

The Honorable
Board of Directors
Great Lakes Water Authority

Dear Chairperson Zech and Directors:

Regarding: CEO's Report – April, 2021

Throughout the last year, the GLWA team worked tirelessly to assist us in achieving our vision of being the service provider of choice in southeast Michigan. No matter the challenge – not the least of which was a global pandemic – our team members have gone above and beyond to ensure that we have been able to provide water of unquestionable quality and safe and sanitary wastewater services without interruption to our member partners.

I am so incredibly proud of our team for their hard work and commitment to serving the people of southeast Michigan and I am excited to share that team members' efforts are being recognized throughout the water sector:

- Water Works Park Water Treatment Facility received the Partnership for Safe Water's Presidents Award for Treatment Plant Optimization. The effort was initiated and led by Balvinder Sehgal, Manager for Special Projects. President's Award recognizes achieving very stringent individual filter performance goals for turbidity.
- The Michigan Water Environment Association (MWEA) and Water Environment Federation (WEF) selected four GLWA team members as recipients of their annual awards program. It is important to note that in each of the categories our team members were honored, there was only one individual picked to receive the award:
 - Luther Blackburn, Jr. - Operations Manager, Wastewater Operations: Operations Professional of the Year;
 - Andrea Busch - Management Professional, Energy, Research & Innovation: WEF Laboratory Analyst Award;
 - Stephen Kuplicki – Manager, Wastewater Operations: MWEA IPP Professional of the Year;
 - Sarah Watkins – Chemist, Wastewater Operations: MWEA PK Sarda Laboratory Professional of the Year;
- Associate General Counsel Lavonda Jackson was selected as one of the 2021 Crain's Detroit Business Notable Women in Law.



I think it is important to call out another important achievement related to our Industrial Pretreatment Program (IPP). As of March 31, 2021, presentations that were made by GLWA team members to introduce the Authority's new Pretreatment Rules to member communities and request a community resolution adopting them, we have now received and acknowledged 76 (96%) executed agreements. There are only two communities left to respond, and one is awaiting final resolution.

Continuing along the water quality theme, I wanted to share with you that I will be serving as an advisor to the Erb Family Foundation related to their new Combined Sewer Overflow Informational Study, which will examine the remaining CSOs in SE Michigan and the best ways to dramatically reduce or eliminate them in the region by 2040. This work aligns philosophically with the water quality goals and objectives in our Wastewater Master Plan and may also ultimately provide another funding source for this important work.

Finally, I share with you some information related to the water shutoffs moratorium in the state of Michigan. Through an Executive Order and then by signing a bill into law, Governor Whitmer required water utilities turn water service back on to households that had been shutoff. This water shutoff moratorium ensured continued water service for those households facing financial hardship due to the pandemic. However, the moratorium was time limited, expiring on March 31, 2021. In addition, the State used its allocation of CARES Act funds to establish a water assistance program totaling \$20 million. The State's water assistance program also included a shutoff moratorium.

Since the CARES Act, two additional COVID-19 relief bills enacted into law by Presidents Trump and Biden allocated \$1.1 billion for the Low-Income Household Water Assistance Program (LIHWAP). LIHWAP is designed to provide emergency assistance to low-income households, particularly those with the lowest incomes, that pay a high proportion of household income for drinking water and wastewater services. The funds will be distributed by the U.S. Department of Health and Human Services (HHS) as a block grant to states and Tribes, which will then re-grant funds to water utilities to reduce arrearages and reduce rates charged to assist such low-income households.

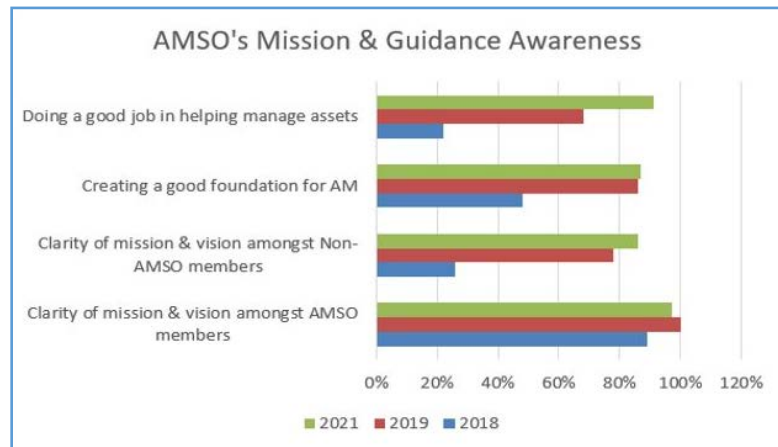
The initial disbursement to states and Tribes will likely occur at the end of May. The State will receive a portion of the initial disbursement of LIHWAP funds if it executes HHS's LIHWAP Terms and Conditions. Additional disbursements will be made to the State upon submission of LIHWAP Implementation Plan. Although LIHWAP does not mandate a water shutoff moratorium, HHS is encouraging states and Tribes to include a moratorium in their Implementation Plans. If prior precedent is an indicator, it is anticipated that the State will condition acceptance of LIHWAP funds by Member Partners on a continued shutoff moratorium.

PLANNING SERVICES

Asset Management (AMG)

The Asset Management Group recently performed an internal survey to assess the current performance of GLWA's asset management governance to identify and implement strategies for future improvements. The Asset Management Strategic Organization (AMSO) as it is formally known is this guiding body. This is the third internal asset management survey that has been conducted targeting those team

members specifically involved in AMSO. The survey provides valuable information related to the understanding of AMSO awareness, effectiveness, and participation trends. In addition, many valuable comments and suggestions have been received that will help to improve AMSO and GLWA's asset management journey. Thank you to all that have participated and have provided well thought out responses and suggestions!



An all AMSO virtual team member meeting has been scheduled for May 13, 2021 from 1:00 -3:00 p.m. This meeting will highlight the specific results of the AMSO survey, the Enterprise Asset Management system upgrade project and contain a robust discussion regarding organization-wide change management strategies related to some of the major initiatives underway at GLWA. Please mark your calendars!

The Linear System Integrity Program is nearing the final stages of project scope and budget discussions. It is anticipated that the details of the contract will be brought to the Operations and Resources Committee and Board of Directors meetings in May 2021.

Capital Improvement Planning (CIP)

We are pleased to welcome Dima El-Gamal, P.E. PhD LEED as our new Director of Capital Improvement Planning. Ms. El-Gamal comes to GLWA from a position of Managing Principal at Stantec's Ann Arbor office. Stantec is a global engineering firm providing a large variety of engineering services. Her body of work at Stantec included many municipal water and wastewater engineering projects. Ms. El-Gamal's most recent accolade is her appointment by the Governor to the State of Michigan's Board of Professional Engineers. Congratulations to her for this distinguished appointment. We look forward to her contributions to the CIP program.

From a CIP Plan perspective, we have begun preparation of the 2023 through 2027 CIP Plan update.

PLANNING SERVICES (continued)

This is the time of year that we contemplate updates and changes to the process. This year among many things on our radar is moving to the exclusive use of a digital solution for updates to CIP project activity, modification to the prioritization scoring algorithm and inclusion of validation efforts that were performed by AECOM as part of the program management contract. As our project execution numbers continue to increase toward the planned spend, we are looking carefully at the criticality of each and every project for inclusion and priority in next year's plan.

We continue to make good progress on the tasks in the AECOM project that will result in our evolution of the CIP program. Notable work this month included nearing conclusion on the resource assessment portion of the project, completion of the RFP for the Program Management Information System project and nearing finalization of some of our much-anticipated business process changes.

Systems Planning

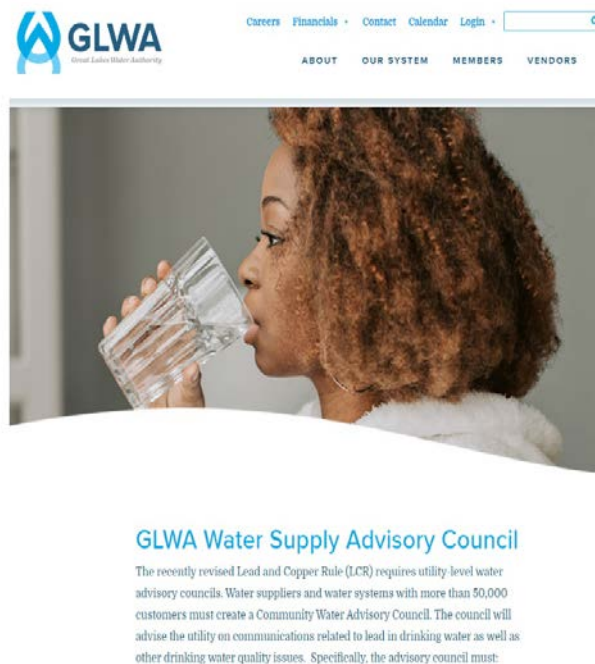
The Member Outreach Team looks forward to continuing our efforts towards a hybrid meeting approach, which will allow members a choice to participate in work group meetings either in-person or virtually, once it is safe to do so. As of right now, Member Outreach meetings will continue to be held virtually through the end of September 2021.



The Water Analytical Work Group met last month on March 16, 2021 with a full agenda! Kerry Sheldon, Bridgeport Facilitator, kicked off the meeting by sharing a status update on the Wholesale vs. Retail Data Comparison and Members discussed their thoughts on participation in the data collection effort. Todd King, Field Services Director, gave an update on the exercising of 450 isolation valves, as part of a condition assessment. John Norton, Energy, Research & Innovation Director, shared a potential pilot opportunity regarding satellite leak detection to gauge Member interest. The technology came out of the Technology Approval Group (TAG) Workshop that was hosted last Fall. Participants indicated their interest and willingness to have such a pilot through a poll at the end of the meeting. Additional information regarding the pilot will be shared with Members soon. Email outreach@glwater.org if your community is interested in participating.

PLANNING SERVICES (continued)

The GLWA Water Supply Advisory Council held its first meeting of 2021 on March 22, 2021. The Lead and Copper Rule (LCR) requires water suppliers and water systems with more than 50,000 customers, to create a Community Water Advisory Council. The council will advise the utility on communications related to lead in drinking water as well as other drinking water quality issues. At this meeting, the council learned about the State Council's current initiatives, recent webinars regarding the LCR, as well as resources available. GLWA has created a dedicated web page for the council, where all relevant council information can be found. Visit www.glwater.org/wsac to learn more! The next council meeting is scheduled for August 16, 2021 at 10:00 a.m.

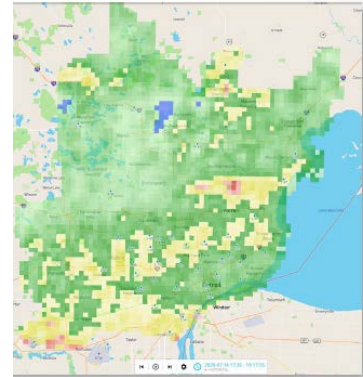


The third Technology Approval Group (TAG) Workshop will be hosted on April 29, 2021. The TAG Program is a technology vetting initiative that will enable GLWA and Member Communities to evaluate emerging technologies, identify pilot opportunities, and engage in collaborative research through a series of workshops and access to a technology portal. This third workshop will be focused on both water and wastewater technologies. [Click here](#) to see a detailed agenda. While the workshop is the full day, participants can choose which sessions to attend, and come and go as they wish. The meeting will stick to the timing laid out in the agenda. This workshop is strictly for Member Communities and GLWA team members. Email outreach@glwater.org for more information.

As mentioned at the March 4, 2021 One Water Partnership Meeting, the Member Outreach's Communication & Education Work Group, in collaboration with GLWA's Contract Negotiation Team, would like to collect examples of water use restriction policies, ordinances and educational materials to share with Member Partners who may be considering implementing their own water use restrictions. A survey is being conducted to gather this information. [Click here](#) to complete the survey.

PLANNING SERVICES (continued)

The Wastewater Best Practices (WWBP) work group meeting on March 10 featured presentations on technologies and services to help operators understand how rainfall impacts the regional collection systems. First up was presentation from Vieux and Associates about the Radar Rainfall service they provide GLWA, and how it could be extended to Member Communities. Richard Pollman of the National Weather Service presented their rainfall-related analytical tools available to operators and requested feedback on how they can be improved. Branko Kerkez of the University of Michigan presented an overview of the early-stage concept for an additional rainfall analytical tool being developed for GLWA that will focus on usability and aggregation of outputs from existing tools. The next Wastewater Best Practices meeting is scheduled for May 12, 2021.



The Regional Collaboration Group (RCG) meeting held on March 18, 2021. Ed Hogan of Wade Trim updates on progress for GLWA's collaborative projects with MDOT including stormwater management at the Gordie Howe International Bridge and I-94 Modernization projects. Updates on several Wastewater Master Plan projects including regulator expansion, the Oakwood-DRI Connector, and Watershed Hub Work Group activities were presented by GLWA team members Biren Saparia, Todd King, and Dan Gold, respectively. Carrie Turner of LimnoTech described an update of the water quality model being used in their Rouge River Water Quality Evaluation as part of the Long-Term CSO Control Plan. A group discussion followed on lessons learned from these projects, and how identified success factors can be carried forward to create future opportunities for continued successful collaborations. The next RCG meeting is May 6, 2021.

On March 23rd, Member Outreach kicked off a series of meetings to discuss GLWA's proposed update to the model wastewater contract. The purpose of the meeting was to orient and introduce members to the working drafts of the updated contract and related Charge Methodology document, which explains how charges are determined. Following the meeting, members were asked to review and share their feedback on the draft documents. GLWA offered to meet individually with members to discuss the proposed update in more detail.

