Miller
Santo
VanSyckel

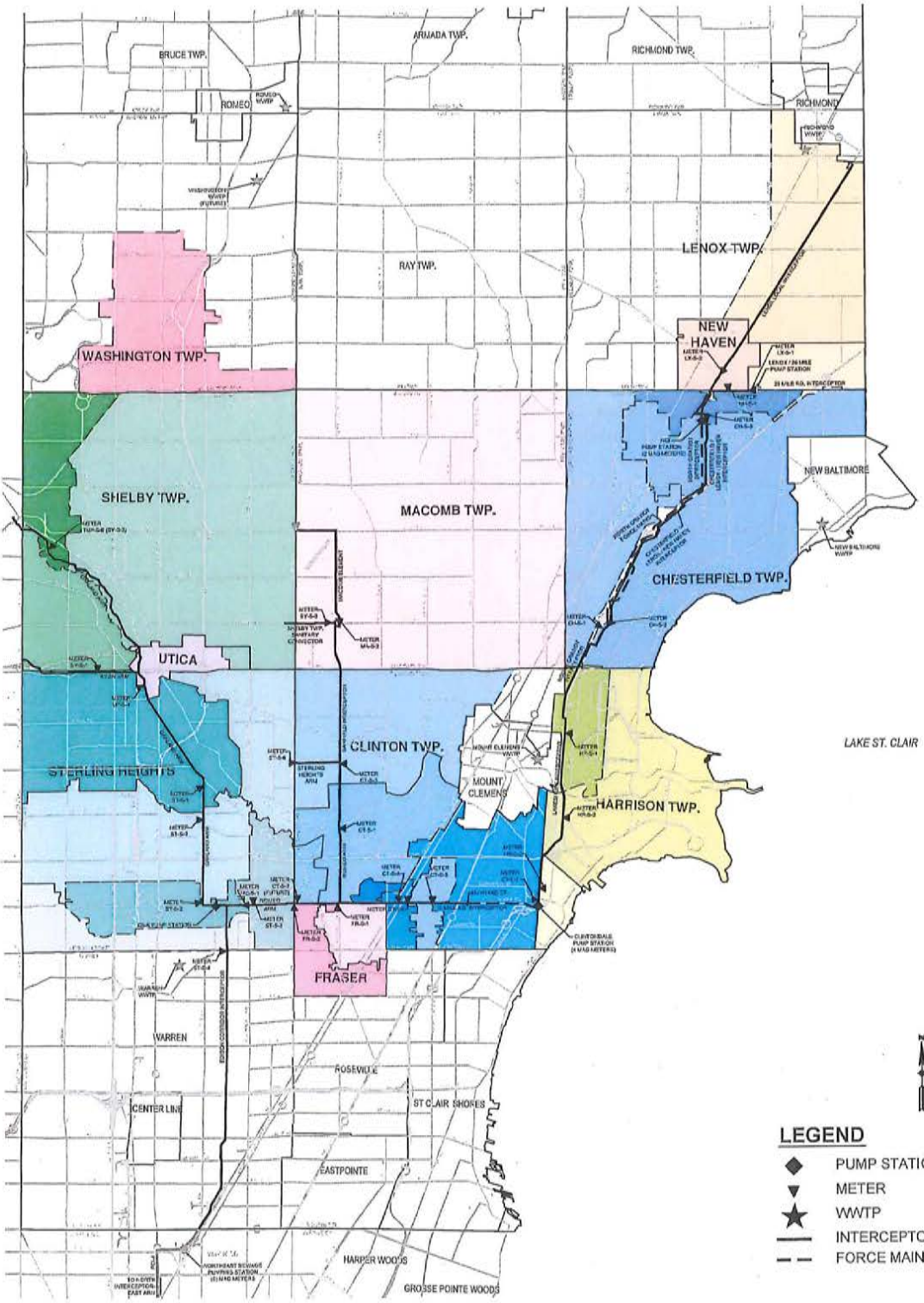
MACOMB INTERCEPTOR DRAIN
INTRA-COUNTY DRAINAGE BOARD
MAY 10, 2021
10:45 A.M.
AGENDA

NOTE: THIS MEETING WILL BE HELD BY TELECONFERENCE

Call in Number: 1-575-708-2723
Access Code: 474 776 139

		Page
1.	Call of meeting to order and roll call	
2.	Approval of Agenda for May 10, 2021	
3.	Approval of Minutes for April 12, 2021	3
4.	Public Participation	
5.	Project Updates – Stephen Downing	6
6.	State Wastewater COVID Detection No Match Grant Submission - Vince Astorino	16
	Motion: To approve the no match COVID detection State grant application for $2,673,807, and if awarded, authorize the Public Works Commissioner to initiate a contract extension with Aquasite so the project can commence on June 1, 2021, per the State grant guidelines	
7.	Consideration for approval of invoices (see attached)	34
8.	Financial Report – Bruce Manning	36
9.	Adjourn	

MACOMB INTERCEPTOR DRAIN DRAINAGE DISTRICT



MACOMB COUNTY MICHIGAN

Candice S. Miller

MACOMB COUNTY PUBLIC WORKS COMMISSIONER

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UPDATED: FEBRUARY 2017

An adjourned meeting of the Intra-County Drainage Board for the **MACOMB INTERCEPTOR DRAIN** was held via telephone conference per the State Public Act 254 of 2020 due to the COVID-19 pandemic, on April 12, 2021, at 10:55 A.M.

PRESENT: Brian Baker, Acting Chair
Location: Clinton Township, MI

Don VanSyckel, Member
Location: Sterling Heights, MI

Bryan Santo, Member
Location: Mt. Clemens, MI

ALSO PRESENT: Karen Czernel, Deputy, Jeff Bednar P.E., Environmental Resources Manager, Stephen Downing, Construction & Maintenance Manager, Bruce Manning, Financial Manager, Vince Astorino, Operations & Flow Manager, Kellie Kource, Drain Account Specialist, Norb Franz, Communications Manager, Macomb County Public Works; Stephen Saph Jr. – Nickel & Saph Insurance; Richard Amormino, Director of Public Works, Sebastian Previti, Supervisor, Washington Township

The meeting was called to order by the Acting Chair, Brian Baker. A motion was made by Mr. VanSyckel, supported by Mr. Santo to approve the agenda as presented.

Adopted: YEAS: 3
NAYS: 0

Minutes of the meeting of March 8, 2021 were presented. A motion was made by Mr. Santo, supported by Mr. VanSyckel to approve the minutes as presented.

Adopted: YEAS: 3
NAYS: 0

The meeting was opened to public participation, then closed, there being no comments from the public.

Mr. Downing updated the board that Segment 5 is continuing install the secant piles in the shaft with 44 of the 60 beams installed. We anticipate completion the end of April, and then will be moving on to excavating down to the interceptor.

Phase 2 grouting was paused but will resume shortly. Once finished with the M59/Garfield location they will move to the Lakeshore interceptor.

Meter rehab will start late April, and the odor and corrosion design is moving forward.

A motion was made by Mr. VanSyckel, supported by Mr. Santo to receive and file the project updates by Mr. Downing.

Adopted: YEAS: 3
NAYS: 0

A motion was made by Mr. Santo, supported by Mr. VanSyckel to receive and file the 2021 MIDD Report.

Adopted: YEAS: 3
NAYS: 0

Mr. Saph updated the board regarding the renewal for the general liability insurance. This will be the fourth year of securing insurance within the districts and we have established a 3 year prior claims history that needed to be established to consider more insurance companies for coverage. We did end up with the same insurer (Argonaut) as before after taking that information to market as they were still the most competitive. The retention for out of pocket expense for claims dropped from $250,000 to $100,000 and this is a more traditional insurance liability program with an underlying policy and an excess policy. There is a change from an occurance form to a claims form which we are more comfortable with. In 2020 we had a $12 million dollar aggregate and for 2021 we will have an $11 million dollar aggregate.

A motion was made by Mr. VanSyckel, supported by Mr. Santo to approve the Chapter 20 General Liability Insurance coverage renewal with Argonaut Insurance Company in the amount of $197,864 (MIDD share $185,797.22).

Adopted: YEAS: 3
NAYS: 0

Mr. Downing updated the board that we are recommending moving forward with a Segment 6 bid award to Ric-Man Construction. This project will be funding through SRF and are looking for a late summer start date.

A motion was made by Mr. Santo, supported by Mr. VanSyckel to award the bid for the rehabilitation of Segment 6 to Ric-Man Construction for the bid amount of $13,541,545.

Adopted: YEAS: 3
NAYS: 0

Mr. Baker updated the board that the proposed MIDD budget has been sent to the communities for their review. There is an average 2.5% increase, which is among the lowest increase in years.

A motion was made by Mr. Santo, supported by Mr. VanSyckel to approve the 2021/2022 Macomb Interceptor Drainage District (MIDD) budget and charges.

Adopted: YEAS: 3
NAYS: 0

Mr. Baker updated the board that the ability to have virtual meetings has been extended through the end of the year if certain conditions are met.

A motion was made by Mr. VanSyckel, supported by Mr. Santo to adopt the resolution regarding electronic and telephonic meetings procedures.

Adopted: YEAS: 3
NAYS: 0

The Chair presented the invoices totaling $8,916,465.56 to the board for review and approval.

A motion was made by Mr. VanSyckel, supported by Mr. Santo to approve the invoices as presented.

Adopted: YEAS: 3
NAYS: 0

A motion to receive and file the financial report given by Mr. Manning was made by Mr. Santo and supported by Mr. VanSyckel.

Adopted: YEAS: 3
NAYS: 0

There being no further business, it was moved by Mr. Santo, supported by Mr. VanSyckel, that the meeting of the Macomb Interceptor Drain Board be adjourned.

Adopted: YEAS: 3
NAYS: 0

The meeting was adjourned at 11:48 a.m.

Brian Baker, Acting Chair
Macomb County Public Works Chief Deputy

STATE OF MICHIGAN
COUNTY OF MACOMB

I certify that the foregoing is a true and correct copy of proceedings taking by the Intra-County Drainage Board for the Drainage District shown on the attached set of minutes, April 12, 2021 the original of which is on file in the Public Works Commissioner's Office. Public notice of the meeting was given pursuant to Act No. 267, Public Acts of Michigan, 1975, including, in the case of a special or rescheduled meeting or a meeting secured for more than 36 hours, notice by posting at least 18 hours prior to the time set for the meeting.

Brian Baker, Acting Chair
Macomb County Public Works Chief Deputy

DATED: 4/12/21

Candice S. Miller
Public Works Commissioner
Macomb County

To: Macomb Interceptor Drain Drainage District Board Members

CC: File

From: Stephen Downing, Construction & Maintenance Manager

Date: May 10, 2021

Subject: Construction Projects Status Updates for May 2021 Board Meeting

The following provides a status update for construction work completed within the Macomb Interceptor Drain Drainage District for the previous month.

