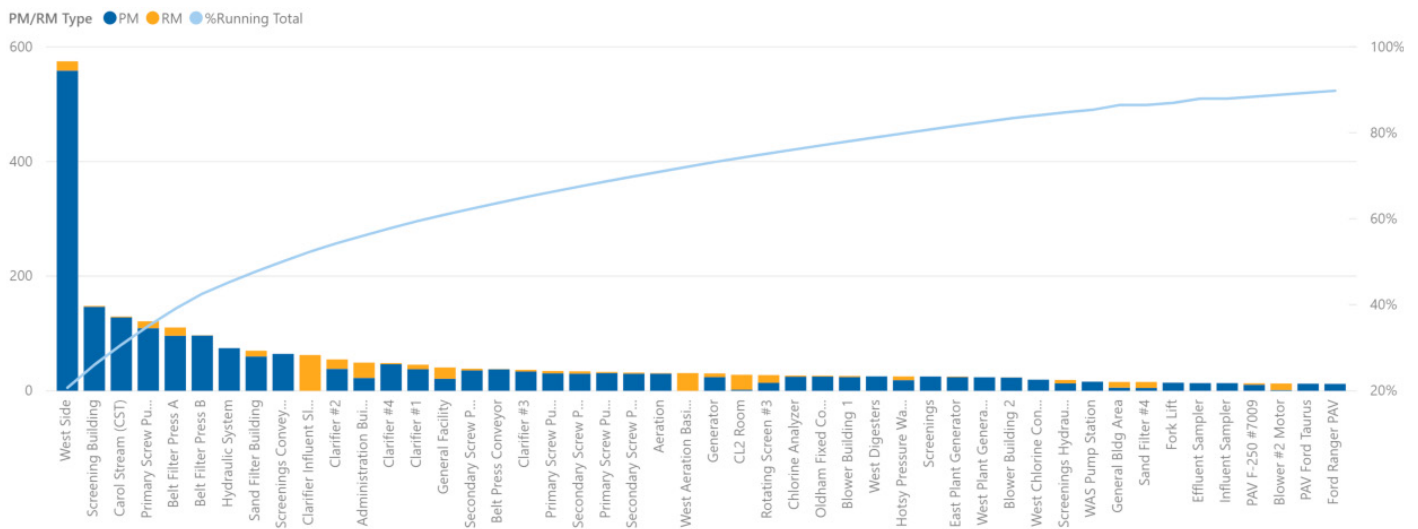
During the last contract year, we completed 83 percent PM tasks to 17 percent CM tasks. This is a 3 percent increase from last year; and is 2 percent away from a world-class PM target of 85 percent. With our emphasis on MEI, we are trending towards that world-class PM to CM percentage.

O&M overview

In 2019, we upgraded our computerized maintenance management system (CMMS) Maintenance Connection and now we can track where and how our time is focused. Exhibit 6 details our time spent on each asset, proactive and reactive. These efforts reduce failures, which ultimately reduce cost and increase uptime.

Exhibit 6

PM and CM hours by asset

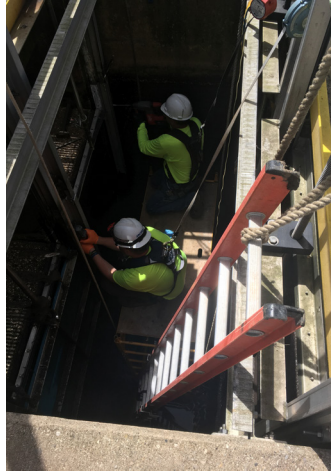


In 2019, the WRC experienced necessary repairs including:

- Rehabilitation of the sandfilter and replacement of valves and weirs
- Rewiring of secondary screw pumps
- Replaced the hycor trunnions
- Rebuilt the Hoffman blower motor
- Replaced the hycor press piston
- Replaced the belt press belt
- Repaired and replaced the aeration basin diffuser
- Replaced the belt press compressor
- Replaced the secondary screw grease pump motor
- Replaced the temporary air line with permanent underground piping
- Repaired the digester valve
- Repaired the clarifier #2 torque switch
- Replaced the Neuros blower circuit breaker
- Repaired the screenings conveyor motor/wiring



Repairing the blower leaks.