March 2021 Member Outreach Meeting Attendance	
Meeting	# Attended
Watershed Hub Webinar (3/2)	103
One Water Partnership (3/4)	113
Wastewater Best Practices Work Group (3/10)	48
Wastewater Analytics Task Force (3/11)	46
Water Analytical Work Group (3/16)	67
Regional Collaboration Group (3/18)	16
Wastewater Model Contract Meeting (3/23)	35

PLANNING SERVICES (continued)

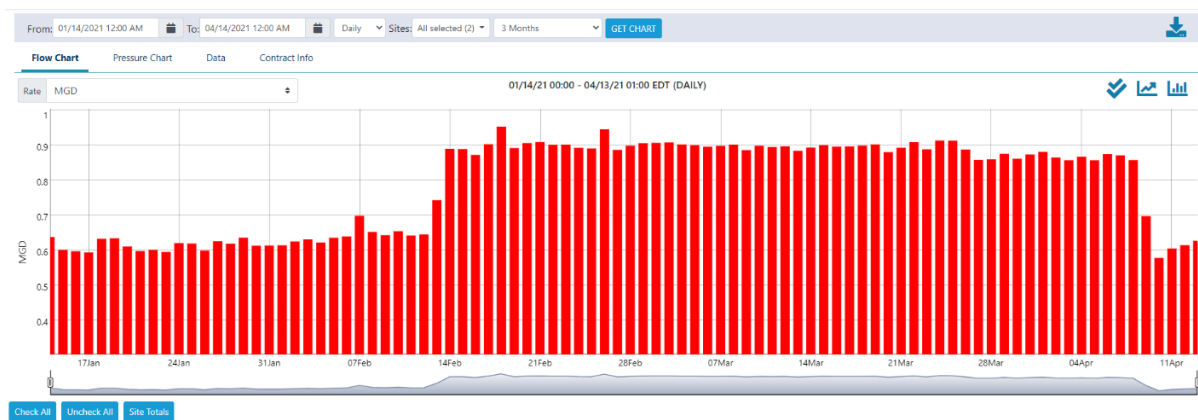
Systems Analytics and Meter Operations (SAMO)

The System Analytics and Meter Operations Group (SAMO) monitors water consumption for all master metered member partners. In the last two months we identified three significant water loss circumstances for member partners and assisted them with resolving the issues. Early detection and notification of abnormal consumption helped member partners avoid high bills and potential resulting billing disputes.

Circumstance #1

Water Loss 0.25 to 0.35 MGD

On February 12, 2021, the wholesale water consumption increased for a member partner (shown below) by 0.25 to 0.35 million gallons per day (MGD). After an investigation by SAMO, the conclusion was that the consumption was accurate and there was no metering issue. SAMO notified the member partner of a potential problem. The member partner performed preliminary checks and sent out a crew to identify possible leaks. Initially they were unable to find any leaks or issues in their system. In early April, while fulfilling a Miss Dig request an employee heard water running. They pulled several manhole covers and saw a significant amount of water flowing in the sewer during dry weather. These types of circumstances are difficult to find since they are not apparent on the surface as are the majority of watermain breaks. The member partner found and repaired a leak on a water main. The member partner's flow pattern returned to normal following the repair.

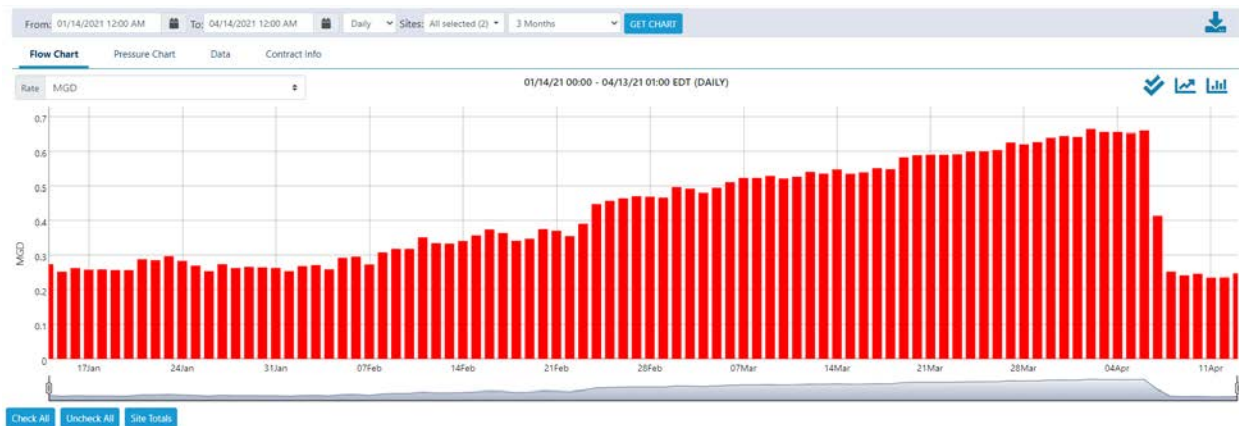


Circumstance #2

Water Loss 0.10 to 0.45 MGD

On February 7, 2021, the wholesale water consumption for a member partner (shown below) started to slowly increase. After an investigation by SAMO, the conclusion was that the consumption was accurate and there was no metering issue. The SAMO group notified the member partner of a potential problem. After some time the member partner was able to identify a break in a 6" main running directly into a storm drain. These types of circumstances are difficult to find since they are not apparent on the surface as are the majority of watermain breaks. The member partner repaired the leak and their flow pattern returned to normal.

PLANNING SERVICES (continued)



Circumstance #3

Water Loss 0.35 to 0.40 MGD

On April 10, 2021, the wholesale water consumption increased for a member partner (shown below) by 0.35 to 0.37 MGD. The member partner was automatically notified by the WAMR system's flow rate alert feature. Even though the issue happened on a weekend, the automatic alert allowed the member partner to find and isolate a break within two days. The break was isolated for repairs and the member partner's flow returned to normal.



WASTEWATER OPERATING SERVICES

Wastewater Operations

Water Resource Recovery Facility (WRRF) operations complied with the Water Quality Standards for March 2021.

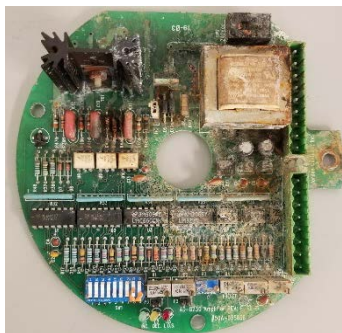
Maintenance

On the WRRF campus, maintenance teams have physically verified the locations of every sump pump. With input from the teams, we will be generating a robust sump pump maintenance and testing program to preclude flooding events that have contributed to the need for costly repairs and

WASTEWATER OPERATING SERVICES (continued)

reduced plant capacity. In addition to the sump pump maintenance program, a training program is being developed to teach maintenance technicians and operators how to identify common points of failure in sump pumps and how to correct these issues before pump failure.

In the short term, the Primary Team has been working to find a creative solution to restore pumping capacity in Sludge Pumping Station 3. They will be replacing or repairing the damaged sludge pump actuators, but in the meantime, they have worked on finding replacement parts for discontinued equipment and attempting to repair damaged circuit cards. This will



maximize the plant's primary clarifier capacity in time for the spring rains. The photos show a damaged actuator card and a replacement card found outside of the manufacturer's stock.

Additionally, the Primary Team, along with Joseph Rowland (Operations Team Leader) and Derek Bennett (Construction Engineering Team Leader), worked hard to troubleshoot a problem with Primary Sludge Pump #9. Despite confusing and inconsistent indications, the team was able to isolate a fault in the soft starter in the control panel. The soft starter will be replaced as soon as a replacement arrives, and Primary Sludge Pump #9 will be returned to service. The photo is of a Primary Sludge Pump soft starter.

Process Control Center (PCC)

The Process Automation and Control System (PACS) Team successfully completed the Ovation Control System Upgrade at the WRRF. We are the first water utility in the country to upgrade to Ovation 3.8.

Several takeaways from this project include: *Teamwork within teams and among the various teams is critical.*

The Operations Team at WRRF did an incredible amount of work in developing and executing the operational plan for the outage. Many team members came in on their off shift to assist and the team worked long hours. They were able to prepare the plant for manual operation and had all critical processes in a stable state the morning of the upgrade. They also did an excellent job of transitioning the plant back to Ovation control.

All members of the PACS Team participated (all hands-on deck) even when it required stretching beyond their comfort zone. The Team self-performed a large portion of the work associated with the upgrade.

WASTEWATER OPERATING SERVICES (continued)

The contractor, Emerson, openly embraced partnering and working collaboratively. They were open to our suggestions and transparent in the sharing of information.

A key factor for the success of this project was the trust among the Teams at the WRRF.

Trust has been established through reliably providing services at a high level, having well-established communication channels, and truly desiring good outcomes for fellow team members. The WRRF management trusted the team's judgment that this project could be successfully executed with newly released software (February) on the largest GLWA site, and it could be performed on a single day.



Planning and preparation are critical and was the bulk of the effort.

Replacing 70 computers and upgrading 54 controllers while keeping a facility in service with no process upsets and maintaining permit compliance requires a substantial amount of prework.

Laboratory

Chemists have completed training on twelve new methods in the first quarter of 2021.

The BOD (biochemical oxygen demand) and Ammonia Lab areas have completed 5S training, and the Trace Organics Lab is now receiving the training.

The new LIMS version is live, and Laboratory and IT teams are currently working on resolving issues as they are identified.

Parsers for direct download are being developed. Autoanalyzer instruments (cyanide and ammonia) and Mercury analyzers are completed. The next priority is to complete the parser for ICP (inductively coupled plasma) metals.

Engineering & Construction

Design Engineering

A construction contract was awarded in late March 2021 for the Rehabilitation Pump Station 1 Ferric Chloride Feed Systems and Complex B TWAS Sludge Line (CIP 211008) design project.

The first set of two incinerator inspections on Multiple Hearth Incinerators MHI 11 and MHI 12 took place during mid to late March 2021. Cleaning was generally complete, and reports were submitted.

WASTEWATER OPERATING SERVICES (continued)

However, based on GLWA Teams inspection in early April 2021, both the cleaning and the reports were not satisfactory. The contractor was asked to do more cleaning and revise the report.

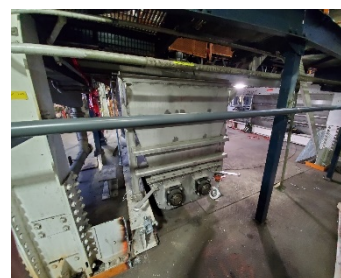
Both Complex I and II incinerators had undergone substantial refractory overhauls as part of Contract PC-774 completed in 2011. It appears that in Complex II, MHIs 7, 8, 9, 12, and 13 received major refractory overhaul while MHIs 10, 11, and 14 had received little. Inspection reveals severe damages on MHI 11 requiring major repair work. At the same time, MHI 11 and 14 are slated for stack testing in early June 2021. A meeting was held on April 12 to discuss options. It is generally agreed that MHI 11 should be repaired first before the stack test, which needs to be postponed. MHI 14 is currently operational and may continue until the stack test, although it is anticipated MHI 14 will also require major repair.

Both MHIs 11 and 12 that underwent major repairs in their breeching under PC-774 just ten years ago will need additional repairs. GLWA inspection and subsequent research revealed that there are problems with structural support, configuration, refractory lining, etc. that are contributing to the failures. Therefore, that needs to be addressed separately.

Construction Engineering

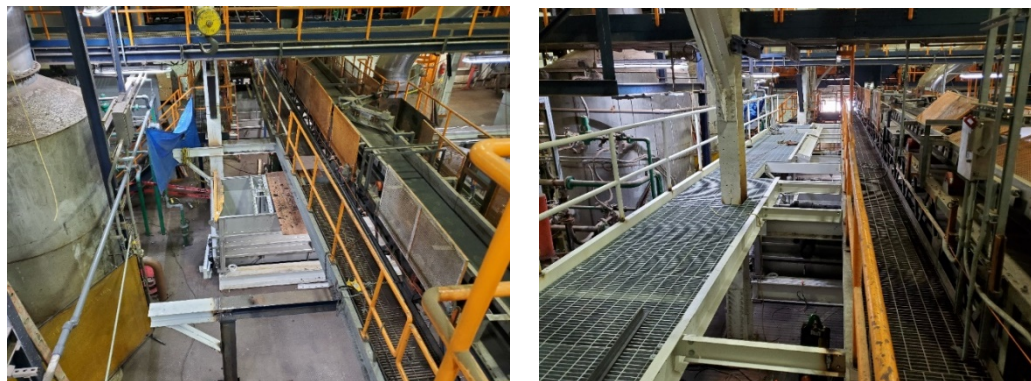
Weiss Construction Co., LLC is in installing new belt conveyors, screw conveyors, and electrical equipment after having recently completed the installation of new sludge cake feed systems on half of the incinerators at the WRRF. The incinerators were successfully restarted, calibrated, and prepared for emission stack testing which occurred in mid-November 2020.

The contractor has completed the replacement of the screw conveyors on Incinerators #11 (picture) and #12 and is underway with placing structural support steel for the new P11-12 belt (pictures shown below), which will replace the equipment that was damaged beyond repair during the fire event of March 2016. This phase of work on Incinerators #11 and #12 began in late December 2020. The replacement JMS belt conveyor assembly will be lifted into place and installed once the handrail and grating are completed.



WASTEWATER OPERATING SERVICES (continued)

Field instrumentation controls infrastructure, and electrical wiring will be the last activities completed before startup by the equipment vendor.



Ironworkers placing supports for new P11-12 cross-conveyor adjacent to existing Q-belt and completed structural support steel, grating, and handrails for P11-12 belt conveyor

The remaining sequence of work includes the replacement of the P13-14 belt conveyor and the last screw conveyors on Incinerators #13 and #14, which will commence after the emissions stack testing that is planned to occur on June 14, 2021, for Incinerators #11 through #14.

The remaining scope of work includes two final sets of SFE strainers, two motor control centers, and miscellaneous plumbing additions requested by GLWA Operations staff. Minor miscellaneous painting work will be completed once Incinerators #13 and #14 have been taken offline. The picture shows a completed installation of new Motor Control Centers serving the incinerator combustion systems and power supplies.



The contract (CON-197) work start date was April 2, 2018. The revised substantial completion date is July 31, 2021, and the revised final completion date is January 31, 2022. The contract value is \$19.5 million.