Segment 5 Rehabilitation

Contractor: Oscar Renda

Engineering Consultant: FK Engineering

Project Description:

The Segment 5 reach of the Romeo Arm Interceptor is approximately 8,300 linear feet; it runs along 15 Mile Road starting at the ITC Corridor and extends east to approximately Hayes Road. The first 7,000 linear feet is 11-foot diameter non-reinforced concrete pipe, and the next 1,300 linear feet is 8-foot diameter steel reinforced concrete pipe. The rehabilitation consists of debris removal, cleaning, and inspection of the pipe's invert. Next, HOBAS pipe will be used to slip line 7,000 linear feet of the 11-foot diameter sewer and the 1,300 linear feet section of 8-foot diameter pipe will be coated with a corrosion resistant geopolymer spray applied coating. To facilitate this work, a new control structure and access shaft is under construction in the ITC Corridor. The new control structure will provide the contractor access to the sewer to facilitate the work and will also serve as a dewatering pump station to draw down the upstream water level in the sewer.

Significant project tasks that have occurred over the past month:

1. The secant pile drilling activity was completed this month with a total 60 piles installed.
2. The drop pipes for the pump station were drilled and installed.
3. Continued development, review, and approval of the required construction submittals.
4. Performed an in-tunnel survey to verify tunnel alignment and wall thickness.
5. Conducted a manned entry to relocate a few of the internal steel ribs based on the in-tunnel survey results.

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6. Started demobilization of the drilling rig.
7. Performed routine maintenance on the groundwater dewatering system.

Construction Costs:

	Date (if applicable)	
Original Contract Amount	9/21/2020	$28,245,500.00
Total Spent to Date	4/1/2021	$6,591,935.00
Remaining Budget	4/1/2021	$22,653,565.00