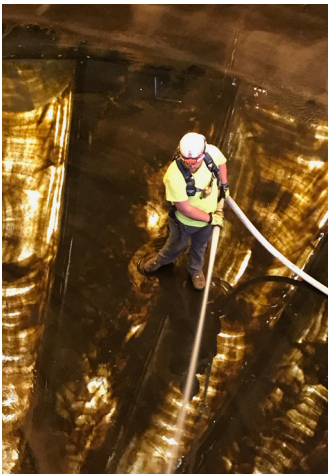
Repairing the clarifier diversion slide gate.



Repairing the waste activated sludge (WAS) pump.



Repairing the pump.



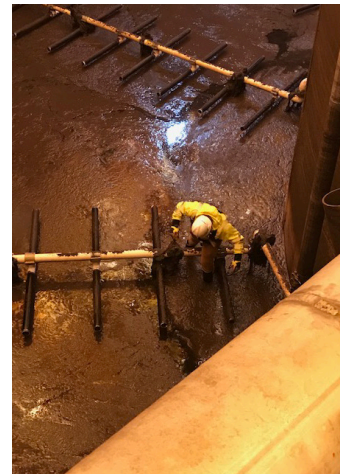
Working in clarifier.



Working in clarifier.



Hycor trunnion.



Making repairs in the digester.

O&M overview

WRC improvements

In 2019, we also completed projects to improve the WRC's operations and appearance. These projects include:

- Planted pollinator flowers around administration building
- Installed new doors and locks on the administration building
- Conducted atmospheric monitoring in the headworks building
- Repaired and replaced of the administrative building flooring
- Repaired the laboratory flooring
- Replaced the submersible pumps with permanent sample pumps
- Installed LED lighting throughout the facility
- Replaced and reglazed a broken window
- Repaired the sidewalk
- Added and relocated a chlorine analyzer for more accurate reading
- Remodeled old administrative building office and converted it to the maintenance office
- Hosted Shwing screw press pilot



The team planting the new pollinator garden at the administration building.

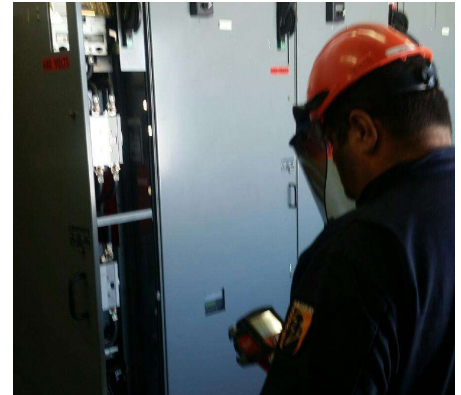


The new pollinator flowers.



Implementing innovations and technology to improve operations

- Use of iPads for PTPs and tracking work orders
- QR coding for assets and reports
- Use of laser alignment tool for primary and secondary pump belts
- Working with ComEd Strategic Energy Management program for energy cost savings
- Infrared imaging of electrical panels
- Addition of level sensors in digesters



Infrared imaging of electrical panels.

Training

Jacobs places a high priority on safety and provides the necessary equipment and training to comply with federal and state regulations. This protects project personnel, the general public from injury, Jacobs and the Village from liability.

Jacobs' formal training programs increased staff efficiency and levels of expertise. Our program uses individual training plans, correspondence courses, on-the-job training and cross-training, which results in a more versatile staff capable of performing a variety of tasks. Trainings in 2019 include:

- Hazard communications
- Ergonomics
- Bloodborne pathogens
- Confined space
- Electrical safety
- Fall protection
- Fire extinguishers
- Hand safety
- Workplace violence awareness and prevention
- Lock out/tag out
- First Aid/CPR/AED
- Noise
- PPE
- Slips, trips and falls
- Stairways and ladders
- Heat stress
- Cold weather risks



NPDES permit

During our last contract year, we were 99-percent compliant. Due to the performance and compliance history of no findings at the WRC, IEPA did not conduct a Compliance Evaluation Inspection in 2019. All records were maintained as required by the NPDES Permit. A dichlorobromomethane (volatile organic compound) study continues to be performed on the discharge. Monitoring for phosphorus and copper discharges continue in preparation of upcoming limits that Illinois is considering statewide.