CSO Control Program

The CSO team is working on the following projects:

- CIP 260617 – St. Aubin Screening and Disinfection Improvements. This project will be provided to GLWA procurement in May 2021 for advertisement. It includes various facility improvements for disinfection, screening, level measurement, storage, and HVAC.
- CIP 277001 – Baby Creek Outfall Improvements. We are anticipating providing this design-build project to GLWA procurement in May 2021 for advertisement. It includes outfall improvements and various improvements near the Baby Creek Facility as well.

WASTEWATER OPERATING SERVICES (continued)

- CIP 274001, 278001 – Leib/Oakwood Facility Improvements. In a slight change in our direction, we are going to develop a single RFP that addresses the scope of work for both facilities. The work between them is somewhat similar and would benefit from the same design team for a similar approach. We are still targeting a July 2021 timeframe to provide to GLWA procurement.
- JOC Task 5 – Chemical Sump Pump Installation. This work was completed and closed out in March 2021.
- JOC Task 29 – Baby Creek Chemical Tank Relining. Tank relining at Baby Creek has begun. We anticipate about two to three months per tank.
- Task Order Engineering Services (TOES) Task 01T. The GLWA WRRF/CSO Consolidated Annual Report was successfully completed and transmitted to EGLE at the end of March 2021. Presently, we are focusing on developing a tool for GLWA operations staff to utilize in improving how data is transmitted to MI-Waters for NPDES monthly discharge reporting requirements.
- TOES Task 5T – CIP 260614 – Oakwood HVAC Improvements. A pre-bid walk-through was held in March 2021. Bids are due in April 2021, and we are anticipating a May 2021 Board approval with notice to proceed in June 2021.
- TOES Task 7T – CIP 260621 – Conner Creek Dike Improvements. This project is presently out for bid. There is a bid walk-through in April 2021. We are targeting a May 2021 Board approval with notice to proceed sometime in June 2021. We have collaborated with the City of Detroit and DWSD extensively on this project, as well as DTE and the Public Lighting Authority, to ensure we are coordinating with other utilities for potential impacts to their operations or the community in general.
- We anticipate construction of the main portion of the project to conclude the fourth quarter of 2021 or the first quarter of 2022 with restoration officially occurring at the beginning season of 2022.
- TOES Task 11T – Consolidated Annual Report 2022. This Contract was bid out to provide professional services to GLWA to analyze quarterly CSO data and various wet-weather events in 2021 to ensure our facilities are operating properly and to spot opportunities to optimize them if any.
- TOES Task 12T – Engineering and CAD Standards. This Contract is presently advertised. We anticipate a notice to proceed for May 2021. This project aims to help standardize the Water and Wastewater groups engineering and CAD standards so that similar approaches to all engineering projects will be made. Similar approaches and guidelines will also allow the consultant community to better serve GLWA because our approach is organizational rather than individual preferences between groups and individuals.

WASTEWATER OPERATING SERVICES (continued)

- TOES Task 14T – St. Aubin Hydraulic Modeling. This contract is presently advertised and has a similar schedule as Task 12T. The goal of this project is to have an updated hydraulic model of the facility, developed head/discharge curves for the facility, and well-defined SOPs around facility hydraulics to facilitate a more consistent operation of the facility which considers all factors in hydraulics (system levels, facility levels, river levels, etc.).

WATER OPERATIONS

Administration

GLWA Water Works Park President's Award

Balvinder Sehgal, Manager for Special Projects initiated and led Water Works Park (WWP) Water Treatment Plant's team for phase IV (Presidents Award project) of the Partnership for Safe Water program of American Water Works Association (AWWA). WWP successfully received the Partnership for Safe Water's Presidents Award for Treatment Plant Optimization. This achievement is an outstanding accomplishment.



This award for Treatment Plant Optimization demonstrates the ongoing commitment to deliver customers the highest quality water. The program is a volunteer initiative developed by the USEPA, AWWA and other water organizations representing water suppliers striving to provide their communities with drinking water quality that surpasses the required regulatory standards, through treatment plant and distribution system optimization. President's Award goals represent a superior level of performance that can be achieved in the four-phased program. The President's Award recognizes achieving very stringent individual filter performance goals for turbidity.

Springwells Water Treatment Plant

First Look into Reservoir No. 3

Contract No. 1900744 "Reservoir Rehabilitation Construction Project at Imlay Station, Lake Huron, Springwells and Southwest Water Treatment Facilities" has mobilized at Springwells to isolate, clean, inspect, and repair Reservoir No. 3.

Inspection of finished water reservoirs is required by the Michigan Department of Environment, Great Lakes, and Energy (EGLE) every five years to access the structural condition of the structure and to check for anything that might compromise the potable water stored in them.



*Initial walkthrough of Reservoir No. 3
with GLWA, Hazen & Sawyer, and Pullman*

WATER OPERATIONS (continued)

Once the reservoir was isolated the water was pumped out and an initial walkthrough was performed to check the general condition of the reservoir. The initial walkthrough found no significant issues of concern with only minor amounts of sand, anthracite, and phosphate precipitate found on the reservoir floor. Once the floor is cleaned, a more thorough inspection of the reservoir will be performed by Hazen & Sawyer the engineering consultant on the contract; any repairs identified will be corrected by the construction contractor Pullman. Once repairs are made and a final cleaning performed, the reservoir will be disinfected and tested by GLWA Water Quality and released for service.



Stop Log at entrance to Reservoir No. 3

Water Quality

Water Quality Participates in the 64th Annual Science and Engineering Fair of Metro Detroit

On March 8 and 9, Great Lakes Water Authority, Water Quality team members Ursula Gray and Patrick Williford, participated in judging science projects in the 64th Annual Science and Engineering Fair of Metro Detroit (SEFMD).

This year marked Ursula Gray's 2nd year of judging and Patrick Williford's 29th year of judging SEFMD. The SEFMD allows metro Detroit middle and high school students a chance to show their science projects to the public.

The students do either individual or group projects. The projects are usually displayed in poster board format with several students having their project log books and/or products of their projects displayed. This year, due to COVID-19 precautions, the projects were virtually displayed. Many students displayed their work using Acrobat Files, image files, and YouTube Videos.

GLWA judges look at the projects related to the water service sector (drinking water, sewage water, and environmental water). The judges form two teams, one for high school (senior) projects and one for middle school (junior) projects. Each team sets out with a list of projects that were separated out from the 1,200 to 1,300 projects that are normally submitted (sadly, only 609 projects during COVID-19) as being related to the water service sector and evaluates the projects for the student's hypothesis, procedure and process, conclusions, and appearance. The judges rate each project on a scale of zero to ten, caucus after they have their individual ratings, and come up with a team rating for each project. The highest ranked projects are then given an award that GLWA provides to the students during an award ceremony usually during the month of May - Water month. Again, this year, COVID-19 is dictating that GLWA award students through the mail.

WATER OPERATIONS (continued)

Water Works Park

Alum Metering Pump Flow Meter

Aluminum sulfate is used to remove raw water turbidity by promoting agglomeration of particles in water to form flocs in the flocculation basins that settle out in the sedimentation basins. There are three trains in the flocculation basin at Water Works Park (WWP); each serves by an influent conduit. Aluminum sulfate is fed through three metering pumps to the three conduits.

Water Works Park continues to optimize the alum chemical metering operational process with automation. Currently, the alum metering pumps measures flow with an algorithm. The algorithm is like a pump curve. The speed and stroke of the pump will give you a desired output based on this theory. But this is not the most efficient method. When we can accurately know the amount of Alum used, we can best control cost and water quality.

The Distributive Control System (DCS) Alum Metering Pump algorithm does not factor in real time scenarios, the possibilities of a worn pump, seals, or mechanical issues. One of the biggest factors is restriction of flow through the strainer as it begins to clog. Loss of suction or head loss from the day tanks is another factor. The most effective way to measure flow in a process is with a flow meter.

A Siemens Sintrans 5000 flow meter was installed on Alum Metering Pump 30.01 as a pilot program. The purpose of the program was to determine the accuracy of the meter pump compared to the DCS (Ovations) and using the drawdown tube to manually test the flow. The operations staff documented the data for comparison. The data shows the most accurate way to measure alum flow is with the flow meter. (See Chart Below)

	Drawdown Reading	Flowmeter Reading	% of Error	DCS Reading	% of Error
1	25 gph	24.5 gph	-2.0%	18.1 gph	-27%
2	24 gph	24.6 gph	2.5%	17.9 gph	-25.4%
3	25 gph	26.9 gph	7.6%	19.2 gph	-23.2%
4	33 gph	32.4 gph	-1.8%	24.5 gph	-25.8%

The chart shows the comparison of the flow meter and the drawdown method in percentage (%) of error. A negative number indicates that a slower flow rate is given compared to the drawdown tube. The flow meter is constantly measuring the flow while the drawdown is based on a manual test.

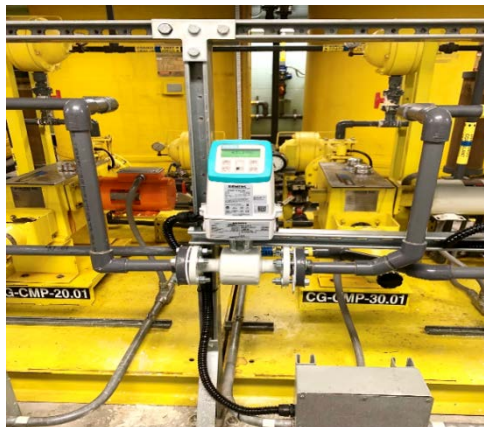
The Alum Pump Flow Meter Pilot was a success. We determined the meter is more accurate than the flow algorithm in the DCS. We intend to move forward with connecting the flow meters to the DCS and move away from reliance on the algorithm. The meter can alert operations when the alum metering pump is underfeeding or is not feeding alum into the treatment process.

WATER OPERATIONS (continued)

We can also use the flow meter to determine possible mechanical breakdowns. Electrical Instrumentation Control Technicians (EICT) can use the flow meter to determine the accuracy of the calibration.



Alum Metering Blowdown Tube



Siemens Flow Meter

Troubleshooting Alum Feed Line to Maintain Plant Capacity

All operational teams are faced with challenges to operate and maintain our systems. Here is a troubleshooting example from a plant maintenance team giving an inside look at the steps taken to meet the change of correcting a leak and resolving an additional challenge once the leak was corrected.

Aluminum sulfate is used to remove raw water turbidity by promoting agglomeration of particles in water to form flocs in the flocculation basins that settle out in the sedimentation basins. There are three trains in the flocculation basin at WWP; each serves by an influent conduit. Aluminum sulfate is fed through three metering pumps to the three conduits.

The alum coming from Metering Pump #2 (Figure 1) to the discharge line leading to Conduit #2 was leaking (Figure 2). A section of the pipe was cut (Figure 2) and replaced. Two out of six basins were taken out of service to fix the leak. The plant capacity was reduced from 240 MGD to 160 MGD. Once a section of the pipe was replaced (Figure 3), high discharge pressure developed in the line during testing of Metering Pump #2. The pump could not run with the high discharge pressure.

Because the exact location of the blockage creating the high discharge pressure was unknown, the Maintenance Technician, with the assistance of the Maintenance Team Leader, did a lot of troubleshooting. The first step taken was to flush the alum line in the alum room. That activity did not clear the high discharge pressure. Once that was not successful, the next step was to clean the strainer located a few feet from the point where the alum line enters under the basin in the tunnel basement area. Cleaning the strainer also did not clear the high discharge pressure. After brainstorming with the maintenance team leader, the maintenance technician decided to go a step further and removed a section of the line near the Basin 2.

WATER OPERATIONS (continued)

That section was completely clogged. During the troubleshooting, air entered the line contributing to the hardness of the residual alum.

The removed pipe (Figure 4) was soaked in warm water for an hour and a cleaning tool was used to remove the dried-up alum from the line. A semi- annual work order was created to inspect the aluminum sulfate feeding line.

The elimination of the aluminum sulfate leak and the removing of the clogged alum after the strainer restored the plant capacity to 240 MG to satisfy any potential high-water demand.



Figure 1. Four aluminum sulfate metering pumps, including a backup pump at WWP



Figure 2. Section of alum discharge line cut and replaced to facilitate alum dosage.



Figure 3. Three alum discharge lines leading to three (3) flocculation basins.

WATER OPERATIONS (continued)



Strainer to
remove particles
before the
Flocculation

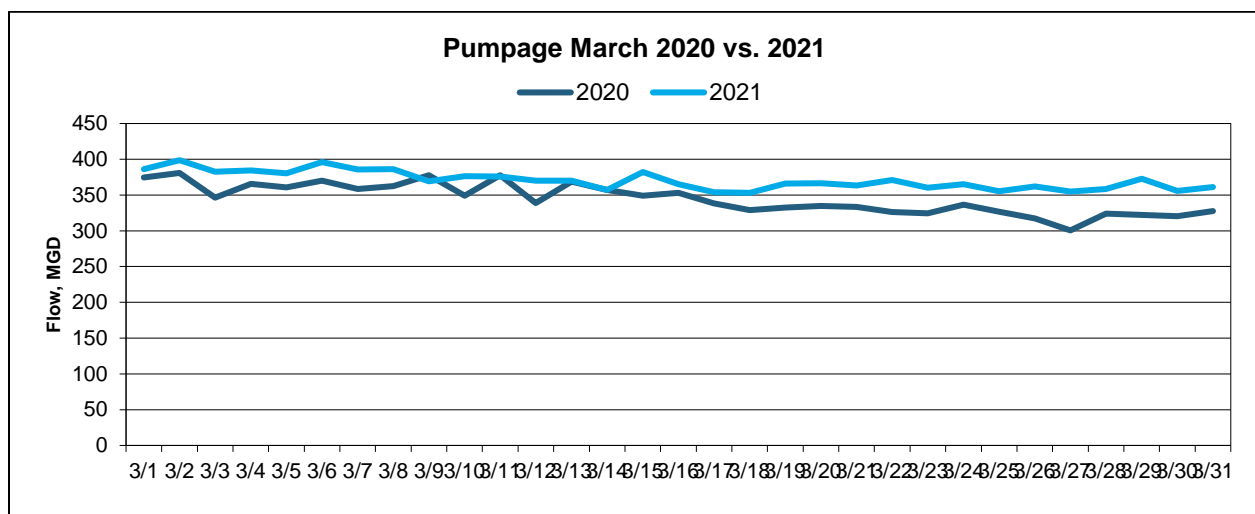
Connection of
the alum line to
Flocculation

Section of the
line removed
and cleaned to
clear residuals

Figure 4. Alum discharge line to Flocculation Basin 2

Systems Control Center (SCC)

March 2021 pumpage was 6.9% higher than March 2020



WATER OPERATIONS (continued)

Monitoring of Pressure Transients in GLWA's Water Transmission System

GLWA's water team's project will be featured in the Journal of Water Management and Modeling in the upcoming publication. A copy of the abstract is an attachment to the CEO's Report.