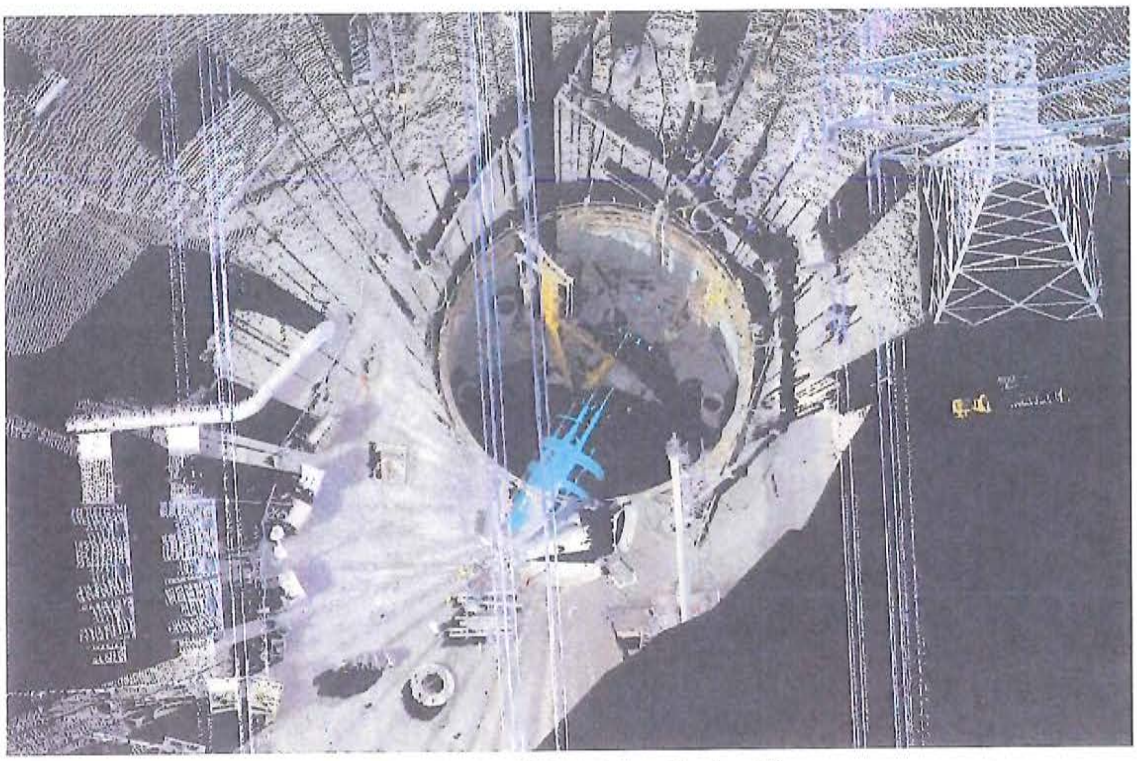

Figure 1 – April 2021 3-D Scan Overhead View

Figure 2 - Isometric View of Shaft in 3-D

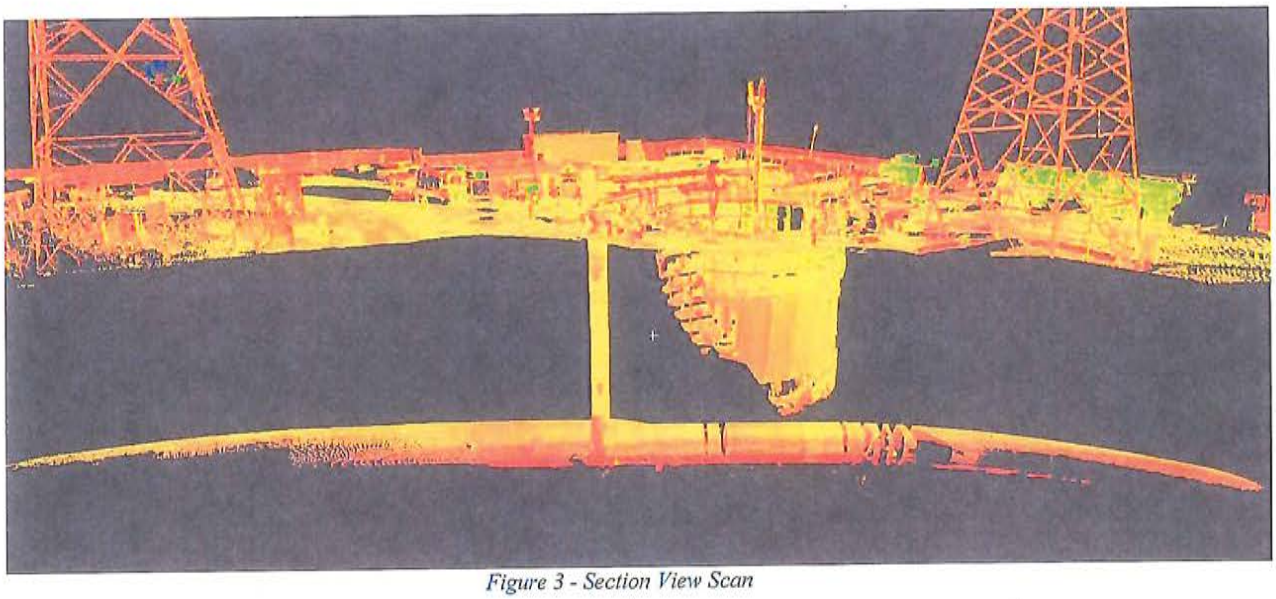

Figure 3 - Section View Scan

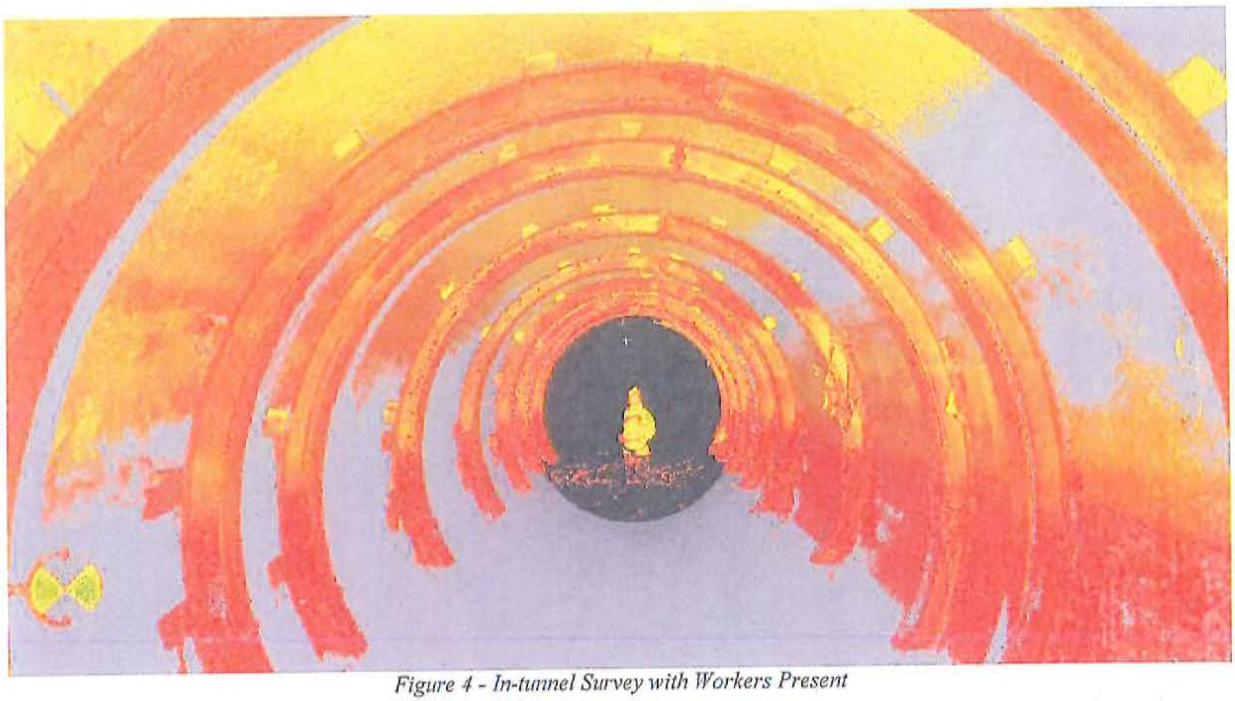

Figure 4 - In-tunnel Survey with Workers Present

Figure 5 - In-Tunnel Survey with Workers Present

Figure 6 - Relocation of Steel Ribs

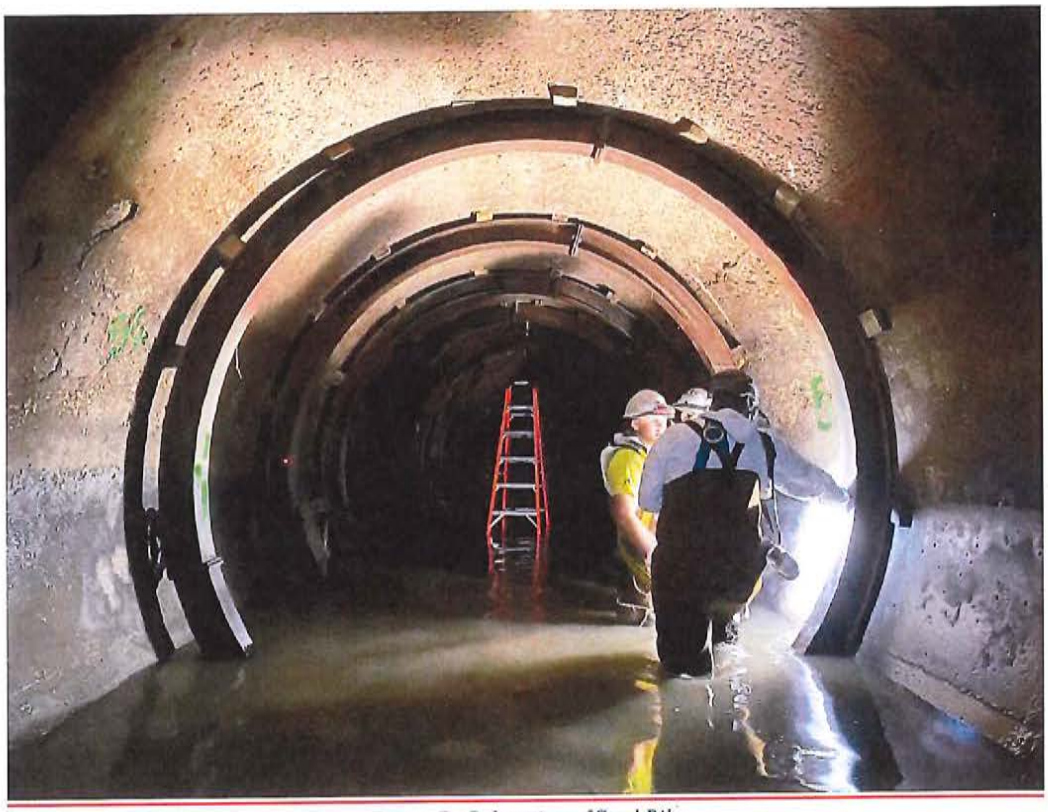

Figure 7 - Relocation of Steel Ribs

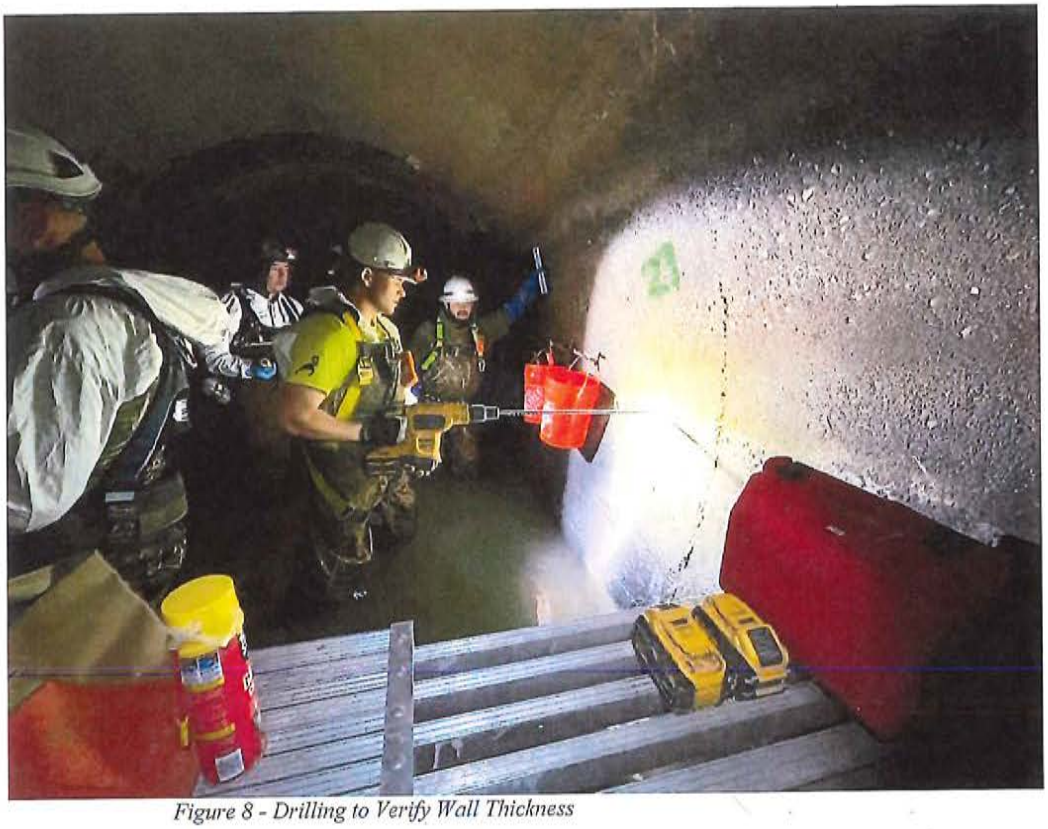

Figure 8 - Drilling to Verify Wall Thickness

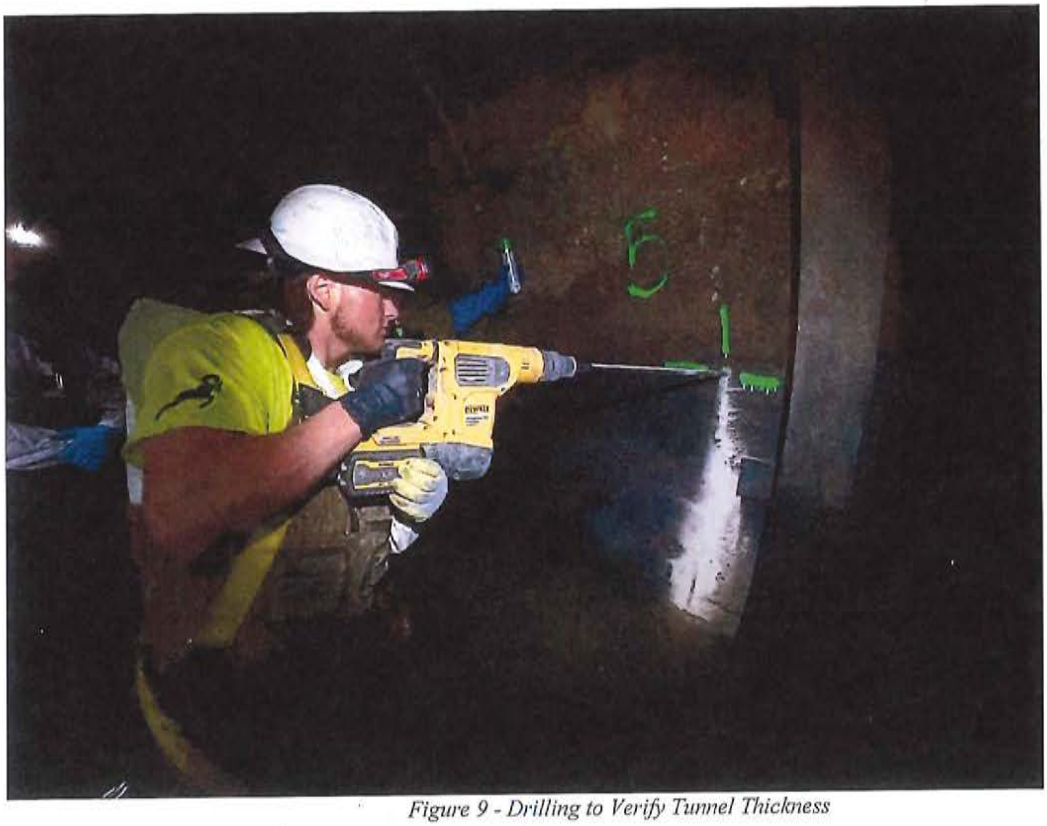

Figure 9 - Drilling to Verify Tunnel Thickness

Phase II Grouting

Contractor: Doetsch Environmental Services, Inc.

Engineering Consultant: AEW

Project Description:

The Phase II Grouting project was awarded to Doetsch Environmental during summer 2020. The work includes chemical grouting of the sewer and manholes where infiltration is present. The work is planned in all reaches of the system not included in the Segment 5 or portion of the Romeo Arm rehabilitated during the 2016 Interceptor Collapse. The main areas of work include the Romeo Arm along Garfield Road between 15 Mile and Clinton River Roads, the Garfield Interceptor between Clinton River and 21 Mile Roads, and the Lakeshore Interceptor between the Clintondale Pump Station at 15 Mile and Union Lake and Joy Boulevard in Harrison Township. The chemical grouting is aimed to stop all active infiltration within the system in advance of future rehabilitation and maintenance projects.

Significant project tasks that have occurred over the past month:

1. Completed grouting work in the Garfield Interceptor at Canal Road on April 12, 2021. All critical areas in the Garfield Interceptor have been addressed.
2. Mobilized to the Lakeshore Interceptor to grout approximately 1500 linear feet beneath the Clinton River.

Construction Costs:

	Date (if applicable)	
Original Contract Amount	6/24/2020	$3,000,000.00
Total Spent to Date		$1,852,167.50
Remaining Budget	4/28/2021	$1,147,832.50

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Meter Facility Rehabilitation

Contractor: Weiss Construction

Engineering Consultant: HRC

Project Description:

The project includes the rehabilitation of three sewerage meter facilities; work includes removal and application of concrete surface repairs and protective coatings, televising, cleaning, and spray-lining the existing influent and effluent connecting sewers; rehabilitation existing adjacent sanitary manholes; improving access and safety features for maintenance personnel; and replacing existing electrical systems.

The sites, SY-S-1 and SY-S-2 are in Shelby Township and WA-S-1 is in Washington Township. The meter facilities are the point of transition of sewerage flow from the local systems into the MIDDD Interceptors. Each of the metering facilities provides the critical flow data required to allocate the billing apportionment for each of the MIDDD member communities.
The Shelby Township meter facilities, originally constructed by DWSD, have reached the end of their useful life and are need of rehabilitation. The MCPWO previously rehabilitated several of the older metering facilities in the system, which were also constructed by DWSD.
The Washington Township meter facility is currently owned by Washington Township, which is a unique situation in the MIDDD system. Typically, the MIDDD assumes ownership of the billing meter facilities, which includes operation and maintenance activity. As such, the MCPWO negotiated a transfer agreement with Washington Township to transfer ownership of this asset to the MIDDD. The two entities agreed to equitable cost sharing terms within the agreement.
The project was designed by Hubbell, Roth and Clark and the construction contract was awarded to Weiss Construction. The total construction cost for the project is $857,159.00. The work started in April 2021.

Significant project tasks that have occurred over the past month:

1. The Contractor continued to develop and submit the required construction submittals for the Engineering team to review.
2. The Contractor secured to required permits for the project.
3. The Contractor requested the required utility markings from MISS Dig.
4. The Engineering team continued review and return of the required construction submittals.
5. The Contractor mobilized the SY-S-1 and SY-S-2 Meter sites to perform the required preconstruction damage survey.
6. The Contractor started the heavy cleaning of the meter pits to facilitate a structural assessment of the concrete to establish the required repairs.