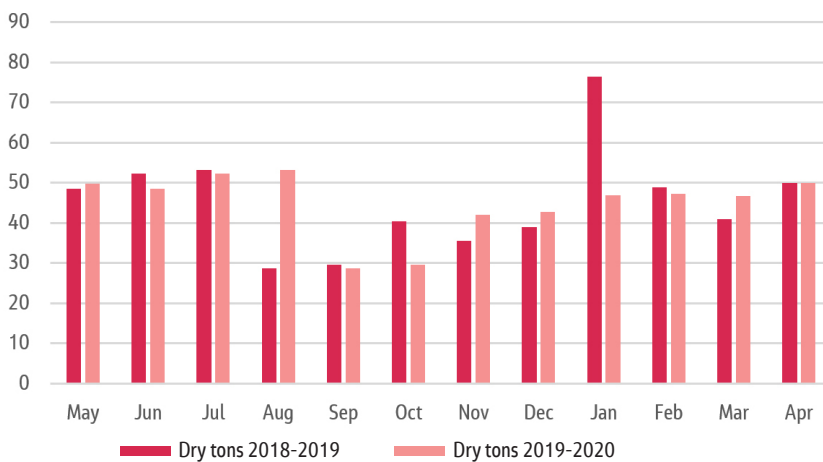
Solids handling

We operate our biosolids treatment processes to reduce volume, facilitate handling and transport, destroy pathogens and control odor. Through plant optimization, a drier sludge is being produced while using less polymer. Exhibit 7 represents the amount of biosolids in dry tons that were removed and pressed from the system; the solids were then hauled to the landfill for disposal.

Exhibit 8 represents the total gallons of polymer used to produce the biosolids pressed from the system.

Exhibit 7

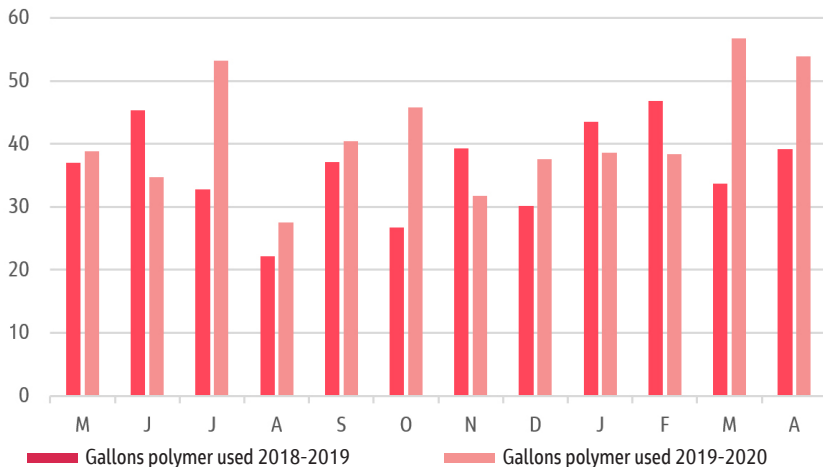
Biosolids removed the past two years



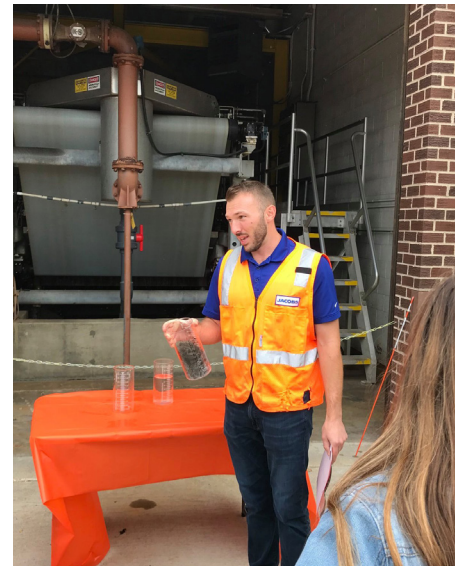
A total of 1,083.03 dry tons of biosolids was removed the last two contract years.

Exhibit 8

Polymer used to produce biosolids the past two years



A total of 931 gallons of polymer was used to produce biosolids the last two contract years.



Project Manager Nick Lenzi leading a tour group.

Laboratory

All sampling we conduct for state and federal permit requirements are performed in-house or sent to a state-certified laboratory for analysis. Our in-house laboratory services perform process control analysis of the activated sludge process and are an integral part of our overall operation of the wastewater treatment system. Our goal is to provide regulatory agencies with reliable, accurate and up-to-date information to enhance their ability to serve our clients and protect the environment. In 2019, we took over 1,332 samples and tested for compliance with the daily limits of the NPDES permit. Additionally, semi-annual metals samples for effluent, influent and sludge were collected and tested, as well as priority pollutants. All permitted industries were tested for their individual permits as required by industrial pretreatment regulations.