Great Lakes Water Authority (GLWA) operates one of the largest water systems in the US and, like most other water utilities, is facing the problem of aging water infrastructure. Internal pressure transient event can be a major contributing factor in the deterioration and failure of aging water pipes. To evaluate the impact of pressure transients on water main deterioration, for over three years GLWA has maintained a real-time pressure transient monitoring program within its water transmission system. The suite of Trimble Unity Remote Monitoring is used that includes high-speed pressure sensors and data loggers. Approximately 60,000 transient events have been recorded by the 30 transient monitoring sensors installed within the transmission system. A quantitative approach to evaluating relative impact of pressure transients on deterioration of water pipes has been used in analyzing the pressure transient events. The approach is based on the frequencies and pressure ranges of transient events. This paper presents the development of the transient monitoring program and analytical results of the pressure transient data. These analytical results, plus the ongoing transient monitoring data, are being used in updating GLWA's system risk assessment.

See attachment: Monitoring of Pressure Transient in GLWA's Water Transmission System

INFORMATION TECHNOLOGY

In the past month, the IT Security team has proactively blocked or thwarted 14,270 spam messages, 5,180 spoofed messages and 32 viruses. Additionally, 1,023 phishing attempts have been caught and 24 malware attempts have been blocked.

The IT Security team along with the IT Customer Service Delivery team continues to develop a strategy for deploying multi-factor authentication for Office 365. The IT Security team has also begun developing requirements for a 3rd party vulnerability assessment on the business and security networks. A replacement for our end point detection has been determined and submitted for procurement.

The IT Business Productivity Team's ongoing efforts to implement and streamline systems to strengthen GLWA's processes included:

- Deploying a SharePoint workflow for the Financial Services Group to manage their forms, policies, and procedures from initiation to final approval. SharePoint sends notifications when documents are ready for review, approval, and nearing expiration.

INFORMATION TECHNOLOGY (continued)

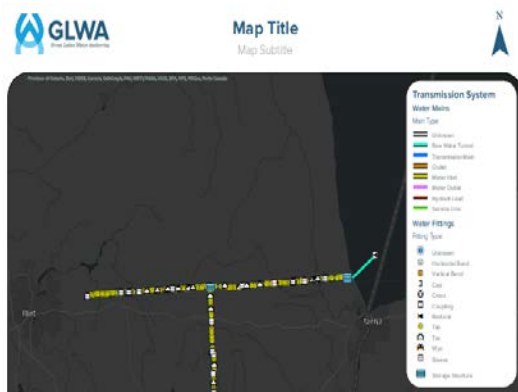
- Contributing to the preparations for and participating in the first of four rounds of vendor demonstrations for GLWA's future Enterprise Resource Planning (ERP) software system.

The IT Infrastructure team has completed the deployment of our new Voice over Internet Protocol (VOIP) phone system at the Water Board Building as of April 19th. Progress continues in the effort to draft the business case and Statement of Work (SOW) for Phase 2 of the Datacenter Modernization Program. Phase 2 consists of multiple projects that include cloud migration, file share appliance replacement and backup platform replacement.

The IT Enterprise Asset Management Systems Team along with the IT Customer Service Delivery Team and the Security & Integrity Group completed the rollout of the new badge access request form for vendors and contractors. The new form streamlined the Badge Request and Emergency Contact forms into one form. It now includes an instructions page and is specific to only GLWA Facilities and Groups. This will assist the Security & Integrity Group with increasing the efficiency of their building access workflows and minimizing paper waste.

The IT Enterprise Asset Management Systems Team along with Enterprise Asset Management Group and Procurement have kicked off the negotiations with the selected vendor, NEXGEN, for the new Enterprise Asset Management (EAM) system. Negotiations will be conducted over the next few months with plans to bring the project to the Board for approval during the later summer/early fall, with the start of implementation soon thereafter.

The IT Enterprise Asset Management Systems Team along with CIP Group and AECOM have finalized the draft RFP for a new Project Management Information System and with a plan to make it available on Bonfire on June 1st after Procurement's review and finalization.



The IT GIS Team has created new GLWA GIS templates in a variety of sizes and formats to be used for internal as well as consulting projects for a consistent look and feel for maps and figures included in deliverables. These new templates make creating a GLWA-related GIS map or figure quickly and consistently across a report. Please contact GIS@glwater.org if you are interested in obtaining the new GIS templates for use on your GLWA project.

New GLWA GIS templates make creating a report map or figure in a consistent and streamlined fashion possible

Currently, the IT PMO is managing 26 active projects and is processing 17 project requests.

PUBLIC AFFAIRS

Ongoing COVID-19 Internal Communications

The month of March officially marked one year of GLWA's ongoing response to the coronavirus (COVID-19) pandemic. Over the course of the last 12 months, we have placed a strong focus on keeping our team members informed about our overall response, including daily (in the beginning) and now weekly updates that shared operational and security protocol changes, as well as a broad cross-section of mental health resources. In total, we have issued 116 communications, including our most recent which shared initial thoughts related to moving GLWA toward a new normal as we see light at the end of pandemic tunnel.

AWWA Utility Benchmarking Survey

Public Affairs led GLWA's effort to respond to the annual American Water Works Association (AWWA) Utility Benchmarking Survey. Information was gathered from across the utility to respond to this national survey. The report and its performance data and trends provide utilities across the country with tools to understand how well they are doing and identify areas for potential improvement. GLWA uses the results of the full report to benchmark its performance, and understand our progress compared to peer utilities.

Lavonda Jackson Named as a 2021 Crain's Detroit Business Notable Women in Law

Public Affairs worked with the Office of the General Counsel to nominate Associate General Counsel Lavonda Jackson as a 2021 Crain's Detroit Business Notable Women in Law. Her selection was announced in Crain's April 19, 2021 publication. She was selected because her knowledge of environmental laws and regulations have helped significantly advance GLWA and its member partners sustainability efforts and surpass regulatory requirements. Congratulations, Lavonda!

Michelle Zdrodowski Elected Vice Chair of American Water Works Association (AWWA) Public Affairs Council

Chief Public Affairs Officer Michelle Zdrodowski is the incoming Vice Chair of the AWWA Public Affairs Council (PAC). She was elected at the PAC's Spring Meeting in April and will begin her new role in June. She has been a member of the PAC since 2018.

Partnership with AMSO on Team Member Recognition Campaign – Asset Management Hero

Public Affairs supported Planning Services efforts to develop a new asset management-focused team member recognition program called Asset Management (AM) Heroes. The campaign is to recognize co-workers and fellow team members who make notable contributions to AM best practices at GLWA.

PUBLIC AFFAIRS (continued)

National Asset Management Awareness Month Communications

Public Affairs developed communications around National Asset Management Awareness Month – emails, REACH slides and One Water Connect image slider to raise awareness about the importance of our assets at GLWA and the creation of the Asset Management Strategic Organization (AMSO).

March is National Asset Management Awareness Month



AMSO's Vision: *GLWA will be a leader in infrastructure management by making decisions informed by risk, regional needs and lifecycle considerations.*



SECURITY AND INTEGRITY

The Hazmat Unit coordinated and completed a total of 444.5 hours of training during the month.

Security and Integrity continues participating in the Emergency Operations Center's ongoing COVID-19 Pandemic briefings.

Security and Integrity participated in the "Rising Water" statewide exercise with Detroit Homeland Security and Emergency Management, in addition, continued in the process of updating the 2021 Emergency Response Plan for GLWA.

Security and Integrity completed GLWA's annual validation for the organization's participation in the GETS (Governmental Emergency Telecommunications Service) program.

ORGANIZATIONAL DEVELOPMENT

Apprenticeships

During the month of April, the EICT-E apprentices adjusted to their new assignments and new journey workers. The journey workers provided positive feedback on the apprentices' work.

Progression

The 2020 Progression Assessment Reviews for 100 percent of eligible team members have been completed. Sixteen team members progressed thus far during this progression cycle.

ORGANIZATIONAL DEVELOPMENT (continued)

Talent Management

Staffing

The table below provides a breakdown of GLWA Team Members since the last CEO report:

Number of New Hires	6
Number of Separations	12
Total Staffing - Regular FTEs (YTD)	1020

Training

During the month of **March 2021**, **80** GLWA team members completed instructor-led safety and non-safety courses for a total of **459** training hours. **30** GLWA team members and **2** member partners completed **41** online 360Water courses for a total of **78** training hours.

FINANCIAL SERVICES AREA

March 2021 Audit Committee Recap

The March Audit Committee meeting was held on Friday, March 26, 2021. The GLWA Audit Committee binders are publicly available at www.glwater.org. The meeting included the following discussion topics.

- ✓ Updates on the Business Inclusion and Diversity Program and Water Residential Assistance Program (WRAP) redesign implementation
- ✓ Presentation of WRAP redesign recommendations
- ✓ A request for an amendment to the bond financial consultant contract
- ✓ Presentation of the December 2020 Monthly Financial Report (Executive Summary attached)
- ✓ Introduction of a new Gifts, Grants and Other Resources report
- ✓ Review of the Quarterly CWIP Report for the period ending December 31, 2020

April 2021 Audit Committee Recap

The April Audit Committee meeting was held on Friday, April 23, 2021. The GLWA Audit Committee binders are publicly available at www.glwater.org. The meeting included the following discussion topics.

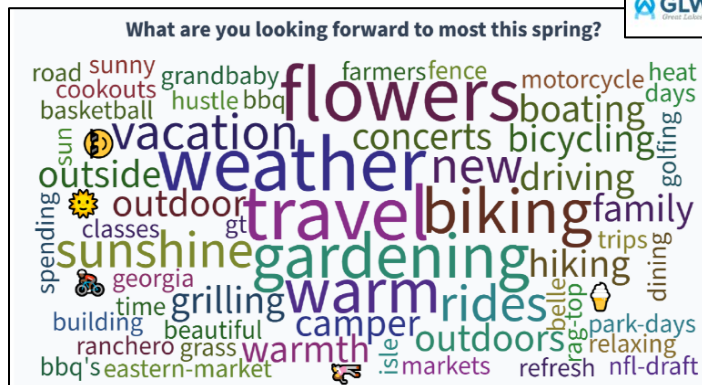
- ✓ Recommendation of a proposed contract amendment to GLWA contract CS-195 effective July 1, 2021 with the Foster Group for annual financial management consulting including the strategic initiative to support GLWA and Member Partners through the challenge of a new water charge methodology

FINANCIAL SERVICES AREA (continued)

- ✓ A request to extend through June 30, 2021, the Water Residential Assistance Program temporary, COVID-related program change related to eligibility criteria
- ✓ Presentation of proposed 2nd Quarter Budget Amendments
- ✓ A resolution for approval of a series ordinance associated with a new SRF bond issue and separately, approval to schedule public hearings related to two, new projects for upcoming SRF loan application submissions
- ✓ Presentation of the January 2021 Monthly Financial Report (Executive Summary attached)
- ✓ A monthly update on the Business Inclusion and Diversity program
- ✓ Introduction of a new, Annual Procurement report (see chart on next page)
- ✓ Review of the Quarterly WRAP Report for the period ending March 31, 2021

All FSA Meeting

Team members staying connected with each other is a top priority in our COVID-19 alternate work arrangements where some team members are onsite at multiple locations while others are working remotely. FSA continues to support communication and connections between team members through regular group meetings.



The most recent March 31 All-Hands meeting kicked off a 5S Remote Home Space Challenge to engage team members to transform a space in their home for Spring. Sponsored by the Transformation Team, this exercise also allows us to keep our 5S skills current. The meeting was also an opportunity to introduce new team members, receive updates on key GLWA initiatives, and

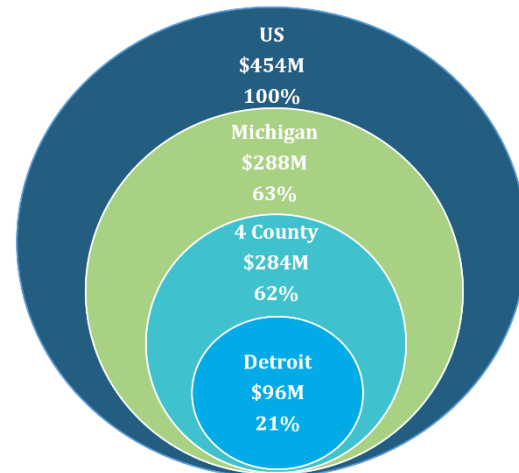
engage with CEO Sue McCormick who was able to check in during the meeting. The group took a few moments to share great plans for spring in the form of a word cloud poll.

FINANCIAL SERVICES AREA (continued)

FY 2020 Annual Procurement Report

The [FY 2020 Annual Procurement report](#), presented at the April 23, 2020 Audit Committee meeting, places GLWA in a leading place in transparency in public procurement. That report for FY 2020 is also posted on the [Vendors page of the GLWA website](#). Thank you to Greg Monson, Procurement Team Management Professional, who navigated through multiple databases and concepts for this inaugural report. Of particular interest is a graph that reports contract awards by geographic area.

Chart 4 – FY 2020 Award Impact by Overall Region



Vendor Outreach

Since launching the new Business Inclusion and Diversity (B.I.D.) Program in February 2021, GLWA has been eager to get the word out to the vendor community about the program and its requirements, as well as how it maximizes opportunities for small, minority-owned, woman-owned, and economically disadvantaged businesses within GLWA's service area to effectively compete and do business with GLWA.