Construction Costs:

	Date (if applicable)	
Original Contract Amount	12/3/2020	$857,159.00
Total Spent to Date	4/30/2021	$2,205.00
Remaining Budget	4/30/2021	$854,954.00

Segment 6 Rehabilitation

Contractor: Ric-Man Construction

Engineering Consultant: FK Engineering

Project Description:

The Segment 6 Rehab project includes the rehabilitation of these main elements:

1. Cleaning and slip-lining (Hobas) of the 5-foot diameter 15 Mile Interceptor from MH-01 at Garfield Road and 15 Mile to MH-04 approximately 2200 feet east along 15 Mile.
2. Cleaning and slip-lining (Hobas) the 1400 linear feet 11-foot diameter Romeo Arm Interceptor sewer between CS-3 on 15 Mile Road and CS-2 on Garfield north of 15 Mile Road.
3. Rehabilitation of the Meter Facility FR-S-1 on Garfield south of 15 Mile Road.
4. Rehabilitation and spray-lining of the CS-2 and CS-3 control structure facilities. These concrete structures have been damaged by H2S damage over time and need repair.
5. Installation of an air-jumper to be incorporated into the existing Biofilter facility. This is being done to address the high level of odor issues that have resulted over the years from the intersection of 15 Mile and Garfield.
6. Installation of a new gate control structure on the 15 Mile Interceptor. This will allow for the rehabilitation of the MH-01 structure and provide future storage options within that interceptor.

The project is scheduled to start in August 2021 and be completed in March 2023.

Significant project tasks that have occurred over the past month:

1. The Engineering Consultant is preparing the Contract Books for delivery to the Contractor for review and signature.
2. The SRF Part III Application was submitted to EGLE and subsequently approved.
3. A conference call was held with EGLE, State Treasury, Attorney General, Owner and the Owner's Financial Consultants to confirm the loan amount and closing date. The loan is scheduled to close on June 7, 2021.
4. The Construction Notice to Proceed will be issue on August 7, 2021.

Construction Costs:

	Date (if applicable)	
Original Contract Amount	9/21/2020	$13,541,545.00
Total Spent to Date	4/1/2021	$0
Remaining Budget	4/1/2021	$13,541,545.00

Candice S. Miller
Public Works Commissioner
Macomb County

April 28, 2021

Susan Peters, DVM, MPH
Department of Health and Human Services
Waterborne Disease Epidemiologist
Emerging and Zoonotic Infectious Disease Section
333 S Grand Ave, 3rd Floor
Lansing, MI 48933

Subject: Application for SEWER Network Funding

Dear Ms. Peters,

The following package is the Macomb County submittal for the Michigan Department of Health and Human Services (MDHHS) program identified as the SEWER Network to monitor SARS-CoV-2 in Wastewater. Macomb County is excited to have the opportunity to build on the successful program that is already in place throughout Clinton Township which is the largest township in Michigan and Warren which is the third largest city in Michigan. Macomb County has been one of the leaders in establishing this testing process and will be able to provide what has been learned to this point and share that with others who are interested. The county's project in Clinton Township has leveraged cutting-edge technology to automate the sampling process and has even built a web-based platform for simple interpretation of the data as it is processed.

Our vision is to expand this successful program into the communities of Mt. Clemens, New Baltimore, Richmond, and Romeo along with the Macomb County Jail, Macomb Correctional Facility, and Martha T. Berry Medical Care Facility.

Macomb County is looking forward to working with MDHHS on this next phase of testing and we feel that this project will help achieve the goals of the state's project and also be extremely beneficial to help support the medical frontline workers, government agencies and the public as we go through this pandemic together.

Sincerely,

Vincent Astorino
Operations and Flow Manager
Macomb County Public Works

Andrew Cox, MPH, REHS
Health Officer
Macomb County Health Department

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Mark A. Hackel
County Executive

MACOMB COUNTY HEALTH DEPARTMENT

Andrew Cox, M.P.H., REHS
Director/Health Officer

Kevin P. Lokar, M.D.
Medical Director

Krista Willette, R.N., M.S.A.
Deputy Health Officer

April 19, 2021

Susan Peters, DVM, MPH
Department of Health and Human Services
Waterborne Disease Epidemiologist
Emerging and Zoonotic Infectious Disease Section
333 S Grand Ave, 3rd Floor
Lansing, MI 48933

Dear Ms. Peters,

I am writing this letter in support of Macomb County Public Works Department's proposal, in partnership with Oakland University and AquaSight, to continue testing wastewater for COVID-19 and its variants at selected locations in Macomb County for the next two years. We are eager to see our region take on such a comprehensive approach to monitoring a contagious disease and the health of our communities. The health department assisted in selecting the test locations in Macomb County. These sites include wastewater treatment plants in Mt. Clemens, New Baltimore, Richmond, Romeo, Warren, four senior living facilities in Warren, the Macomb County jail, Macomb Correctional facility, Marth T. Berry Medical Care Facility, and select community locations in Clinton Township.

The Macomb County Health Department is always interested to participate in innovative ways to monitor, protect, and improve the health of our residents. The information gathered from this project can be used to allocate resources, send out appropriate public messaging, and further strength community partnerships.

This project will directly impact our ability to monitor for future disease outbreaks, including emergent viruses. We look forward to continuing this project with our partners.

Sincerely,

Andrew Cox
Director/Health Officer

Mount Clemens Health Center
43525 Elizabeth Road ♦ Mount Clemens, Michigan 48043
Phone: 586-469-5235 Fax: 586-469-5885
health.macombgov.org

MACOMB COUNTY PUBLIC WORKS OFFICE

CANDICE S. MILLER

MACOMB COUNTY PUBLIC WORKS COMMISSIONER

SARS-CoV-2 Wastewater Sewage Surveillance Project

Michigan Department of Health and Human Services

April 30th, 2021

1. Project Overview:

The MDHHS grant funding will be utilized to continue and add new sites for an actionable COVID-19 wastewater surveillance program in Macomb County. This funding request will support a total of 19 monitoring points in the county that includes five WWTPs, seven neighborhood sewer sheds, two correctional facilities, four senior living centers, and one long term care facility. These monitoring points have been developed in partnership with the Macomb County health department and has consensus from participating agencies. All the monitoring points will have composite samplers as part of this program and will leverage existing sampling infrastructure and install new ones where required.

The state funding will be utilized to continue the sewage surveillance program at Clinton Township, specific senior living centers within Warren, and the City of Warren WWTP. To date the program has been paid by the county and the city funds. The MDHHS funding program will assist Macomb County Health Department and Public Works Office to create a long-term monitoring program and collection of important actionable sewage surveillance insights that the county and the City of Warren has been using diligently.

For example, the Clinton Township monitoring program has been in place since August 2020 and over 460 monitoring data points have been collected to date of which 81% had positive quantifiable COVID-19 sewer signal. The sewer signal trends, moving average, and clinical case trends in the township is a mirror image of what is occurring overall in Michigan COVID-19 trends on a normalized basis. In most cases the sewer signal was observed up to a week in advance of clinical cases. In addition, the recent case surge in March 2021 has been observed in the sewers including the exponential growth since February 2021. Continuing this program through these grant funds will help us understand if there is spread of COVID-19 underground as well as serve as a proxy for what might be occurring elsewhere in the county and the state.

In addition, the funds will be used to bring on new sites that the Macomb County Health Department wants to monitor and that includes 4 WWTPs, 2 Jails, and 1 Long-Term Care facility. The program will serve a total population of over 301,000 residents in the county. The program will be performing twice a week testing including variant testing at each of the 19 monitoring points from start of the project till end of May 2022 (12 months) and then switch to once a week testing till end of July 2023 (14 months).

2. Project Partner & Responsibility:

MCPWO will have a lead partner (Aquasight) to execute the overall program. The partner is integrated with Macomb County Health Department, MCPWO, the City of Warren and the local WWTP plants. The partner will have a team of staff, integrated lab and subcontractors that will be engaged to execute this project. The partner team will include Mahesh Lunani, David Inman, Nabeel Mehdi, Dr. Dave Szlag (OU), Christine Laba (OU), Dave Burkel (Hesco), Parna Bandyopadhyay and Ravindra Rapaka. As well, a number of other experts and on-the-ground logistical crew that will be working and coming in and out of the project based on needs and requirements. The Oakland University ddPCR lab will be utilized for sewage testing. Partner team will perform the following key tasks. The budget narrative describes in depth activities involved in each of the below key tasks

a) Project Management and Coordination
b) Sampling Infrastructure Design and Installation
c) Sample Logistics, Shipment and Delivery
d) Lab Testing, Variants Analysis and Raw ddPCR Data Quality Checks
e) Data Analytics, Reporting & Communication
f) Training and Access to Live Dashboard to Key Stakeholders
g) LHD and/or Stakeholder Timely Decision-Making Integration

2.1. Lead Agency Personnel – at a minimum include Project Director, Financial Officer, Authorizing Official. Please add additional rows to the table as needed.

Name	Title	Project Responsibilities	Phone Number	Email Address
Andrew Cox	Health Dept. Director	Health department lead	(586) 469-5510	andrew.cox@macombgov.org
Stacey McFarlane	Health Dept. Supervisor	Health department lead	(586) 469-5236	stacey.mcfarlane@macombgov.org
Vince Astorino	Public Works Operations Manager	Operations and overall project lead	(586) 615-2436	Vincent.astorino@macombgov.org
Bruce Manning	Public Works Finance Manager	Finance lead	(586) 307-8279	Bruce.manning@macombgov.org
Candice Miller	Public Works Commissioner	Authorizing Official	(586) 469-6320	Candice.miller@macombgov.org

2.2. Partner Agency Personnel (Select names only) – Please add additional rows to the table as needed.

Name	Title	Organization	Project Responsibilities	Phone Number	Email Address
David Inman	Project manager	Aquasight	Project management & coordination, Sampling infrastructure design and installation, LHD stakeholder timely decision making and integration, logistics management, workplan development	248 590 2190	david@aquasight.io
Nabeel Mehdi	Sewage surveillance specialist	Aquasight	Data analytics, calibration, reporting and communication, training and access to live dashboard to key stakeholders and troubleshooting, creation and execution of advisory system, anomaly analysis,	248 590 2190	nabeel@aquasight.io
Dave Szlag	Professor	Oakland University	Lab testing & variant testing, including ddPCR raw data analysis and quality checking	586 921 3027	szlag@oakland.edu
Christine Laba	Student	Oakland University	Lab testing & variant testing, including ddPCR raw data analysis and quality checking	586 921 3027	claba@oakland.edu
Dave Burkel	Service manager	HESCO	Sample logistics shipment & delivery, crew schedule management, sampler installation	586 978 7200	dave.burkel@hesco-mi.com
Parna Bandyopadhyay	Data science & analyst	Aquasight	Data analytics, reporting & communication, creation and execution of advisory system, system and dashboard management.	248 590 2190	parna@aquasight.io
Mahesh Lunani	Project oversight	Aquasight	Project direction, quality control, stakeholder management, insights and analytics review, oversight and strategic direction	248 590 2190	Mahesh@aquasight.io

3. Project Implementation:

Surveillance strategy selected is a mixture of WWTP, and Congregate facilities such as Senior Centers, Jails and community sewer sheds. Jails and Senior Centers have specifically been targeted for this funding where both vaccinated and unvaccinated people move in and out of these facilities on a regular basis. Vulnerable elderly population as well as geo-locked inmates are at risk for infection or super spreader events in case of a virus breakout. In addition, vaccine effectiveness and immunity to variants is not yet well understood, and new variants may continue to emerge in the future. Through sewage surveillance we will have a non-invasive tool that will allow for understanding any surges and if these surges are driven by variants. Regarding WWTPs, New Baltimore, Richmond, Romeo and Mt. Clemens are relatively small WWTPs that can allow for detection and monitoring in small communities and can help with early warning or actions by LHD. The City of Warren remains the third largest city in the state with 16% of population above the age of 65 and 30% population made up of minority and ethnic groups, both vulnerable segments. By monitoring at the WWTP and city owned senior centers, through this program we will detect and monitor the spread of COVID-19.