Required parameters in the permit include:

- Flow
- BOD₅
- CBOD₅
- Suspended solids
- Ammonia-nitrogen
- Dissolved oxygen (DO)
- Total phosphorus
- Total nitrogen
- Nitrates and nitrites
- Copper
- Alkalinity
- pH
- Temperature
- Fecal coliform
- Total chlorine residual
- Chloride
- Dissolved phosphorus
- Total kjeldahl nitrogen (TKN)
- Dichlorobromomethane

Statistical analysis for each parameter is analyzed and graphed, showing upper and lower control limits. Operations personnel are responsible for entering daily laboratory data into a computerized operational database. The data is transferred into a computerized NPDES form for reporting to IEPA. Being intimately familiar with daily analytical data, the laboratory is the first line of defense in identifying potential problems associated with permit compliance.

The Carol Stream laboratory is a part of our internal quality control program. We pride ourselves in the quality control measures we take to validate and corroborate our analytical data.

The following list reflects routine minimum standards for Jacobs laboratories:

- Adherence to Jacobs' comprehensive quality assurance/quality control (QA/QC) program for all permit-required analyses, including, but not limited to, precision and accuracy results and corresponding control charts.
- Chain of custody documentation for all samples entering or leaving the facility (internal or external), which are kept in Jacobs bound and numbered books.
- A Chemical Hygiene Plan, including Safety Data Sheets (SDSs) for all chemicals and reagents, emergency response, training sign-off sheets and any site-specific requirements.
- Segregation of existing chemical stock according to chemical compatibility; all chemicals and reagents exceeding the expiration date are discarded according to state and local guidelines.
- Standard operating procedures for all chemical and physical analyses.
- A comprehensive computerized PM program for all laboratory equipment.

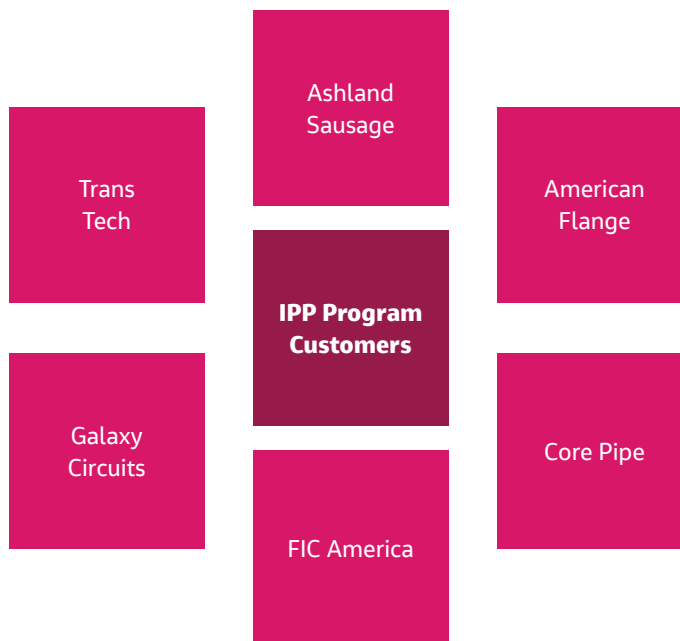


Samples being analyzed during the open house in the laboratory.

Industrial Pretreatment Program

The Village of Carol Stream's IPP has identified six industrial users that require permitting and monitoring according to the US EPA guidelines. Five of these users have processes that classify them as Categorical Industrial Users (CIU). They are required to meet effluent limitations set by 40 CFR 433. Exhibit 9 is a summary of our IPP customers.

Exhibit 9
IPP customers



In 2019, the IPP completed the following:

- Performed semi-annual metals and annual priority pollutant testing on effluent, influent and sludge from the publicly owned treatment works (POTW).
- Performed annual inspections and sampling for the permitted Significant Industrial Users (SIUs).
- Performed a comprehensive survey of the industry and businesses which discharge to the Carol Stream WRC.
- Performed a required Resource Conservation and Recovery Act (RCRA) hazardous waste survey of medical waste generators.
- Issued new permits for each permitted industry with updated requirements.
- Participation in the Salt Creek Watershed Study Group, Illinois section of the AWWA, the IAWPCO, and FVOA.
- Surcharge billing calculations were submitted quarterly for BOD; TSS and fats, oils and grease (FOG).
- Continued to work with local industries on phosphorus alternatives and pretreatment options.
- A total of 361 work hours and \$20,309 were devoted to managing the IPP in 2019.