On March 23, 2021, Megan Torti and Michael Lasley participated in the 40th Annual Disadvantaged Business Enterprise (DBE) Conference hosted virtually by the Michigan Department of Transportation (MDOT). Over 300 businesses pre-registered for the day-long event, which included a keynote address by Governor Gretchen Whitmer. GLWA's presentation on the B.I.D. Program outlined program thresholds, requirements, and important resources for vendors planning to submit a response to a B.I.D. program qualifying GLWA solicitation.

In addition, Megan and Michael also presented on the B.I.D. Program at the reoccurring series "Coffee and Contracting" hosted by the Southwest Michigan Procurement Technical Assistance Center (PTAC) for over 10 businesses who pre-registered for the webinar. At both events, GLWA answered questions about the B.I.D. Program and about our procurement process. Thank you to both MDOT and Southwest Michigan PTAC for hosting these virtual events, and to all the businesses who participated!

FINANCIAL SERVICES AREA (continued)

Procurement Pipeline

The April 2021 Procurement Pipeline edition is attached. This month features tips for creating complete and responsive Request for Bid (RFB) and Request for Proposal (RFP) submissions, reminders on Michigan Sales & Use Tax, visitor COVID-19 access requirements, details on the next GLWA Procurement virtual webinar hosted by the Michigan Department of Transportation as well as a complete listing of current solicitations.

The General Counsel's April Report is an attachment to the Chief Executive Officer's Report.

Respectfully submitted,



Sue F. McCormick
Chief Executive Officer

SFM/dlr

Attachments (4)

- Monitoring of Pressure Transient in GLWA's Water Transmission System
- April Financial Report (Executive Summary)
- April 2021 Procurement Pipeline
- General Counsel's April Report

Monitoring of Pressure Transients in GLWA's Water Transmission System

Steven Jin,¹ Biren Saparia,¹ John Norton,¹ Bryon Wood,¹ Ahmad Abdallah,¹ Tara McClinton,¹ Joe Burchi¹ and Laura Radtke¹

¹*Great Lakes Water Authority, Detroit, Michigan*

Abstract

Great Lakes Water Authority (GLWA) operates one of the largest water systems in the US and, like most other water utilities, is facing the problem of aging water infrastructure. Internal pressure transient event can be a major contributing factor in the deterioration and failure of aging water pipes. To evaluate the impact of pressure transients on water main deterioration, for over three years GLWA has maintained a real-time pressure transient monitoring program within its water transmission system. The suite of Trimble Unity Remote Monitoring is used that includes high-speed pressure sensors and data loggers. Approximately 60,000 transient events have been recorded by the 30 transient monitoring sensors installed within the transmission system. A quantitative approach to evaluating relative impact of pressure transients on deterioration of water pipes has been used in analyzing the pressure transient events. The approach is based on the frequencies and pressure ranges of transient events. This paper presents the development of the transient monitoring program and analytical results of the pressure transient data. These analytical results, plus the ongoing transient monitoring data, are being used in updating GLWA's system risk assessment.

1 Introduction

Municipal drinking water infrastructure in the United States are becoming older and hence are more prone to failure. Despite increases in infrastructure investments, municipal infrastructure is decaying faster than it is being renewed. According to the 2021 Report Card for America's Infrastructure, the U.S. drinking water infrastructure system made up of 2.2 million miles of underground pipes is aging and underfunded. There is a water main break every two-minutes and an estimated 6 billion gallons of treated water lost each day (America Society of Civil Engineers, 2021). Ageing water infrastructure is one of the major problems faced by water utilities in the United States, and urgent solutions are required to maintain the integrity of the water supply network.

Generally, failure of water pipes depends on factors such as pipe structural properties, material type, environmental conditions, and internal and external loads. The interactions of individual factors and their impact on pipe failures is extremely complex. While most previous work has focused upon pipe material properties and environmental conditions, there is less understanding of internal water pressure loading. Internal water pressure loading can be subdivided into two main categories, steady-state pressure (i.e., operational pressure) and transient pressure. Internal water pressure can

be quite unpredictable during a transient event and are a major contributing factor in the deterioration and failure of water mains (Rezaeia, 2015).

For many years, pressure transient modelling had been being a major means to determine the effects of pressure transients on water pipe failure. The reliability of any pressure transient hydraulic model depends on how accurately they can predict the real field events. Water distribution networks are massive in size and complex in nature. It is quite hard to model entire network due to excessive model development time and inherent issues with computational aspects (Rathnayaka, 2016).

However, conventional pressure measuring instruments are not adequate for assessing the propagation speed of pressure transients since they travel close to the speed of sound. Over the last few years, advances in data logging tools and technologies have allowed the investigation of pressure transients in a more rigorous approach. High speed pressure transducers are being used to measure transient pressures to obtain reliable data for the evaluation of transient effects.

Great Lakes Water Authority (GLWA) operates one of the largest water systems in the nation that serves drinking water for 3.8 million people in southeastern Michigan. The transmission network started being built in the middle 1800's. Like most other water utilities, GLWA is facing the problem of aging water infrastructure and is updating its system risk assessment. GLWA is deploying innovative water technologies like sensors and smart water monitoring to assess the system reliability. To evaluate the impact of pressure transients on water main deterioration and failure, GLWA has performed a pressure transient monitoring program for over three years. High speed pressure transducers are installed in the water transmission system to record real-time transient pressures. This paper presents the pressure transient monitoring program and results gained from analyzing the pressure transient records.

2 Water Transmission System Overview

GLWA provides potable water to approximately 3.8 million people through 88 member partners across 112 communities in southeast Michigan. The average day demand and maximum day water demand for the year 2020 were respectively 417 MGD and 723 MGD. The system draws its fresh water from Lake Huron and the Detroit River via 3 intake facilities. The water transmission system includes 5 water treatment plants, 19 booster pump stations, 28 water storage reservoirs, and about 816 miles of transmission mains.

Concrete, cast iron, and steel pipes constitute approximately 97 percent of the transmission mains in the GLWA system. The cast iron pipes were installed from the late 1850s to the late 1940s, steel pipes between the 1910s and 1970s, and concrete pipes since the late 1940s. In general, the water system slowly expanded from the 1850s to the mid-1920s with intermittently stagnant growth. Periods of rapid expansion can be identified in the 1920s and 1930s, and the 1950s to 1970. Concrete pipes are mostly 50- to 60-year-old pipes, while cast iron pipes are 90 to 110 years old, with some more than 150 years old. In recent 10 years, an additional 16 miles of concrete pipes have been installed in the system so that concrete pipe accounts for approximately 62 percent. Figures 1 and 2 show the existing water transmission main data by category and age of the pipes.

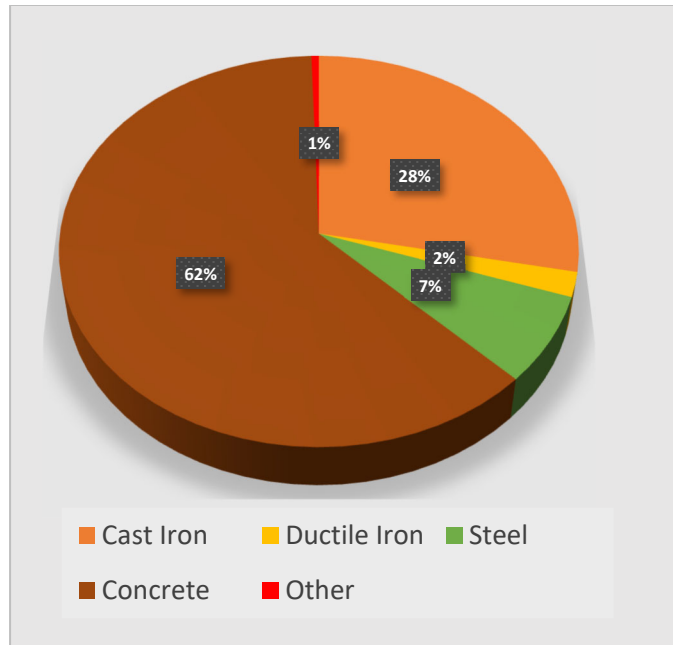


Figure 1 Percent Length of Transmission Mains by Pipe Material.

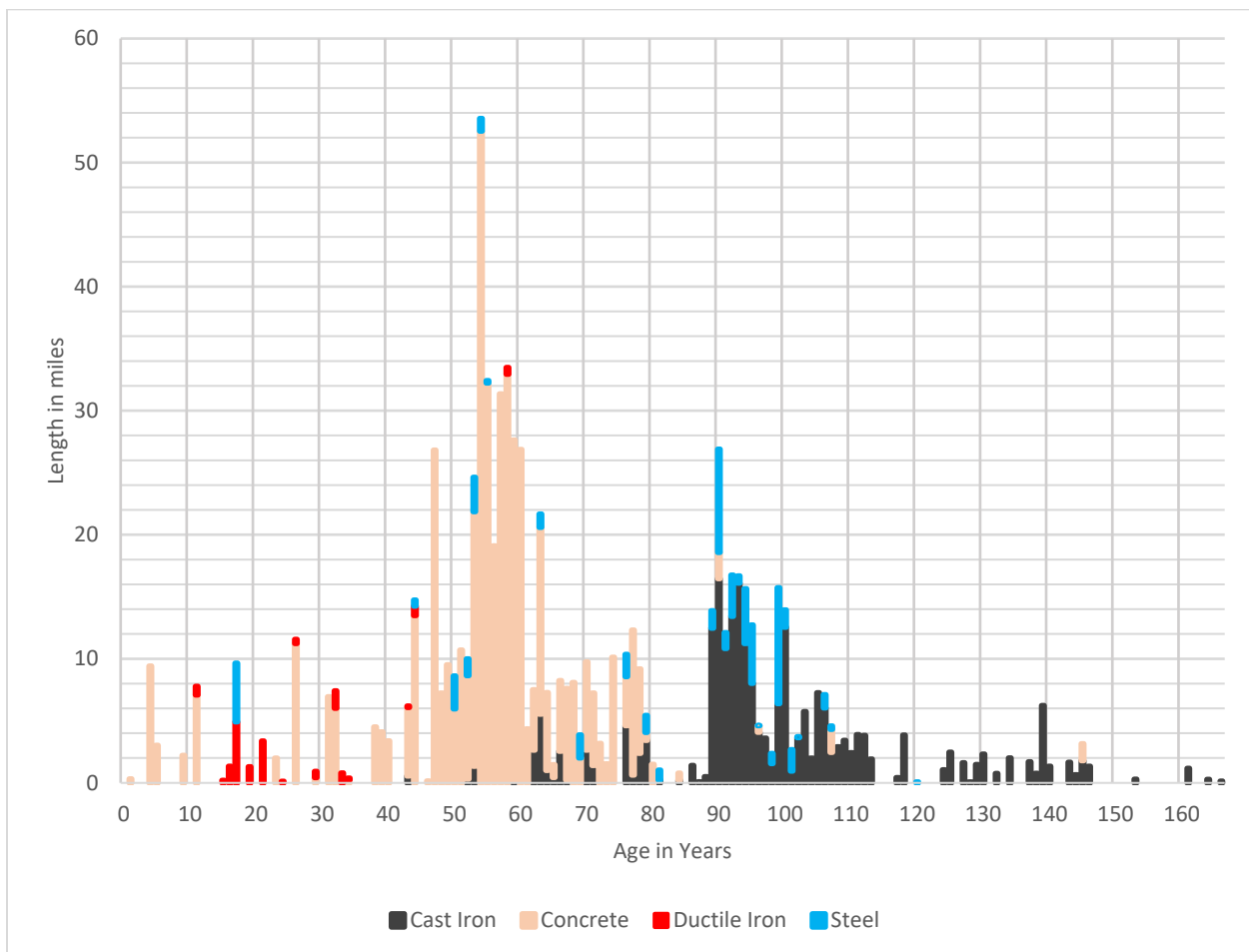


Figure 2 Distribution of Water Transmission Mains by Age.

3 Methodology

Our transient monitoring program uses an integrated suite of remote pressure monitoring hardware and software, which includes high speed pressure sensors, locational data loggers, and enterprise support software for data storage and analytics. The Telog Ru-32imA remote monitoring unit, by the Trimble Telog Company, was used for our project to record real-time impulse data during a transient event.

3.1 Using High Speed Pressure Transducers

Conventional pressure transducers are not able to accurately measure the magnitudes of pressure transients; hence high-speed pressure transducers were installed in the transmission system to collect transient pressure data. The Ru-32imA unit includes a wireless recording telemetry unit (RTU) and high-speed pressure and flow sensors.

The Ru-32imA RTU, powered by a battery or AC/DC adaptor, can sample the pressure sensors up to 30 times per second and store up to 125 events of pressure transient. The Ru-32imA unit's recorder stores the waveform of captured pressure impulse waves detected within the water network. The Ru-32imA may be configured to call its server application on a schedule (e.g., once per day; every four hours, etc.) and in response to site alarm conditions (e.g., transient event, high or low pressure or level exceedance).

The Ru-32imA RTU uses wireless communication with a 4G LTE cellular modem, enabling unmanned monitoring of remote sites as well as instant updates and alarm notifications. The Ru-32imA instrument, and different attachment configurations, are shown in Figure 3.



Figure 3 Ru-32imA Instrument and Attachment Methods.

Through the transient monitoring program, 30 transient pressure sensors were installed within the transmission system. Most of them are installed in the 14 large pumping stations located in the suburbs of City of Detroit due to interest in monitoring real-time pressure transients within the adjacent large diameter prestressed concrete (PC) pipes. Performance of PC pipes has been an item of interest to water utilities for a long time (Romer, 2007).

3.2 Deploying Trimble Unity Software

In the pressure transient monitoring program, the Ru-32imA instruments were integrated with the Trimble Unity Remote Monitoring software. This approach allowed users to monitor the real-time

performance of the installed pressure sensors. Figure 4 shows a snapshot of the Trimble Unity application.