Total there are 19 monitoring points, and the mix of facilities will provide an actionable surveillance strategy that health departments and agencies will have access to. If there are surprise surges, we can increase the frequency to get more granular insights. COVID-19 response teams, decision-making committees, individual city and agencies will have access to the surveillance insights, analytics and trends to make valuable health related early warning decisions.

4. Sample Collection Methodology:

Samples are collected using two types of composite samplers, fixed (permanent) or portable units.

4.1) Fixed (Permanent) Autosamplers

Fixed units are typically installed at wastewater plants as 24-hour influent composite samplers for various testing purposes. These units are typically refrigerated, not requiring ice. At the time of collection, lab technicians are instructed to ensure thorough mixing of the collection vessel either by inverting the collection vessel several times or stirring with a clean object. Samples for the Covid-19 testing program are collected into the provided sample bottle, marked with the timestamp, and details are recorded onto the provided Chain of Custody. Additional parameters such as sample pH, temperature, and day composite flow are also recorded. Sample bottle(s) are secured and packed for overnight shipping to the lab.

4.2) Portable Samplers

Portable composite samplers are deployed for remote locations such as manholes or lift stations. Smaller spaces may require compact samplers that can limit bottle volume and affect composite

runtimes. 24-hour composite samples are deployed where the portable sampler can utilize a 10L or larger bottle. 8-hour peak diurnal sampling may be deployed where smaller sampler's limit ice packing and 5L bottles must be used. Samplers are prepared with ice, a new battery is installed, and programed the day before. Samples are collected the following day. This approach minimizes ice melt. Samplers are retrieved, the bottle volume is recorded as well as temperature if ice is not present. pH is not typically collected for field samples. Sampler program reports are retrieved where available. Sample vessels are inverted several times to promote homogeneity and then poured off into sample bottles. Sample bottles are labeled and secured in a cooler for transport or prepared for shipment in insulated shipping containers.

5. Lab Testing:

Molecular quantification of SARS-CoV-2 virus is conducted using CDC qPCR detection method adapted to the BIO RAD QX200™ Droplet Digital PCR (ddPCR) analysis platform using Biorad's One-Step RT-ddPCR Advanced Kit for Probes (CDC, 2020). The SARS CoV-2 target is amplified by ddPCR using CDC recommended primer and probe sets (N1 and N2) listed in Table 1. (CDC, 2020). The percent recovery for each sample is analyzed by spiking the sample with Phi6 bacteriophage, which is an enveloped double stranded RNA virus using the primer and probe set listed in Table below.

Quality assurance and control measures (QA/QC) are performed for all samples. A minimum of 10,000 droplets are required that pass droplet formation QA/QC before a sample can be considered for further analysis. Positive and negative ddPCR controls are run concurrently with all samples for ddPCR analysis. In order for a replicate well to be considered positive it must have greater than or equal to three positive droplets. Three technical replicates are run for each sample to check for reproducibility and to identify those samples with low concentrations at the limit of detection. Detection of particular genetic marker sequences provide evidence that virus, is present in the samples. While non-detection may be a result of sample matrix interference (inhibitors), low levels of gene targets below the limit of detection of the assay, or the absence of the virus. The LDL of gene copies (GC) detectable by the ddPCR (droplet digital PCR) method for each sample varies with initial volume filtered and final eluent volume.

Table 1

Target	Primer/Probe name	Primer/Probe Sequence	Reference
SARS CoV-2	2019-nCoV_N1-F	5'-GACCCCAAAATCAGCGAAAT-3'	CDC, 2020
	2019-nCoV_N1-R	5'-TCTGGTTACTGCCAGTTGAATCTG-3'	
	2019-nCoV_N1-P	5'-FAM-ACCCCGCATTACGTTTGGTGGACC-BHQ1-3'	
	2019-nCoV_N2-F	5'-TTACAAACATTGGCCGCAAA-3'	CDC, 2020
	2019-nCoV_N2-R	5'-GCGCGACATTCCGAAGAA-3'	
	2019-nCoV_N2-P	5'-HEX-ACAATTTGCCCCCAGCGCTTCAG-BHQ1-3'	
Phi6	Φ6Tfor	5'-TGGCGGCGGTCAAGAGC-3'	Gendron et al. 2010
	Φ6Trev	5'-GGATGATTCTCCAGAAGCTGCTG-3'	
	Φ6Tprobe	5'- FAM-CGGTCGTCGCAGGTCTGACACTCGC-BHQ1-3'	

6. Variant Testing:

We use a strategy developed by GT Molecular, LLC that allows us to assess the relative abundance of the UK, South Africa, and Brazilian variants:

UK Variant B.1.1.7

Mutations

Del69-70, 144Y, E484K, S494P, N501Y,

A570D, D614, P681H

Brazil P.1 (Japan)

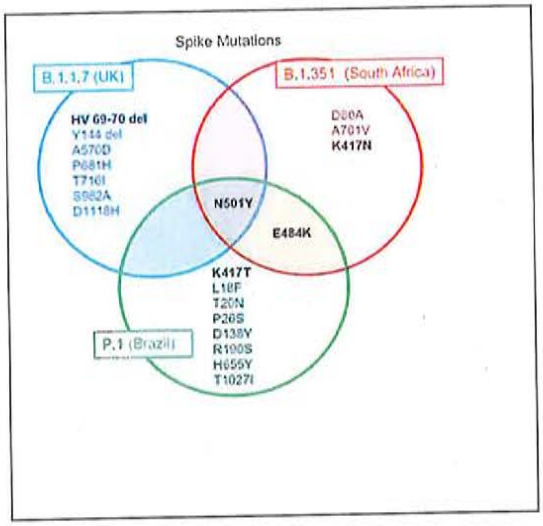
Mutations

K417N/T, E484K, N501Y, D614G

South African B.1.351

Mutations

K417N, E484K, N501Y, D614G



All of these variants contain the N501Y mutation, while only the UK variant contains the del69/70 mutation. The GT Molecular Variant assay we use is a 4-plex that measures N501Y relative to its Wuhan parent, and del69/70 relative to its Wuhan parent. Thus we can identify presence of UK variant if both mutations are present and the presence of either the SA or Brazil variants if only the N501Y mutation is present. We can also get an estimate of the relative percentage of the variants present in the sample.

7. Data Reporting & Communication:

For the program to be actionable and successful, it is paramount that sewage surveillance is used as a practical detection and monitoring tool and is reported timely. This requires a level of precision and repeatability across all aspects of this program including insights reported and shared within 36 to 48 hours of samples being received. A robust workflow has been defined that is optimized to achieve this goal from the time samples arrive to what and how the results are presented to LHD and/or decision-making agencies.

A system, reporting, dashboard and analytical workflow is in place for participating agencies to be immediately notified and also act on results within a very aggressive timeline. This approach has been honed, validated and proven during the last nine months of sewage surveillance deployment with over 1800 COVID-19 monitoring data points. The results contain all meta-data, normalized data assets, that is interpretable and actionable.

The receiving agencies are making decisions using such an expedited workflow and communications is occurring within minutes of go-live both via e-mail as well the on-line system information updates. Case

data is overlayed to see correlation and trending along with sewer signal as well geo level insights. In addition, an advisory system has been put in place to see if a particular site is high, elevated or guarded in order to provide short term actionable outcomes for the decision makers.

8. Work Plan

The goal of the first four months of the program include:

- Identify new site location and install sampling infrastructure
- Sample kits, chain of custody and logistics preparation
- Train WWTPs on sample shipments
- Optimize lab testing workflow and scale up for variant testing
- Prepare logistics crew and set up schedule of sample arrivals
- Resume sampling for pre-existing sites
- Tune the analytics, insights and metadata to minimize false-positives and false-negatives
- Improve the models based upon past learnings
- Establish the data reporting, communication and system access
- Engage stakeholders and LHD's