Sustainability

At Jacobs we are committed to developing sustainable business practices. We pledge to develop strategies that enable us to move toward sustainability while enhancing the value to the citizens of Carol Stream. During the last contract year, we decreased our electrical consumption by 5,000 kilowatt hours (kWh) (Exhibit 10) and although we didn't decrease our natural gas consumption (Exhibit 11) over the previous year, we did spend \$3,500 less than our budgeted amount.

Exhibit 10
Electrical consumption comparisons

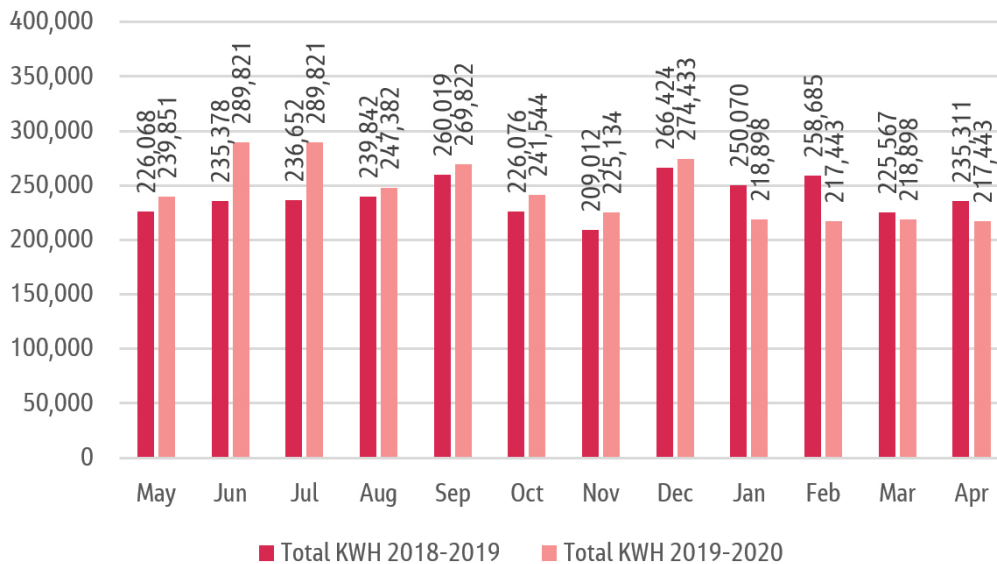
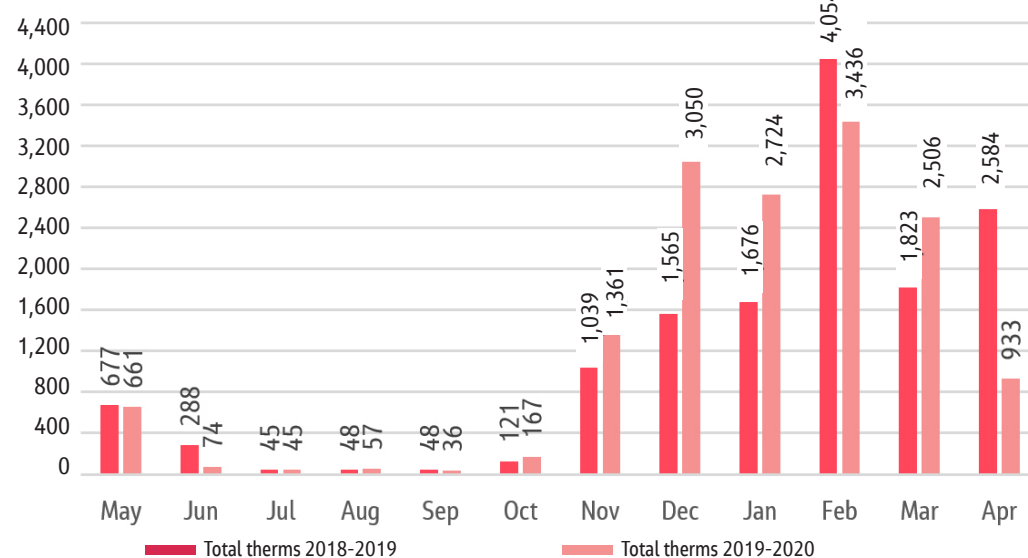