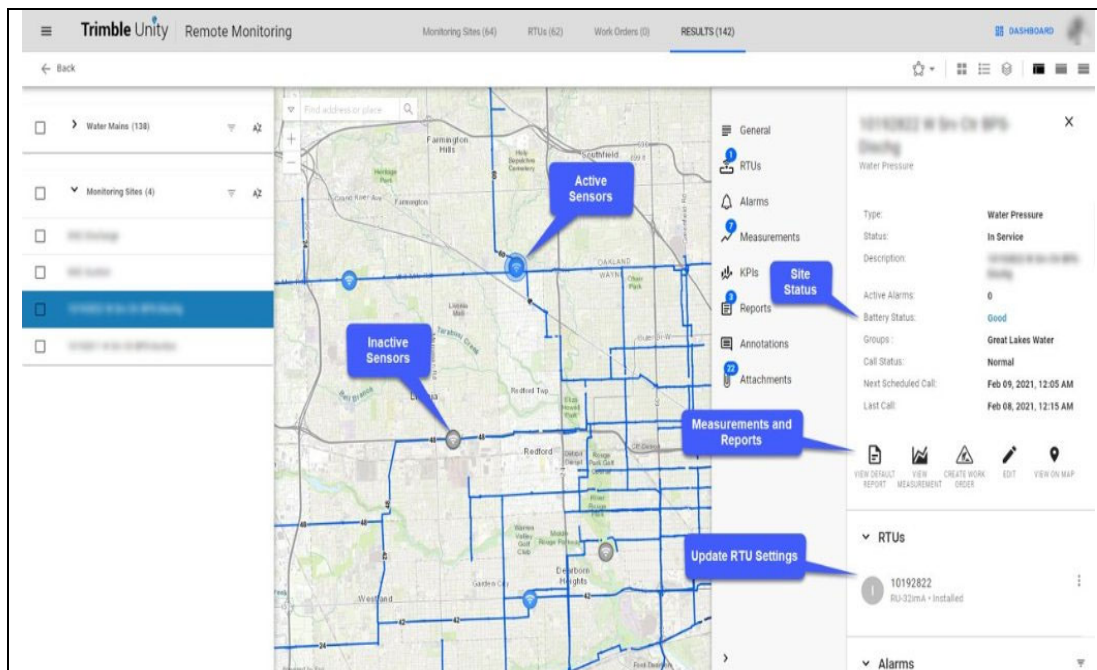


Figure 4 Trimble Unity Application for Remote Transient Monitoring.

4 Analysis of Pressure Transient Data

4.1 Summary of Pressure Transient Events

The GLWA pressure transient monitoring program started in 2017. As of March 1st of 2021, the program has run for more than three years and 59,342 transient events have been recorded through the 30 monitoring sensors. Most of the sensors are installed in the 14 pumping stations that serve the communities in the suburbs of City of Detroit. All the transmission pipes being monitored are PC pipes. GLWA prioritizes the assessment of PC pipes because they are typically 3 ft in diameter or bigger, and thus failures have significant impact. Table 1 presents a summary of the transients in PC pipes.

A transient pressure sensor records the minimum and maximum pressure during a transient event. The difference between the maximum and minimum pressure is the transient pressure range. Most of the transient events have a relative low value of transient pressure range. The mean range for the 59,342 transient events recorded is 26.4 PSI. However, the mean pressure range at some sites is much higher than the system average. For example, the mean ranges for the sites of Imlay Station discharge to Flint and Imlay Station discharge to NSC are 62.6 and 57.6 PSI, respectively. The daily frequency of transient events is calculated for each monitoring site. The frequency for half of the monitored sites is less than once per day. However, there are 4 sites where transients occur more than 10 times per day.

Table 1 Summation of Transient Events by Pressure Sensor.

Location of Sensor	Pipe Size (in)	Number of Transient Events	Average Impulse Duration (sec)	Average Pressure Range (PSI)
Adams Road Discharge	54	62	26.76	25.60
Adams Road Suction	54	86	34.97	27.80
Ford Road Discharge	48	166	27.98	25.50
Ford Road Suction	48	211	44.75	21.71
Franklin Road Discharge	60	559	32.67	28.32
Franklin Road Suction	60	9,764	42.68	17.14
Haggerty Discharge	42	314	20.42	24.46
Haggerty Suction	42	453	21.41	27.91
Imlay Discharge to Flint	60	41	27.81	62.62
Imlay Discharge to NSC	84	59	23.22	57.64
Joy Road Discharge	48	1,172	20.72	23.28
Joy Road Suction	48	4,111	31.12	19.12
Michigan Ave Discharge	24	68	20.29	26.73
Michigan Ave Suction	24	357	25.46	27.92
NSC Discharge	84	554	29.29	27.46
NSC Suction	72	1,265	93.86	25.94
Newburgh Discharge	42	1,158	23.31	23.66
Newburgh Suction	42	2,106	23.58	23.43
Rochester Discharge	42	9,048	8.53	17.29
Rochester Suction	42	1,045	8.15	16.57
Schoolcraft Discharge	36	1,700	26.59	25.02
Schoolcraft Suction	36	295	27.12	29.59
Wick Road Discharge	36	2,705	23.70	26.46
Wick Road Suction	36	2,816	24.11	21.76
WSC Suction	60	12,455	36.91	18.94
WSC Discharge High	54	331	42.59	22.83
WSC Discharge Int.	54	4,793	30.58	20.28
Ypsilanti Discharge	48	451	24.48	35.75
Ypsilanti Suction	42	1,167	36.30	21.64
Dequindre 54-inch Main	54	30	19.84	18.46

As an example, the profile of transient events recorded at the site of Franklin Station Discharge from January 2018 to January 2021 is shown in Figure 5. Total 559 events were recorded during the period of three years. The average pressure range is 32.7 PSI and average duration of transient events is 28.3 seconds. There are 9 transient events that have a pressure range over 100 PSI. The longest duration of a transient event is 100 seconds while the average duration is less than 30 seconds.

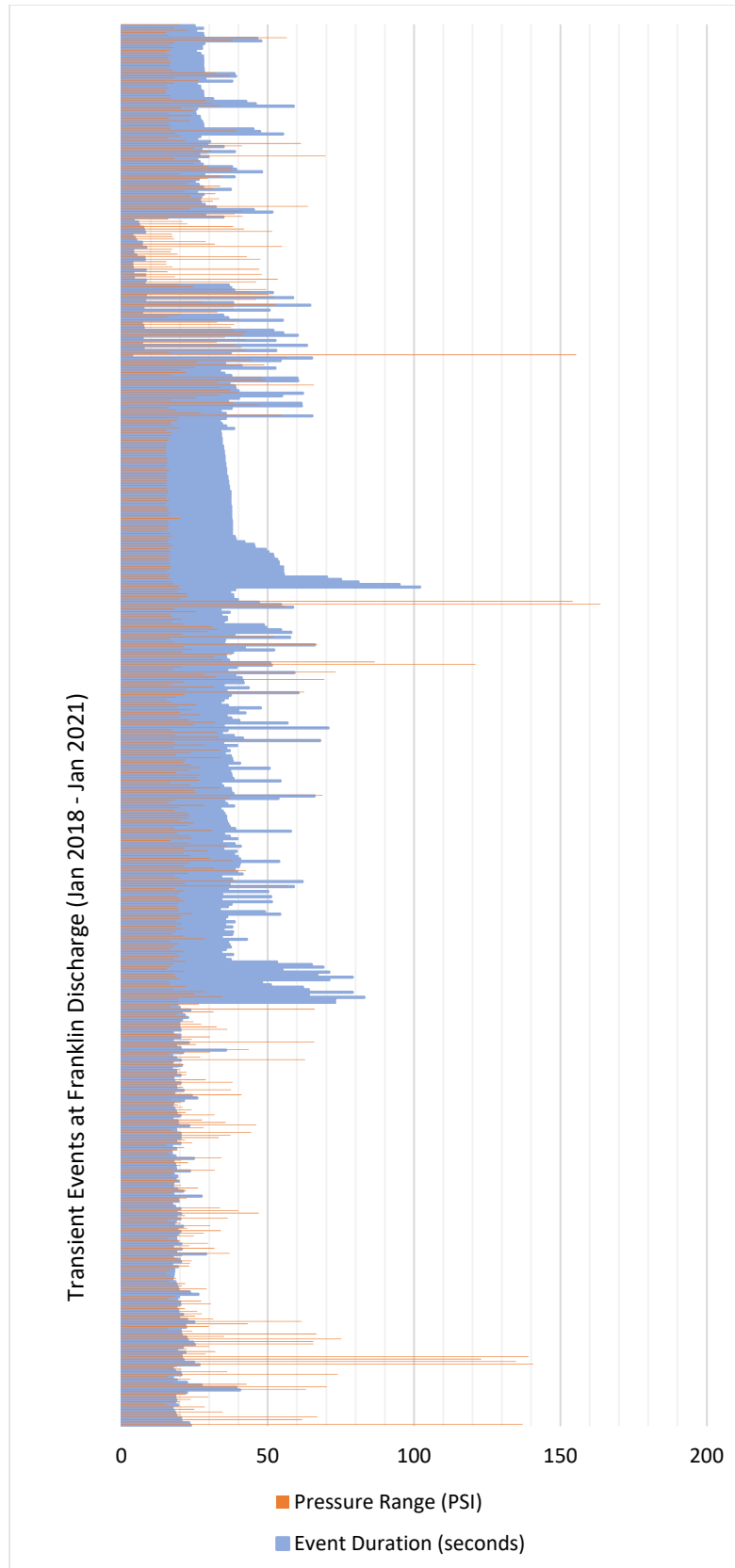


Figure 5 Profile of Transient Events at Franklin Station Discharge Side.

4.2 Assessment of Impact of Transient on Pipe Fatigue Life

The internal loading in a water pipe includes two parts, transient pressure, and steady-state pressure (i.e., the operating pressure). For the steady-state pressure in a pipe, the focus is values of water pressure. The higher a pressure value is, the more stress a pipe endures. For transient pressure, the emphasis is on sudden pressure changes caused by short-term events (i.e., cyclic pressure ranges).

Transient pressures produce cyclic stress in a pipe and result in pipe fatigue. The fatigue life of a pipe is defined as number of loading cycles for the pipe to fail. Usually for a given material, Woehler's curve is developed to reflect the relation between amplitude of cyclic load and pipe fatigue life. Figure 6 shows the typical shape of a Woehler's curve.

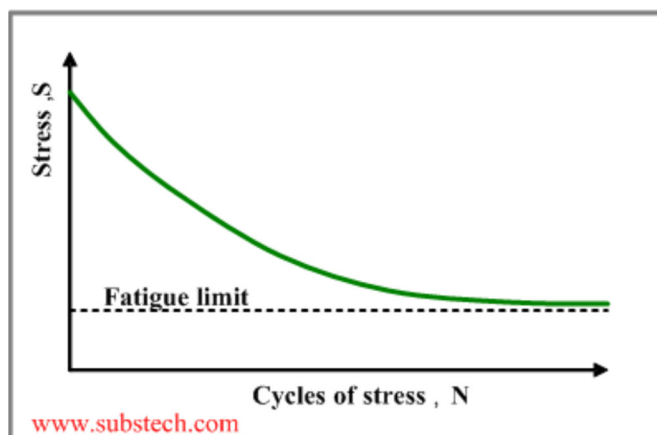


Figure 6 A Typical Shape of Woehler's Curve.

The fatigue life decreases with amplitude of cyclic load for a pipe. Contrastingly, the accumulative pipe damage (i.e., impact on pipe fatigue life) increases with amplitude of cyclic load. But the relation is not linear. When both the cyclic load and impact on pipe life are displayed on logarithmic scales, a linear relation can be established. Figure 7 shows the relation between impact of transient and cyclic load plotted in linear vs linear and logarithmic vs logarithmic.

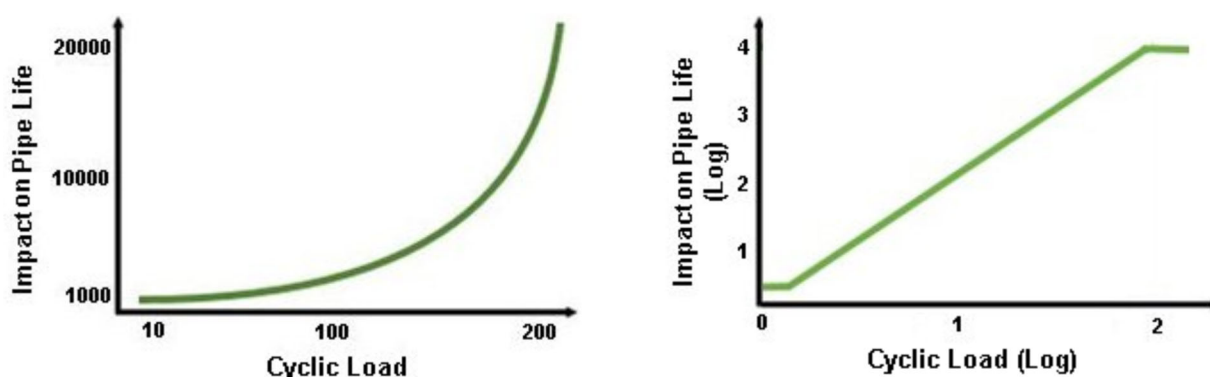


Figure 7 Relations of Impact vs Cyclic Load Plotted in Linear vs Linear and Log vs Log.

For any site in GLWA's transient monitoring program, many transient events have been recorded. The pressure ranges for these transient events pressure vary at different times. The transient time records of a monitoring site are used to evaluate the impact of pressure transients at

the site. To do so, the transient records are categorized into levels based on amplitude of pressure range. Table 2 shows the defined transient load levels.

Table 2 Levels of Transient Pressure Range.