Activity(ies)	Responsible Individual(s)	Timeline		Deliverable(s)
		Start By	End By	
Objective Clinton Twp Sewershed Sampling Resumes				
Logistics planning	David Inman, Dave Burkel	6/1/21	6/11/21	
Scheduled sampling resumes	Dave Burkel, Vince Astorino	6/7/21		
Scheduled ddPCR analysis begins	Dave Szlag, Christine Laba	6/9/21		
Scheduled reporting begins	Nabeel Mehdi, Parna B	6/11/21		
Ongoing communication with LHD	Mahesh Lunani, David Inman	6/14/21		
Caseload/Spread review	Nabeel Mehdi, Parna B		9/30/21	Data shared with MDHHS
Objective CF and LTC Sampling (3 new sites)				
Identify new monitoring sites	David Inman	6/1/21	6/11/21	
Onsite site review & Hardware procurement and Installation	David Inman, Dave Burkel	6/7/21	6/11/21	
New site metadata collection	Nabeel Mehdi, David Inman	6/1/21	6/11/21	
New sites added to CEWS	David Inman, Nabeel Mehdi, Parna B	6/7/21	6/18/21	
New sites deployed and tested and Sampling strategy and existing sites redeployed	David Inman, Dave Burkel	6/7/21	6/18/21	
Logistics schedule developed	David Inman, Dave Burkel	6/7/21	6/18/21	Sample type updated
Scheduled sampling starts	Dave Burkel	6/7/21	6/18/21	
Scheduled ddPCR analysis begins	Dave Szlag, Christine Laba	6/21/21		
Scheduled data analysis, reporting and communication begins	Nabeel Mehdi, Parna B	6/23/21		
Ongoing communication with LHD	Mahesh Lunani, David Inman	6/25/21		
Caseload/Spread review	Nabeel Mehdi, Parna B	6/28/21		
Objective Mt Clemens WWTP Sample Monitoring				
Logistics planning & Material Delivered	David Inman	6/1/21	6/11/21	
Creation of digital platform	David Inman, Nabeel Mehdi, Parna B	6/1/21	6/11/21	
Scheduled sampling starts	WWTP	6/14/21		
Scheduled ddPCR analysis begins	Dave Szlag, Christine Laba	6/16/21		
Scheduled data analysis, reporting and communication begins	Nabeel Mehdi, Parna B	6/18/21	7/22/21	
Ongoing communication with LHD	Mahesh Lunani, David Inman	6/23/21		
Caseload/Spread review	Nabeel Mehdi, Parna B		9/30/21	Data shared with MDHHS
Objective New Baltimore WWTP Sample Monitoring				
Logistics planning & Material Delivered	David Inman	6/1/21	6/11/21	
Creation of digital platform	David Inman, Nabeel Mehdi, Parna B	6/1/21	6/11/21	
Scheduled sampling starts	WWTP	6/14/21		
Scheduled ddPCR analysis begins	Dave Szlag, Christine Laba	6/16/21		
Scheduled data analysis, reporting and communication begins	Nabeel Mehdi, Parna B	6/18/21	7/22/21	
Ongoing communication with LHD	Mahesh Lunani, David Inman	6/23/21		
Caseload/Spread review	Nabeel Mehdi, Parna B		9/30/21	Data shared with MDHHS
Objective Richmond WWTP Sample Monitoring				
Logistics planning & Material Delivered	David Inman	6/1/21	6/11/21	
Creation of digital platform	David Inman, Nabeel Mehdi, Parna B	6/1/21	6/11/21	
Scheduled sampling starts	WWTP	6/14/21		
Scheduled ddPCR analysis begins	Dave Szlag, Christine Laba	6/16/21		
Scheduled data analysis, reporting and communication begins	Nabeel Mehdi, Parna B	6/18/21	7/22/21	
Ongoing communication with LHD	Mahesh Lunani, David Inman	6/23/21		
Caseload/Spread review	Nabeel Mehdi, Parna B		9/30/21	Data shared with MDHHS
Objective Romeo WWTP Sample Monitoring				
Logistics planning & Material Delivered	David Inman	6/1/21	6/11/21	
Creation of digital platform	David Inman, Nabeel Mehdi, Parna B	6/1/21	6/11/21	
Scheduled sampling starts	WWTP	6/14/21		
Scheduled ddPCR analysis begins	Dave Szlag, Christine Laba	6/16/21		
Scheduled data analysis, reporting and communication begins	Nabeel Mehdi, Parna B	6/18/21	7/22/21	
Ongoing communication with LHD	Mahesh Lunani, David Inman	6/23/21		
Caseload/Spread review	Nabeel Mehdi, Parna B		9/30/21	Data shared with MDHHS
Objective Warren WWTP Sample Monitoring Resumes				
Logistics planning	David Inman	6/1/21	6/11/21	
Scheduled sampling starts	WWTP/IPP	6/7/21		
Scheduled ddPCR analysis begins	Dave Szlag, Christine Laba	6/9/21		
Scheduled data analysis, reporting and communication begins	Nabeel Mehdi, Parna B	6/11/21		
Ongoing communication with LHD	Mahesh Lunani, David Inman	6/14/21		
Caseload/Spread review	Nabeel Mehdi, Parna B		9/30/21	Data shared with MDHHS
Objective Warren Senior Community Sample Monitoring Resumes (4 sites)				
Logistics planning	David Inman	6/1/21	6/11/21	
Scheduled sampling starts	WWTP/IPP	6/7/21		
Scheduled ddPCR analysis begins	Dave Szlag, Christine Laba	6/9/21		
Scheduled data analysis, reporting and communication begins	Nabeel Mehdi, Parna B	6/11/21		
Ongoing communication with LHD	Mahesh Lunani, David Inman	6/14/21		
Caseload/Spread review	Nabeel Mehdi, Parna B		9/30/21	Data shared with MDHHS

9. Proposed Sample Site Locations

Name	Type of Facility	Latitude	Longitude	Street Address or Location	Sampling Frequency/ week (yr1/yr2)	# of weeks/yr to be samples	Sample Type	Estimated Population Served	Anticipated collection start date
Clinton Twp Sewer Shed #1	SS	42.5771919	-82.952047	38201 Garfield @ old DPW yard	2x/1x	52	8hr Peak Composite	19662	6/1/21
Clinton Twp Sewer Shed #2	SS	42.5550366	-82.864661	35115 Union Lake Rd @ Clintondale Pump Station	2x/1x	52	8hr Peak Composite	29555	6/1/21
Clinton Twp Sewer Shed #3	SS	42.5979398	-82.952243	20696 15 Mile Rd @ Little Mack	2x/1x	52	8hr Peak Composite	56026	6/1/21
Clinton Twp Sewer Shed #4	SS	42.5540382	-82.934368	18275 15 Mile Rd @ Simon	2x/1x	52	8hr Peak Composite	2715	6/1/21
Clinton Twp Sewer Shed #5	SS	42.5545934	-82.910564	19655 15 Mile Rd @ Beaconsfield	2x/1x	52	8hr Peak Composite	9083	6/1/21
Clinton Twp Sewer Shed #6	SS	42.5544519	-82.920615	20696 15 Mile Rd @ Little Mack	2x/1x	52	8hr Peak Composite	4934	6/1/21
Clinton Twp Sewer Shed #7	SS	42.553286	-82.969713	15 Mile @ Hayes	2x/1x	52	8hr Peak Composite	1976	6/1/21
Macomb Correctional Facility	CF	42.7201688	-82.780188	32989 26 Mile Rd	2x/1x	52	24hr Composite	1500	6/1/21
Macomb County Jail	CF	42.6169129	-82.890981	43565 Elizabeth Rd, Mt Clemens, MI 48043	2x/1x	52	24hr Composite	1250	6/1/21
Martha T Berry Medical Care Facility	LTC	42.6153036	-82.892079	43533 Elizabeth St, Mt Clemens, MI 48043	2x/1x	52	24hr Composite	250	6/1/21
Mt Clemens WWTP	WWTP	42.6016637	-82.866985	1750 Clara St, Mt Clemens, MI 48043	2x/1x	52	24hr Composite	16300	6/1/21
New Baltimore WWTP	WWTP	42.6779659	-82.751196	35319 Cricklewood Blvd, New Baltimore, MI 48047	2x/1x	52	24hr Composite	12400	6/1/21
Richmond WWTP	WWTP	42.7953059	-82.757897	35653 31 Mile Rd, Richmond, MI 48062	2x/1x	52	24hr Composite	5800	6/1/21
Romeo WWTP	WWTP	42.8031713	-82.986559	14787 32 Mile Rd, Bruce Township, MI 48065	2x/1x	52	24hr Composite	3900	6/1/21
Stillwell Manor-Joseph Coach Manor Residential Deduct	Senior Living Deduct	42.488632	83.011369	Carrier Ave and Burg Ave	2x/1x	52	24hr Composite	190	6/1/21
Stillwell Manor-Joseph Coach Manor	Senior Living Community	42.489995	-83.012793	26600 Burg Rd, Warren, MI 48089	2x/1x	52	24hr Composite	400	6/1/21
Tivoli Manor	Senior Living Community	42.502845	-83.005686	28103 Imperial Dr, Warren, MI 48093	2x/1x	52	24hr Composite	120	6/1/21
Ukrainian Village	Senior Living Community	42.4863623	-83.070482	26377 Ryan Rd, Warren, MI 48091	2x/1x	52	24hr Composite	309	6/1/21
Warren WWRF	WWTP	42.5330963	-83.024306	32360 Warkop Ave, Warren, MI 48093	2x/1x	52	24hr Composite	135000	6/1/21

10. Budget Narrative

The budget proposed will be utilized in executing the following project activities through the course of the program.

10.1) Project Management and Coordination: Overall project management and coordination for the sewage surveillance program at aforementioned sites and across six different agencies and local health departments. This includes development of schedule, creation of work plan, engineering & installation of composite samplers, sampling dates, sampling kit preparation, pre-paid shipment packages, chain of custody forms, on-ground logistics management, lab coordination, results review, issue management, LHD coordination and project meetings.
Duration: June 1st, 2021 to July 31st, 2023

10.2) Sampling Infrastructure Design and Installation: Optimal site identification, site feasibility analysis, selection of the right sampler, purchase samplers, composite samplers, hardware installation, perform flow testing and troubleshooting, and determine optimal sampling aliquot and time window.
Duration: June 1st to June 30th, 2021

10.3) Weekly Sample Logistics and Delivery: Establish the schedule for on-site sample pick up and drop off, crew of two to three people preparing samplers, picking up samples and delivering samples to lab. For sites that are shipping the samples, pre-paid shipping labels as well as sample kits including cool packs will be provided to ensure sample is well preserved for testing and minimal lift on WWTP teams' operators time.
Duration: June 1st to July 31st, 2023

10.4) Lab Testing, Variants Analysis and Raw ddPCR Data Quality Checks: Molecular quantification of SARS-CoV-2 virus is conducted using CDC qPCR detection method. The SARS CoV-2 target is amplified by ddPCR using CDC recommended primer and probe sets (N1 and N2). The percent recovery for each sample is analyzed by spiking the sample with Phi6 bacteriophage. Quality assurance and control measures (QA/QC) are performed for all samples. A minimum of 10,000 droplets are required that pass droplet formation QA/QC before a sample can be considered for further analysis. Positive and negative ddPCR controls are run concurrently with all samples for ddPCR analysis. For variant analysis, we will use a strategy developed by GT Molecular, LLC that allows us to assess the relative abundance of the UK, South Africa, and Brazilian variants
Duration: June 1st to July 31st, 2023

Data Analytics, Reporting & Communication: meta data on sampling site, quality checks on lab data outputs, data conversion, calibration and normalization. Create analytics and trending, variant analysis, heat maps, on-line dashboard updates, use of clinical case data, correlation and statistical analysis, rapid and instant communication with LHDs and reporting agencies, set up of automated notification system of results availability, follow up on actions.
Duration: June 1st to July 31st, 2023

Training and Access to Surveillance System: Train on how to access the reporting tool, review lab data, interpret the normalization information, read trends, analytics and heat map, when and what actions to take and closely coordinate with LHD and decision-making authorities.
Duration: June 1st to September 30th, 2021

LHD and/or Stakeholder Timely Decision-Making Integration: Frequent touchpoints will be established with decision making and LHD as and when required. Twice a week when the system goes live with new insights so decisions can be made on additional testing and/or isolation or enhanced social distancing activities. This communication along with access by LHD for the reporting system has been made available to severely cut down communication time.
Duration: June 1st to July 31st, 2023

11. Additional Requirements /Supporting Documentation:

The continuation of this program will provide excellent follow up and expansion of successful in sewage surveillance program at Macomb County. The surveillance data for example showed a spike at one of the Warren senior living centers leading to health department alerting for focused testing at that facility.

The rise in sewer shed COVID-19 numbers in Clinton Township allowed for increased alertness by health department and public works office. The statistics indicated that up to a one-week advance signal was available at the township level and next week cases are predictable based on current week's sewer signal data. In addition, sewer signal trending and moving average aligns very well with clinical case information. All of these insights point to the fact that a continued program at sewer shed level will provide very valuable and actionable insights to health department.