Exhibit 11
Natural gas consumption comparison



Sustainability

For our company, sustainability extends beyond good environmental stewardship. We emphasize social and economic progress while protecting our environment and improving resilience. Our new strategy encompasses People, Places and Partnerships:

- **People** – Being the employer of choice by maintaining safe, healthy and inclusive work environments that help our people thrive.
- **Places** – Creating sustainable places to live and work. Increasing the efficiency of our operations to reduce negative impacts and positively contribute to society.
- **Partnerships** – Enabling change through smart solutions. Driving progress and positive change by collaborating with our clients to deliver innovative solutions on our projects and across our supply chain.

During 2019, employees at the Carol Stream project implemented more recycling measures as part of our plan:

- Recycling includes coffee pods and disposable gloves have been added to our recycling program. Through the year a coffee pod box containing approximately 600 pods was recycled.
- We continue to recycle many items such as paper, plastics, ink cartridges, scrap metals, waste oil and skids. Items are also re-purposed, such as wooden pallets being used as a basement ceiling and made into a bench. Approximately 35 pallets were re-purposed.
- Bottle caps were saved for donation to children at the Jefferson Early Childhood Center. The caps are used for math skills, such as sorting and counting, then ultimately will be recycled into a buddy bench. Through the year 416 caps were donated to the school project.
- Over 6,420 pounds of scrap metal, 25 pounds of batteries and 68 ink and toner cartridges were recycled.

For years, we've started meetings with a Safety Moment – a daily reminder of ways to keep ourselves and our communities safe. This year, with the addition of Inclusion and Diversity to the foundation of our core values, we're expanding these moments to include more tenets of our Culture of Caring. This includes mental health, emotional wellbeing, professional development, inclusion and diversity.



Financial review

This section provides an overview of rebateable expenditures (Exhibit 12). We are committed to providing the Village world-class operations and maintenance. During the last contract year, Jacobs made substantial investments in our O&M activities. These investments resulted in budget overruns, all of which will be covered by Jacobs. These overruns include:

- A large unbudgeted increase in prevailing wage rates occurred in August.
- Chad Askeland was promoted out of his "in training" role to Mechanic.
- Utilized Jacobs regional subject matter experts to conduct multiple internal audits resulting in upgrades to our SCADA system, improved plan implementation and document review.
- We spent \$3,500 less in natural gas, but we used 68,000 kWh in the first two months during the end of the record-setting rain season. But for the remainder of the year, we used 5,000 kWh less than the previous year.
- Although we came in under budget for solids hauling and disposal, we did see an increase in the number of tons hauled in 2019 relative to previous years. This is due in part to the cake solids concentration. We are focused on producing a high percent of cake solids, but the deterioration of the belt presses is making it increasingly more difficult.

Exhibit 12

2019-2020 financial overview

Rebateable Accounts			
<i>Deviations from budget 100% rebateable/invoiceable</i>			
	Budget	Expenses	Rebate to City
Repairs	\$60,000.00	\$59,862.58	\$137.42
Shared Savings Accounts			
<i>Jacobs covers 100% of aggregate budget overruns, savings are split 50/50</i>			
	Budget	Expenses	Jacobs Investment
Labor and Benefits	\$743,835.00	\$793,803.50	\$49,968.50
Utilities	\$243,198.00	\$245,751.52	\$2,553.52
Solids	\$160,940.00	\$152,904.59	(\$8,035.41)
Total	\$1,147,973.00	\$1,192,459.61	\$44,486.61



Looking forward

As we look to the future, we're excited about continuing to support the Village and your evolving needs. We will work with you to identify and pursue opportunities for improvement and advancement. Examples include:

- Continuing our team efforts with the Village on capital planning and O&M related issues affecting the WRC
- Continue to explore and deploy Internet of Things (IOT) solutions
- Optimize our processes to become more energy efficient

It is a pleasure serving the citizens and Village of Carol Stream. We look forward to another successful year and strengthening our partnership and continuing to make facility improvements and efficiencies.

www.jacobs.com



Jacobs