Transient Load Level	Lower Range	Upper Range	Notes
1	15	25	1
2	25	35	
3	35	45	
4	45	55	
5	55	65	
6	65	75	
7	75	85	
8	85	95	
9	95	105	
10	105	115	
11	115	125	
12	125	135	
13	135	145	
14	145	155	
15	155	165	
16	165	175	
17	175	185	
18	185	195	
19	195	205	

38	485	495	2
39	495	500	

Notes

1 a transient event recording is triggered when pressure change exceeds 15 PSI or more in 3 seconds

2 a transient pressure sensor can record a pressure up to 500 PSI

For prestressed concrete pipes, which consisted of multiple layers with different materials such as concrete, steel wire and/or steel cylinder, no quantitative relation has been determined for cyclic load vs pipe fatigue life or cyclic load vs impact of transient on pipe. For the purposes of this study, similar to Woehler's curves for other materials of pipes, an exponent relation between transient pressure range and impact on fatigue life was assumed for prestressed concrete pipes. To quantify effect of transient under a given load level, the impact of transient is defined as the product of transient frequency and exponent function of corresponding transient load level, which is:

$$Si = f * EXP(i) \quad (1)$$

where:

Si = impact on fatigue life under cyclic load level i ,

f = daily frequency of transient at level i ,

EXP = exponent function with the base of the natural logarithm (e), and
 i = cyclic load level based on amplitude of pressure range (as shown in Table 2).

There are different levels of cyclic load in the transient time records for a site. The accumulative impact of transients at the site is defined as the sum of impacts from all cyclic load levels. An index of transient impact at a site is defined as logarithmic scale of the accumulative impact. The logarithmic scale makes a linear or quasi-linear relation between the index and transient impact.

$$I = \text{Log} [\Sigma(Si)] \quad (2)$$

where:

I = index of accumulative transient impact at a site, and

Σ = sum of transient impacts for all levels of the transient occurrences at a site.

The calculations of index of transient impact for the monitoring site of Franklin Discharge are presented in Table 3 as an illustration of using Equations (1) and (2).

Table 3 Calculations for Index of Transient Impact at Site of Franklin Discharge

Cyclic Load Level (i)	Average Range (PSI)	Count of Events	Daily Frequency of Impulse (f)	Impact to Pipe Life $Si=f*EXP(i)$	Accumulative Impact $\Sigma(Si)$	Index of Impact $\text{Log}[\Sigma(Si)]$
1	18.98	349	0.3167	0.8609		
2	29.95	99	0.0898	0.6638		
3	39.37	51	0.0463	0.9295		
4	49.58	20	0.0181	0.9909		
5	60.24	11	0.0100	1.4814		
6	68.30	16	0.0145	5.8574		
7	75.13	1	0.0009	0.9951		
8	86.53	1	0.0009	2.7050		
9	N.A.	0	0.0000	0.0000		
10	N.A.	0	0.0000	0.0000		
11	121.96	2	0.0018	108.6645	8499.40	3.93
12	134.83	1	0.0009	147.6904		
13	138.96	3	0.0027	1204.3922		
14	154.20	1	0.0009	1091.2925		
15	159.51	2	0.0018	5932.8809		
16	N.A.	0	0.0000	0.0000		
17	N.A.	0	0.0000	0.0000		
18	N.A.	0	0.0000	0.0000		
19	N.A.	0	0.0000	0.0000		
20	N.A.	0	0.0000	0.0000		
21	N.A.	0	0.0000	0.0000		

The evaluation results for transient impact index for all 30 monitoring sites are shown in Table 4. There are 15 sites where the index of transient impact is low ($I < 2.0$). These sites have either a low frequency of transient events or are events associated with a small amplitude of pressure range (i.e., less than 25 PSI). The sites with relatively high index of transient impact include Schoolcraft Suction, Franklin Discharge, Joy Road Discharge and Haggerty Suction, each of which had several transient

occurrences with a pressure range higher than 130 PSI. The transient events with a high-pressure range can make significant contribution to the index of impact at each of these sites because these transients are those that have significant impact on fatigue life of a pipe and sometime, cause failure of the impacted pipe. The pipes with high index of transient impact were then prioritized for subsequent additional monitoring and assessment by GLWA's asset management division.

Table 4 Transient Frequency and Index of Transient Impact by Site.

Location of Sensor	Transient Event Frequency (/day)	Average Range of Top 20 Transient Events	Index of Impact on Fatigue Life
Adams Road Discharge	0.42	37.66	3.48
Adams Road Suction	0.62	27.80	0.41
Ford Road Discharge	0.94	34.55	1.33
Ford Road Suction	1.18	28.10	0.56
Franklin Road Discharge	0.51	98.21	3.93
Franklin Road Suction	8.84	62.66	1.71
Haggerty Discharge	0.30	27.58	1.19
Haggerty Suction	0.43	85.17	3.59
Imlay Discharge to Flint	0.06	85.64	2.47
Imlay Discharge to NSC	0.08	85.92	2.20
Joy Road Discharge	1.19	51.51	3.66
Joy Road Suction	4.13	53.95	1.27
Michigan Ave Discharge	0.11	39.16	0.84
Michigan Ave Suction	0.45	47.63	0.62
NSC Discharge	0.61	58.15	2.75
NSC Suction	1.81	42.43	1.06
Newburgh Discharge	1.07	78.87	2.80
Newburgh Suction	1.94	55.15	1.28
Rochester Discharge	113.10	28.64	2.65
Rochester Suction	12.90	21.35	2.11
Schoolcraft Discharge	1.51	66.14	1.46
Schoolcraft Suction	0.42	74.51	4.97
Wick Road Discharge	2.25	56.56	1.65
Wick Road Suction	2.62	50.30	1.01
WSC Suction	11.82	66.21	2.11
WSC Discharge High	3.32	16.09	2.79
WSC Discharge Int.	12.49	53.73	2.37
Ypsilanti Discharge	0.43	87.28	2.36
Ypsilanti Suction	1.74	55.06	1.22
Dequindre 54-inch Main	0.08	19.59	0.01

A map showing the geographical distribution of monitoring sites with different impact level is presented in Figure 8. The impact levels for each of the influenced transmission pipes have been estimated. The estimation was based on the corresponding impact levels of the monitoring points near an influenced pipe. The estimation results are also presented in Figure 8.

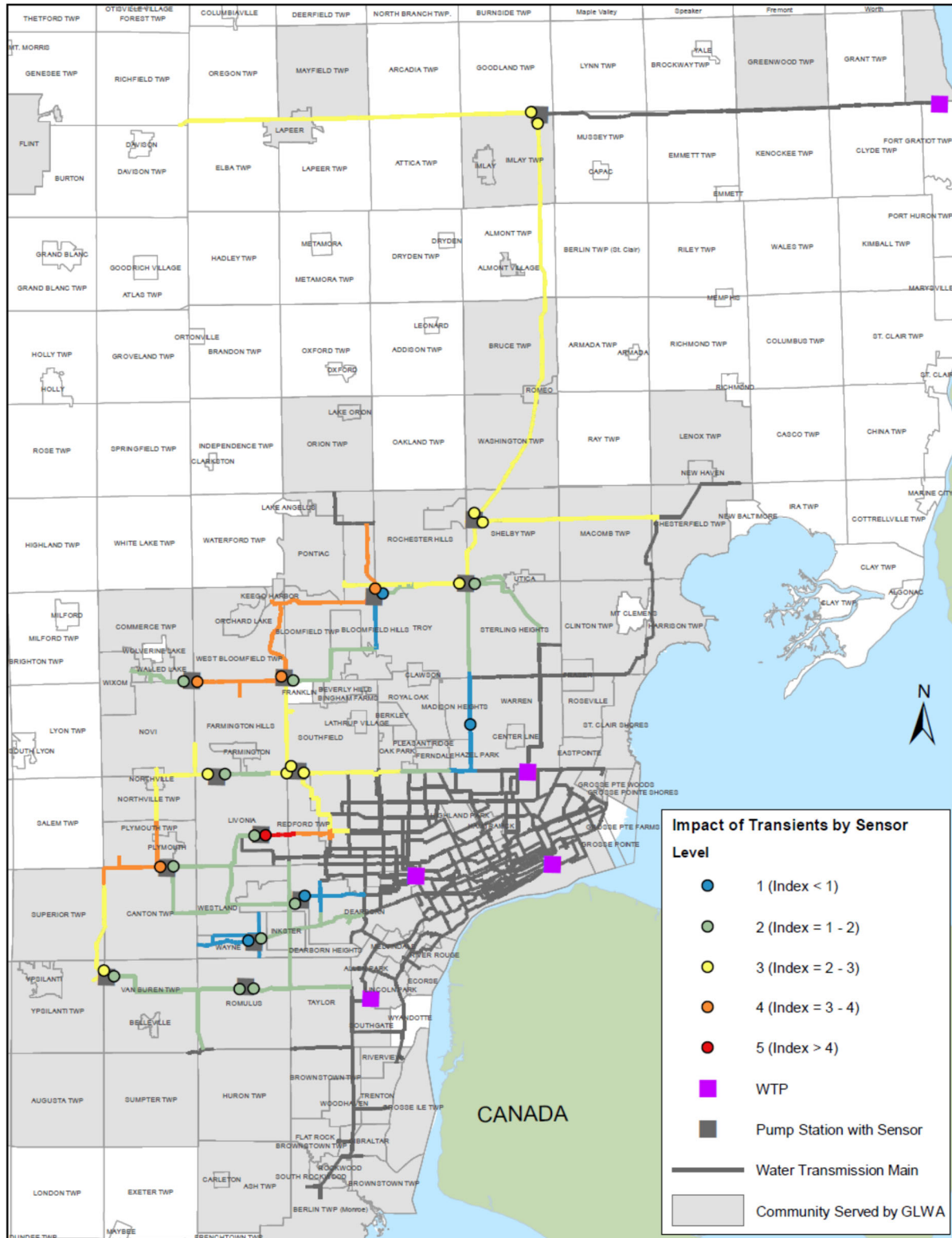


Figure 8 Results of Transient Monitoring Data Assessment Showing Impact Level by Site.

Note the clear geographical clustering of impacted pipes as shown in Figure 8. Geographical clustering is expected because transients are generated by local events such as pump activations and valve operations. Our approach was able to demonstrate a method of measuring pipe pressure transients, map the spatial variation of occurrence, and ultimately, develop a prioritization of pipe assets for subsequent asset management-based monitoring and assessment.

5 Conclusions

Our approach was able to assess and prioritize the condition of water main pipes by monitoring and assessing pressure transients. Internal pressure during a transient event can be a major contributing factor in the failure of aging water pipes. Based on the analysis described in this paper, the impact of water transient events on water pipe deterioration, and thus overall condition assessment, can be estimated by integrating transient amplitude with frequency.

The assessment of pressure transient effects in GLWA's transmission system, which uses the proposed quantitative approach to evaluate the transient impact on pipe fatigue life, is presented. Transient impact on pipe deterioration is exponential with increase of transient pressure range. The assessment results showed the approach is useful to evaluate relative impact levels of transient events to the pipes located near a transient monitoring location.

GLWA has a predictive model to evaluate the conditions and forecast future rehabilitation or replacement needs of the water transmission pipes. The prediction is based on water pipe reliability functions. The current pipe reliability functions majorly depend on pipe material and age. Amplitude and frequency of transient loading effect the pipe fatigue life. The impact effects of pressure transient are used to revise the pipe reliability functions when the transient monitoring and impact assessment are performed for the entire transmission system.

GLWA's water transmission system contains the longest length of prestressed concrete pipe in the nation and GLWA has put its transient monitoring priority on the pipes of this type of material. GLWA is extending its program to monitor transient events in the pipes of other materials (i.e., cast iron and steel). This program informs our prioritization of pipe assets for subsequent asset-management efforts, such as expanded inspections and assessment methods.

References

- American Society of Civil Engineers. 2021. "Comprehensive Assessment of America's Infrastructure." 2021 Report Card for America's Infrastructure, 34-44
<https://doi.org/10.1080/20464177.2016.1247635>.
- Rathnayaka, S., B. Shannon, P. Rajeev, et al. 2016. "Monitoring of Pressure Transients in Water Supply Networks." *Water Resources Management* 30, 471-485
<https://doi.org/10.1007/s11269-015-1172-y>
- Rezaeia, H., B. Ryanb and I. Stoianovc. 2015. "Pipe Failure Analysis and Impact of Dynamic Hydraulic Conditions in Water Supply Networks." *Procedia Engineering* 119, 253-262
<https://doi.org/10.1016/j.proeng.2015.08.883>
- Romer, A., G. Bell and R. Ellison. 2007. "Failure of prestressed concrete cylinder pipe." *Pipelines 2007: Advances and Experiences with Trenchless Pipeline Projects* 07, 1-17
[https://doi.org/10.1061/40934\(252\)64](https://doi.org/10.1061/40934(252)64)

Key Financial Metrics

The table below provides key report highlights and flags the financial risk of a budget shortfall by year-end as follows:

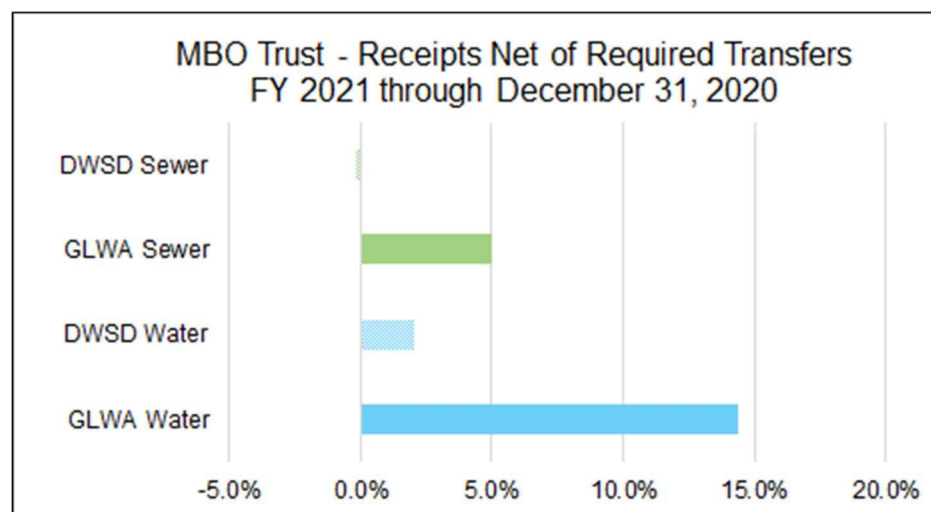
No Risk (green) - Potential (yellow) - Likely (red)

Each variance is monitored by the Great Lakes Water Authority (GLWA) management and, where appropriate, operating and/or budget priorities are re-evaluated. Budget amendments are prepared and presented quarterly based on most current information.