"We believe this testing can be a critical addition to the toolbox for our community – and hopefully for many communities – as we continue to engage in contact tracing to limit the impact of the pandemic. My team has made this their number one priority, working with experts from public health, academia and other units of local government," said Honorable Candice S. Miller, Macomb County Public Works Commissioner.

https://publicworks.macombgov.org/publicworksMacombCountyToTestSewageFromStatePrisonForCoronavirus

The detection of UK variant at Warren WWTP was very helpful and timely to the Mayor and county health department to emphasize and reinforce the safety measures required to protect lives.

Mayor James Fouts said the presence of the B117 COVID strain in Warren's wastewater shows residents must continue to be diligent.

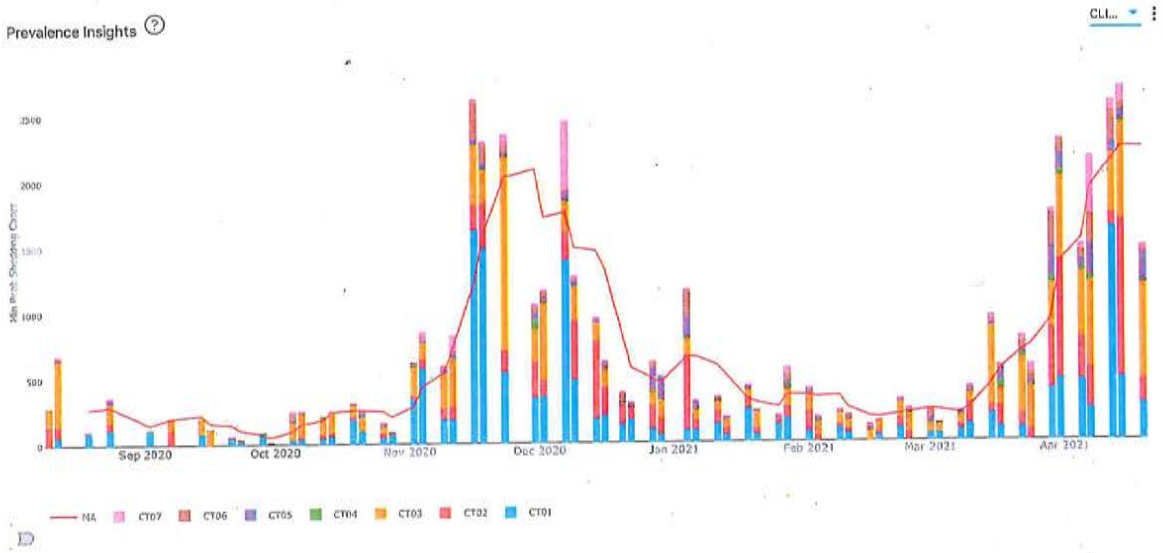
"Warren residents can't let their guard down," said Fouts. "We must continue with social distancing, masking, and avoiding large social gatherings."

"At this time, COVID-19 wastewater sampling is a promising surveillance tool for local health departments for detection in our community. The detection of the B.1.1.7 variant, also known as the United Kingdom variant, is a good reminder to remain vigilant and for all of us to practice the proven strategies in the fight against COVID-19 -- wearing a facemask, social distancing when able, washing our hands, and getting vaccinated when we're eligible," Cox said.

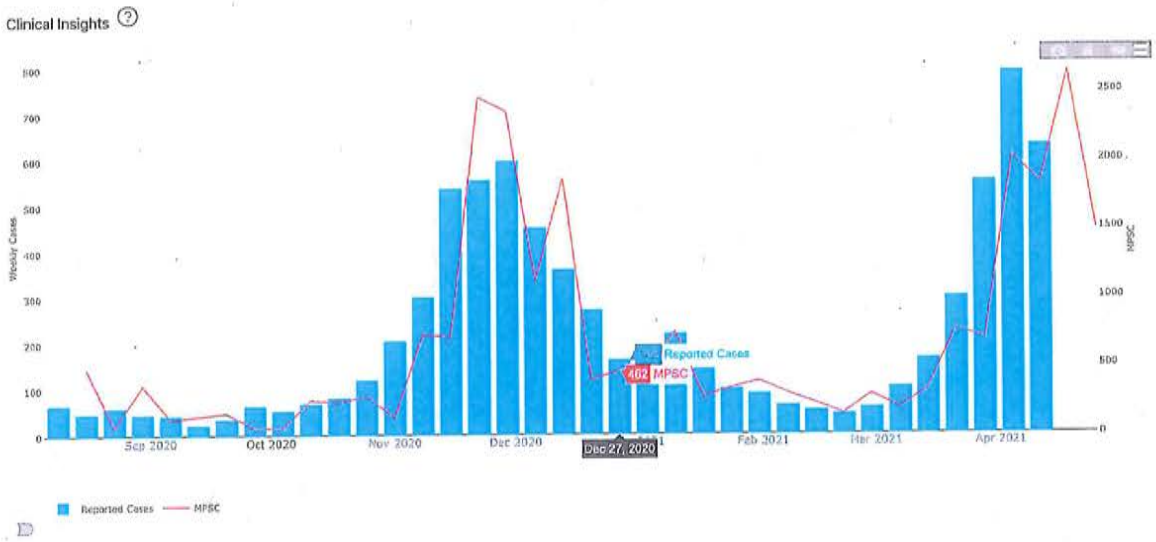
Bryan Clor, Division Head of Wastewater in Warren, said he shares testing results with the Macomb County Health Department and as of last week, with the State of Michigan's health department. The speed with which sample results can be analyzed can show the presence of COVID several days before people experience symptoms or an outbreak occurs.

Sewage surveillance insights and actionable information from sewer shed monitoring at Clinton Township has provided great insights and understanding of spread of COVID-19 within the community as well over various surges. See below some insights generated

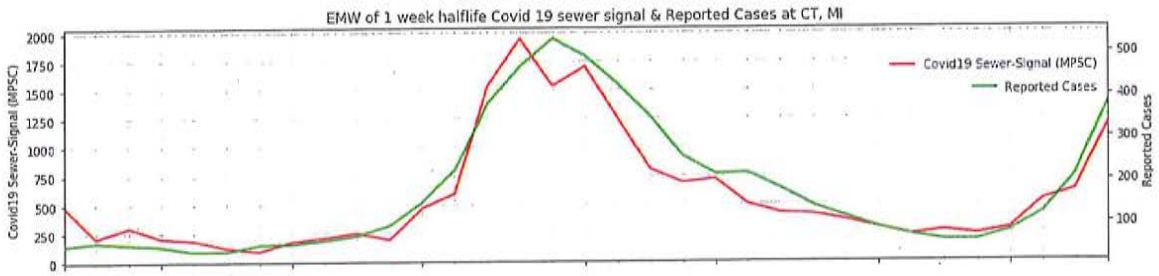
Rising Signal: Neighborhood Covid-19 underground signal on rise, grown 10X since mid-February 2021



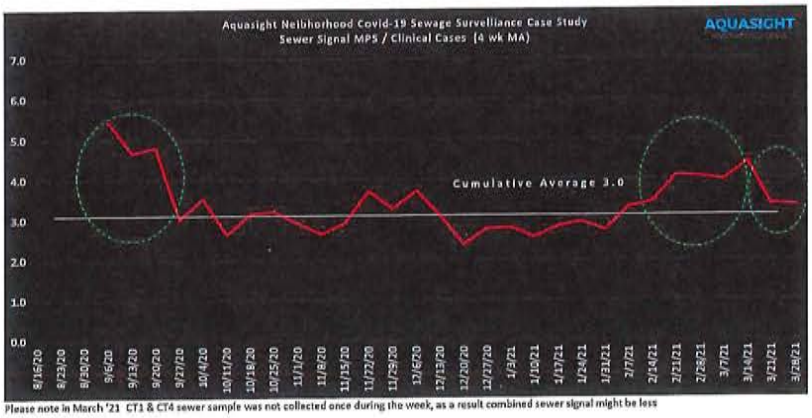
Trend Alignment: Over the ground case rise trajectory align with underground sewer signal



Early Warning: Underground Covid-19 sewer signal shifted up to a week in advance to rising cases

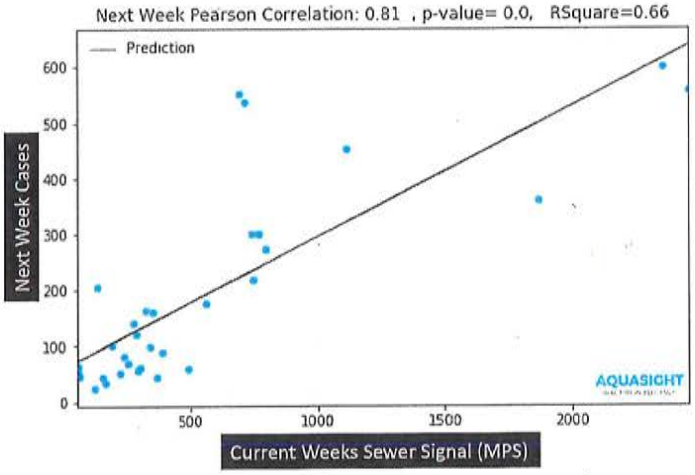


Unexplained and unaccounted sewer signal trending is tracked to qualify actions required



Please note in March '21 CT1 & CT4 sewer sample was not collected once during the week, as a result combined sewer signal might be less

Predictive Power: Next week clinical cases can be estimated based on current week sewer signal and **are** *statistically correlated*



Category	Jun-21	Jul-21	Aug-21	Sep-21	Oct-21 to Sept-22	Oct -22 to Jul 2023
Project Management, Set Up New Sites, Planning and Day to Day Program Execution, LHD Integration, Site Meta Data	$ 13,500	$ 13,500	$ 13,500	$ 13,500	$ 162,000	$ 90,000
Site Review, Sampling Infrastructure Design & Installation, Flow Testing and Optimization	$ 46,500					
Weekly Sampling Kits, Sample Pick Up and Drop Off Logistics, Shipment & Delivery via UPS, Chain of Custody, Schedule Management	$ 22,430	$ 22,430	$ 28,038	$ 22,430	$ 251,600	$ 154,155
Lab Testing Kits, Variant Analysis, ddPCR Data Quality Checks, System & Data Management	$ 60,800	$ 60,800	$ 76,000	$ 60,800	$ 646,000	$ 326,800
Sewage Surveillance Analytics & Reporting, Surveillance System, Notification and Communication, Clinical Case Data and Correlations	$ 22,800	$ 22,800	$ 28,500	$ 22,800	$ 242,250	$ 122,550

Contractor Total	$ 166,030	$ 119,530	$ 146,038	$ 119,530	$ 1,301,850	$ 693,505	$ 2,546,483
MCPWO Costs	$ 8,302	$ 5,977	$ 7,302	$ 5,977	$ 65,093	$ 34,675	$ 127,324

Total Project Cost	$ 2,673,807

Funding Source	Apportionment	Manager	Vendor	Amount	Invoice Detail	Project Summary	Project Balance
Macomb Interceptor Drain	Chapter 20 Chesterfield – 7.2499% Clinton – 21.2506% Fraser – 4.0512% Harrison – 6.4207% Lenox – 1.0638% Macomb – 13.9606% New Haven – .8226% Shelby – 9.9057% Sterling Heights – 30.9081% Utica – 1.5918% Washington – 2.7751%						
		Downing	Anderson, Eckstein & Westrick	$ 6,883.50	Invoice #130906 - 4.22.21	2016 Recovery Shaft Warranty	$ 30.30
		Downing	Anderson, Eckstein & Westrick	$ 6,550.70	Invoice #130428 - 3.23.21	Dropshaft & Connecting Sewer Rehab	$ 31,529.40
		Downing	Anderson, Eckstein & Westrick	$ 13,061.50	Invoice #130907 - 4.22.21	Dropshaft & Connecting Sewer Rehab	$ 18,467.90
		Astorino	Anderson, Eckstein & Westrick	$ 1,566.15	Invoice #130909 - 4.23.21	Engineering Oversight - Phase 2 Grouting	$ 223,499.35
		Manning	County of Macomb	$ 463,424.69	Invoice #AR210129 - 2.8.21	Personnel/Operating Expenses 4th Quarter 2020	
		Astorino	Department of Roads	$ 523.15	Invoice #301801 - 3.16.21	Monthly Fuel through 2.28.21	
		Astorino	Doetsch	$ 68,542.05	Invoice #71420 - 10.28.20	Phase 2 Grouting - 10.12.20 - 10.16.20	$ 1,466,449.05
		Astorino	Doetsch	$ 136,548.50	Invoice #71584 - 3.31.21	Phase 2 Grouting through 3.10.21	$ 1,329,900.55
		Astorino	Doetsch	$ 130,011.95	Invoice #71595 - 4.28.21	Phase 2 Grouting through 4.24.21	$ 1,199,888.60
		Astorino	Fishbeck	$ 7,585.14	Invoice #400284 - 4.21.21	Wastewater Master Plan through 4.16.21	$ 431,742.31
		Astorino	Fishbeck	$ 1,875.00	Invoice #399622 - 3.24.21	GLWA Assistance through 3.19.21	$ 17,014.37
		Astorino	Fishbeck	$ 10,304.00	Invoice #399624 - 3.24.21	CS13 Electrical Design - Segment 6	$ 65,956.88
		Downing	FK Engineering Associates	$ 11,267.50	Invoice #20-058-010 - 3.18.21	Segment 6 Rehabilitation - 2.14.21 - 3.13.21	$ 25.75
		Downing	FK Engineering Associates	$ 130,732.47	Invoice #20-152-005 - 4.15.21	Romeo Arm Lining - Segment 5 - CCA	$ 1,984,107.19
		Baker	KHVPF PLC	$ 607.50	Invoice #46428 - 4.1.21	General Matters - LOTO	
		Manning	Macomb County Treasurer	$ 1,196.00	Invoice #34883 - 3.12.21	Printing MIDD Report	
		Astorino	Motor City Electric Technologies	$ 680.00	Invoice #93570 - 3.31.21	Adding Logic to Clinton/Macomb Interface Panel	
		Downing	Nickel & Saph, Inc.	$ 185,797.22	Invoice #21144 - 4.13.21	Insurance Renewal - 4.23.21 - 4.26.22	
		Downing	Oscar Renda Contracting	$ 469,200.00	Invoice #WO19024 Est #7 - 4.2.21	Segment 5 Lining through 3.31.21	$ 22,656,898.33
		Downing	Oscar Renda Contracting	$ 397,200.00	Invoice #WO19024 Est #8 - 5.1.21	Segment 5 Lining through 4.30.21	$ 22,215,565.00
		Astorino	Tetra Tech, Inc.	$ 21,137.50	Invoice #51722771 - 4.14.21	Odor & Corrosion through 4.9.21	$ 777,812.50
		Astorino	Weiss Construction	$ 2,205.00	Invoice #WO18351 Est #1 - 4.28.21	Meter Facility Rehabilitation	$ 854,954.00
Biofilter		Astorino	De-Cal, Inc.	$ 556.80	Invoice #WO90021085-1 - 4.21.21	Preventative Maintenance - Blowers	
CPS		Astorino	De-Cal, Inc.	$ 1,917.40	Invoice #WO90021091-1 - 4.21.21	Preventative Maintenance - Blowers	
		Astorino	De-Cal, Inc.	$ 710.39	Invoice #WO9210505 - 4.23.21	Lift Rental for HVAC Maintenance	
		Astorino	De-Cal, Inc.	$ 1,119.30	Invoice #WO9210436 - 4.16.21	Hose Reel Install	
		Astorino	DTE Energy	$ 25,921.21	Invoice #RFP2J-DHYMR - 4.4.21	Monthly Electric - 3.2.21 - 4.4.21	
		Astorino	Kennedy Industries	$ 3,100.00	Invoice #623961 - 3.12.21	Pump Preventative Maintenance	
CS-3		Astorino	HESCO	$ 7,110.00	Invoice #202112857 - 4.26.21	Gate Preventative Maintenance	

Funding Source	Apportionment	Manager	Vendor	Amount	Invoice Detail	Project Summary	Project Balance
15 Mile		Downing	TBM Property Management	$ 750.00	Invoice #550 - 4.2.21	Pipe & Material Storage January 2021 - March 2021	
Meters		Astorino	Aquasight	$ 64,086.00	Invoice #000632 - 4.12.21	Data Review Platform Service	$ 24,086.00
NGI		Astorino	DTE Energy	$ 1,143.22	Invoice #RFL5G-QM7S0 - 4.1.21	Monthly Electric - 3.3.21. - 3.31.21	
		Astorino	Fishbeck	$ 1,241.00	Invoice #399556 - 3.24.21	Inspection Program	$ 259,029.00
		Astorino	National Industrial Maintenance	$ 1,100.00	Invoice #39916 - 3.25.21	Jet Vac Basket Cleanout - Concordia	
		Astorino	Taylor Made Fence	$ 750.00	Invoice #54010 - 3.20.21	Fence Repairs	
OMID		Downing	Oakland County	$ 4,257,665.09	Invoice #SDS0007705 -April - 5.4.21	Monthly Utilities - April 2021	
			Total	$ 6,434,069.93			

Budget to Actual
MIDDD
As of Apr 30, 2021 = 83%

DESCRIPTION	2021 FINAL BUDGET	ENCUMBERED	ACTUAL	REMAINING BUDGET	PCT UTILIZED
REVENUE ACCOUNTS					
GLWA-OMID	47,262,993		39,391,816	7,871,178	83.3%
OMID O&M	3,828,987		3,190,823	638,165	83.3%
Settlement	100,000		12,500,000	(12,400,000)	12500.0%
EGLE Testing Grant	-		366,128	-	0.0%
SRF 5659-03			2,505,992	-	9.6%
Reimbursements	225,000		126,594	98,406	56.3%
PY Revenue-Fund Balance	8,388,627			8,388,627	0.0%
Washington Twp Meter Project	47,475			47,475	0.0%
Reimb-Local Communities	13,548,089		10,161,067	3,387,022	75.0%
Interest	250,000		38,637	211,363	15.5%
Total Revenue Accounts	73,651,171	-	68,281,056	8,242,235	92.7%
EXPENSE ACCOUNTS					
GLWA-OMID	47,262,993		39,391,816	7,871,178	83.3%
OMID O&M	3,828,987		3,190,823	638,165	83.3%
Public Works Wastewater Disposal Division	1,942,127		764,147	1,177,980	39.3%
Office Operations/Insurance	309,925		251,141	58,784	81.0%
SCADA	268,889		34,411	234,478	12.8%
Engineering					
Meter Dye Testing 2 year contract new this year	100,000		25,300	74,700	25.3%
Data Review-Aquasight	250,000		157,076	92,924	62.8%
Replenish reserve from CPS refunding	618,680			618,680	0.0%
Design Odor and Corrosion	750,000		24,558	725,442	3.3%
Construction Project for Odor and Control	1,000,000			1,000,000	0.0%
SY-S-1,SY-S-2, WA-S-1 Construction Admin	250,000		44,354	205,646	17.7%
FKE Rehab analysis phase 2	84,000		33,500	50,500	39.9%
Seg 5 Construction[1]	1,150,000		3,255,658	(2,105,658)	283.1%
Seg 5 Lining SRF($26 Million)	-		2,505,992	-	9.6%
Phase II Grouting	3,825,000		1,196,625	2,628,375	31.3%
GLWA Assistance	40,000		10,575	29,425	26.4%
Drop Shaft	-		1,372,179	(1,372,179)	100.0%
As Needed FTCH	75,000		26,912	48,088	35.9%
As Needed FK Engineering	75,000		6,898	68,102	9.2%
As Needed Wade Trim	75,000		5,346	69,654	7.1%
As Needed Metco	125,000		14,879	110,121	11.9%
As Needed Applied Science	25,000			25,000	0.0%
As Needed Odor and Corrosion	75,000		53,366	21,634	71.2%
Seg 5 Engineering Design[1]	374,557		426,078	(51,521)	113.8%
Contribution to Segment 6/Grouting	1,460,000		811,975	638,025	56.0%
15 Mile Inter Design East of Garfield (Segment 6)/Const Admin	1,500,000		382,046	1,117,954	25.5%
SY-S-1 & SY-S-2 Meter Design/Rehab	1,134,070			1,134,070	0.0%
Level Sensors/Pressure/H2S-Meters	250,000			250,000	0.0%
Wastewater Master Plan/Contract Capacity	400,000		64,026	335,974	16.0%
EGLE Testing Grant	-		330,304	-	0.0%
Washington Township meter	500,000			500,000	0.0%
Legal Services	250,000		21,925	228,075	8.8%
Clintondale PS O&M	639,500		193,369	446,131	30.2%
NGI O&M	230,000		84,395	145,605	36.7%
Meters O&M	253,470		186,947	66,523	73.8%
CS-3 O&M	226,000			226,000	0.0%
Biofilter O&M	22,500		9,761	12,739	43.4%
Contribution Life Cycle Reserve	171,700			171,700	0.0%
Interceptor O&M	1,900,000		11,653	1,888,347	0.6%
Stormwater Pump Stations	234,250		195,208	39,042	83.3%
Sewage Disposal Charges - Mt. Clemens	200,000		124,074	75,926	62.0%
Debt Service - Revenue Bonds	1,784,523		1,487,103	297,421	83.3%
Total Expense Accounts	73,651,171	-	56,694,419	19,793,048	77.0%

	O&M Balance 6/30/2020	O&M	Total 4/30/2021
Cash - Operating	24,226,346	11,586,636	35,812,982
Accounts Receivable			0
Assets			0
Liabilities			0
Revenues		68,281,056	68,281,056
Expenditures		56,694,419	56,694,419
			0
Equity*	24,226,346		35,812,982

Detail of 2020 Equity*

Projected reserve at 6/30/2020	6,818,887
Projected Engineering Reserve	12,920,000
Projected Sinkhole Surplus	3,656,059
Life Cycle Reserve	831,400

Note
1) Using proceeds from lawsuit settlement to fund Segment 5 construction and engineering