As of December 31, 2020				
Metric	FY 2021 Budget	FY 2021 Actual	Variance from Financial Plan	Report Page Reference
Wholesale Water Billed Revenue (\$M)	\$162.3	\$167.1	3%	45
Wholesale Water Billed Usage (mcf)	7,380,000	7,808,000	6%	
Wholesale Sewer Billed Revenue (\$M)	\$133.9	\$133.9	0%	47
Wholesale Water Operations & Maintenance (\$M)	\$67.1	\$64.6	-4%	6
Wholesale Sewer Operations & Maintenance (\$M)	\$91.1	\$84.0	-8%	
Investment Income (\$M)	\$3.6	\$4.2	17%	35
Water Prorated Capital Spend w/SRA* (\$M)	\$56.0	\$59.0	5%	27
Sewer Prorated Capital Spend w/SRA* (\$M)	\$41.0	\$41.0	0%	28

*SRA refers to the capital spending ratio assumption which allows capital program delivery realities to align with the financial plan.

Master Bond Ordinance (MBO) Trust Net Receipts (page 51)



Net cash flow receipts remain positive for GLWA Water and Sewer. This means that all legal commitments of the MBO Trust and the lease payment are fully funded – and that positive cash flow is available for additional capital program funding in

subsequent year(s). DWSD Water reports positive net receipts of \$1.1 million and DWSD Sewer reports a small shortfall of \$275 thousand through December 2020.

The current DWSD loan receivable balance for fiscal years 2017 and 2018 is \$17.5 million.

Budget to Actual Analysis (page 3)

- The second quarter budget amendments are not reflected in the FY 2021 Amended Budget columns on the tables in the December 2020 Budget to Actual report.
- The total Revenue Requirements are on target through December 2020.
- The total Operations & Maintenance expenses are at 47.0% of budget through December 2020 which is reasonably within the pro-rata benchmark of 50.0%.

Basic Financial Statements (page 10)

- The Basic Financial Statements are prepared on a full accrual basis and reflect preliminary, unaudited results.
- Operating income for December 2020 is \$51.8 million for the Water fund (29.0% of total revenues) and \$74.8 million for the Sewer fund (31.7% of total revenues).
- Water Net Position increased \$1.3 million, and Sewage Disposal Net Position increased \$25.6 million for the year to date through December 2020.

Capital Improvement Plan Financial Summary (page 26)

- The Water system is exceeding, and the Sewer system is meeting the 75% of the Capital Spend Ratio goal.

Master Bond Ordinance Transfers (page 29)

- For December, transfers of \$12.8 million and \$17.6 million were completed for the GLWA Water and Sewer funds, respectively.
- Also for December, transfers of \$4.5 million and \$8.1 million were completed for the DWSD Water and Sewer funds, respectively.

Cash Balances & Investment Income (page 35)

- Total cash & investments are \$525 million in the Water fund and \$431 million in the Sewer fund.
- The total combined cumulative investment income for FY 2021 through December was \$4.2 million.

DWSD Retail Revenues, Receivables & Collections (page 40)

- Water usage through December 31, 2020 is at 93.07% and revenues at 94.01% of budget.
- Sewer usage through December 31, 2020 is at 92.96% and revenues at 97.95% of budget.
- Combined accounts receivable balances for the water and sewer funds report an increase of \$19 million over the prior year.
- Past dues over 180 days make up 63.7% of the total accounts receivable balance. The current bad debt allowance covers 100% of past dues over 180 days.

GLWA Wholesale Billing, Receivables & Collections (page 45)

- GLWA accounts receivable past due balance net of Highland Park continues to be higher than usual due to mail delivery issues and COVID-related collection issues at 11% of the total accounts receivable balance. Looking ahead, this past due balance does decrease significantly in January with the resolution of one past due sewer account.
- The Highland Park past due balance is \$45.8 million. It includes \$34.9 million for wastewater treatment services, \$1.8 million for industrial waste control services, and \$9.1 million for water supply services. In FY 2021, Highland Park has made four payments totaling \$2.0 million through December 2020.

Questions? Contact the Office of the Chief Financial Officer at CFO@glwater.org

Welcome to the April edition of *The Procurement Pipeline*, a monthly newsletter designed to provide informative updates on doing business with the Great Lakes Water Authority (GLWA).

Tips for Creating a Complete and Responsive RFB and RFP Submission & Vendor Debriefs

To ensure that you have created a complete and responsive Request for Bid (RFB) and Request for Proposal (RFP) submission for a GLWA solicitation, please do the following:

1. Carefully read and follow the detailed instructions outlined in the "Solicitation Cover/Instruction to Vendors" document, posted with each advertisement in Bonfire;
2. Adhere to all deadlines and due dates. Late bid/proposals will not be accepted;
3. Review all submittal requirements and complete all required forms. Failure to submit required documents may result in your solicitation response being deemed nonresponsive;
4. Obtain and submit all third-party forms (e.g., proof of insurance and bonding);
5. Ensure that all required signatures have been completed by the appropriate, authorized individuals at your company.

Did you know we offer Post-Award Debrief Sessions? Vendors not selected for award may elect to request a vendor debrief meeting with GLWA Procurement to gain insight for improving future solicitations responses. For questions on creating a complete and responsive RFB/RFP submission, or to schedule a vendor debrief session, please contact the GLWA Buyer responsible for the solicitation.

Reminder: Michigan Sales & Use Tax for the Vendor Construction Community

In the July 2020 issue of the *Procurement Pipeline*, we addressed some questions regarding the extension of GLWA's tax exempt status to our construction contracts. Please note that GLWA's tax exempt status does **not** extend to our construction contractors who are recognized as the consumer of

the goods and materials that they purchase for use in providing services to GLWA. As the consumer of these purchased goods and materials, the contractor or subcontractor cannot claim tax exempt status and therefore is responsible for paying the sales tax.

We strongly encourage all GLWA vendors with further questions on this matter to consult with their own tax advisors when determining whether they will be responsible for payment of sales or use taxes to help them determine whether those costs should be included in their bid prices.

Visitor COVID-19 Access Requirements

On March 29, 2021, GLWA released [Coronavirus Update #112](#) to the vendor community which outlines updated requirements for Badged Access Visitors. By July 1, 2021, visitors requesting badged access to GLWA facilities or project worksites must submit **either** documentation of a negative COVID-19 test (dated between March 1, 2021 and June 30, 2021) **or** documentation of a completed COVID-19 vaccine. Until then, both badged access and non-badged access visitors must complete the daily [Visitor COVID-19 Questionnaire](#) which is available on [GLWA's Vendor webpage](#). All questions regarding COVID-19 visitor access protocols may be directed to [Michael Lasley](#) and [Megan Torti](#).

Where to Meet GLWA

GLWA welcomes you to join us at the "Real Talk Wednesday" virtual webinar, hosted by the Michigan Department of Transportation (MDOT), on May 19, 2021 from 10am-12pm. Please contact [Kathleen Jones](#) and [Ann Williams](#) for the event link. All businesses are welcome to join!

What's Coming Down the Pipe?

Current Solicitations: Be sure to register in [Bonfire](#) for new solicitations and contract award information. *Upcoming Procurements: Next Three to Nine Months* - See page 2

Visit GLWA online! See the Vendors page at www.glwater.org or contact us via email at procurement@glwater.org.

Upcoming Solicitations April 2021

Category	Description	Budget Estimate
Water System (next three months)		
Maintenance Services	Skilled Trades Contract	TBD
Engineering	North Service Center Pumping Station Improvements (CIP #132016)	\$10,000,000
Construction	Northeast WTP Flocculator Improvements (CIP #112006)	\$11,000,000
Construction	Springwells Water Treatment Plant Medium Voltage Electrical System Replacement (CIP #114002 Project B)	\$45,000,000
Design Build	Belle Isle Seawall Rehabilitation (CIP #116005)	\$1,740,000
Wastewater System (next three months)		
Construction	Rehabilitation of Outfalls – Phase III (B-39) (CIP #260508)	\$7,000,000
Design Build	Control System Upgrade – St. Aubin, Leib, and 7 Mile CSO Facilities (CIP #360619)	\$7,000,000
Design	WRRF Rehabilitation of the Circular Primary Clarifier Scum Removal System (CIP #211009)	\$2,000,000
Design Build	Baby Creek Outfall Improvements (CIP #260521) (CSO)	\$10,000,000
Design	St. Aubin Disinfection and Screening Improvements (CIP #260617) (CSO)	TBD
Construction	Generator Improvements (Controls upgrades, Generator modifications) (CIP #260622)	\$1,000,000
Construction	Hubbell Southfield CSO Basin Pipe Hanger Replacement	\$1,500,000
Water System (next four to nine months)		
Design Build	WTP Ovation Workstation Upgrade Project (CIP #170303)	TBD
Progressive Design Build	Lake Huron WTP Instrumentation and Filter Control Improvements (CIP #111006)	\$5,400,000
Design	Reservoir Inspection, Design, Construction Administration, and RPR Services (CIP #170802)	\$5,400,000
Maintenance	Lake Huron WTP Instrumentation and Filter Control Improvements (CIP #111006)	\$21,000,000
Construction	Roof Replacement – Lake Huron WTP and Southwest WTP (CIP #171500)	\$3,000,000
Wastewater System (next four to nine months)		
Professional Services	Virtual Tour and Laser Scanning Services	TBD
Design	Leib Screening & Disinfection Facility Improvements for Meldrum Diversion (CIP #274001) (CSO) & Oakwood CSO Facility Improvements for Northwest Interceptor Diversion (CIP #278001)	\$5,000,000
Design	Pilot Netting Facility Project (CIP #270001) (CSO)	TBD
Construction	Rehabilitation of CSO Outfall Backwater Gates (CIP #260510)	\$5,000,000
Construction	HAZMAT (Hazardous Material) Building Renovation	TBD
Construction	WRRF Administration Building 4 th Floor Renovation	TBD
Construction	Pump Station #1 Screenings Building HVAC Improvements (CIP #211006)	\$1,000,000
Enterprise (next four to nine months)		
Information Technology	Project Management Information System	\$3,000,000
Professional Services	Document Scanning and Management Services (WRRF, Conner Creek, Enterprise)	TBD

Vendors should continue to monitor [Bonfire](#) for solicitation updates.

Acronyms		
WRRF: Water Resource Recovery Facility	CSO: Combined Sewer Overflow	WTP: Water Treatment Plant

Office of the General Counsel – April, 2021

- ***COVID-19:*** The Office supports GLWA's response to the COVID-19 pandemic, including participating in GLWA's COVID-19 Task Force, review of COVID-19 related laws, rules and public health orders.
- ***NPDES ACO Dismissal:*** The Office assisted in preparing documents to have the ACO dismissed.
- ***Legislative Updates:*** GLWA continues to cooperate with member partners on the Lead and Copper Rules as well and attend webinars on the subject. The Office is also monitoring a bio-solids bill and water assistance bills at the federal and state level.
- ***Gordie Howe International Bridge:*** GLWA submitted its relocation reimbursement request to MDOT and is evaluating MDOT's response.
- ***Trenton Water Main:*** The Office is negotiating the transfer of the 24-inch water main to GLWA.
- ***Contract Negotiations:*** GLWA will attempt to secure long term contracts with all communities that are not on the model contract. The negotiation team is meeting with the City of Rochester Hills on April 15, 2021 to begin discussions on the terms of a potential new contract. Rochester Hills has never been a direct customer of GLWA (or DWSD) and has always been served through the Shelby Twp. contract. The Office is working with member partners to draft a new model sewer contract.
- ***Environmental and Workplace Safety Compliance:*** The Office continues to work with the COO and team leaders from both the water and sewer systems to comply with regulations and to respond to any alleged violations.
- ***Record Retention Policy:*** The Office is drafting a record retention policy for GLWA.
- ***Industrial Pretreatment Program:*** The Office continues to work with the Industrial Waste Control ("IWC") Group and external stakeholders on finalizing and implementing an updated IPP. To date, 99% of the communities have passed a concurring resolution and GLWA made a presentation to the City of Highland Park's City Council, which is one of the communities that has not passed a concurring resolution. The Office is also providing assistance on PFAS and PFOS matters.
- ***Real Estate:*** The Office is negotiating easements related to support the 14 Mile Road redundancy project, Baby Creek CSO infrastructure improvement project. The Office is negotiating the acquisition of property for the Newburgh pump station. The office is negotiating easements related to 96" watermain relocation.

- **Member Outreach:** The Office continues to be an active participant in Member Outreach sessions.
- **Water Supply Advisory Council:** The Office advised the Council during a meeting on March 22, 2021.
- **Main Relocations:** The Office continues to support water operations in its discussions with community stakeholders regarding water main relocations.
- **Civil Litigation and Arbitrations:** The Office continues to vigorously defend actions against GLWA, including a class action lawsuit regarding IWC charges. GLWA filed a lawsuit against Highland Park for unpaid water, sewer and IWC invoices. With the assistance of outside counsel, the Office is preparing for the Jeffery Moyer trial. In the *City of Detroit v Highland Park* matter, outside counsel is taking steps to reverse a recent decision by the trial court that vacated the 2015 Judgment and entered a judgment in favor of Highland Park. GLWA filed its lawsuit against the State of Michigan for unpaid water charges. In *Massey v GLWA*, the Sixth Circuit affirmed the district court's dismissal of the action against GLWA.
- **Labor Relations:** The Office continues to provide legal advice to Organizational Development on labor relations and employment matters.
- **Procurement:** The Office continues to assist GLWA's Procurement Team negotiate contracts, change orders and amendments and interpret contractual provisions. The Office is also assisting with the Procurement Policy's Procedures and updating GLWA's template contracts. The Office is part of a cross-functional team working to complete significant revisions to the GLWA construction contract, including consideration of using an entirely new contract format.
- **Statistics:**

	#
Contracts approved as to form:	36
Contracts drafted or revised:	91
Subpoenas/Information requests received:	3
Subpoenas/Information responded to:	2