

INSPECTION REPORT

Inspection Date:	08/25/2022	Announced: Yes			
Time:	Entry: 08:35 AM (ET)	Exit: 02:24 PM (ET)			
Media:	Water				
Statute(s)/Program(s):	Clean Water Act, NPDES, WWTP				
Type of inspection:	CEI - Compliance Evaluation Inspection				
Access:	Granted				
Permittee Name:	SAGINAW CHIPPEWA INDIAN TRIBE OF MICHIGAN				
Facility or Site Name:	SAGANING WWTP				
Facility/Site Physical Address:	2500 EAST WORTH ROAD				
(City, state, zip code)	STANDISH, MI 48658				
County/Parish:	ARENAC				
Facility GPS Coordinates:	43.92504, -83.90606				
Facility/Site Identifier:	110039409985				
Permit Number:	MI0058582				
Persons Participating in Inspection:					
Title	Name	Phone	Email	Present at Opening Conf.	Present at Closing Conf.
Lead Inspector	Dean Maraldo	3123532098	Maraldo.Dean@epa.gov	Yes	Yes
Inspector	Jake Berger	(312) 353-8024	Berger.Jake@epa.gov	Yes	Yes
Operator	Cody Berk			No	No
Operator	Stacy Ancel		sancel@sagchip.org	No	No
Water and Wastewater Manager	Jonas Wilcox	(989) 775-5990	jwilcox@sagchip.org	Yes	Yes
Lead Inspector:					
Dean Maraldo	[Signature]	DINO MARALDO Digitally signed by DINO MARALDO Date: 2022.08.29 16:47:34 -05'00'			
	REGION 5	Maraldo.Dean@epa.gov		(312) 353-2098	
Supervisor Review:					
Ryan Bahr	[Signature]	Bahr, Ryan Digitally signed by Bahr, Ryan Date: 2022.09.01 13:06:50 -05'00'			
	REGION 5	bahr.ryan@epa.gov			

SECTION I – INTRODUCTION**Site Entry and Inspection Objectives**

I, Region 5 Lead Inspector, Dean Maraldo, arrived at the SAGANING WWTP (the “Site” or “Facility”), located at 2500 EAST WORTH ROAD, at 08:35 AM (ET) on 08/25/2022 for an announced inspection. REGION 5 inspector Jake Berger joined me for the inspection and we both presented our credentials to the Water and Wastewater Manager Jonas Wilcox (“Manager”) and informed him that this was a REGION 5 inspection to determine compliance with the Clean Water Act (CWA) and the National Pollutant Discharge Elimination System (NPDES) permit program. The inspection was conducted under the authority of the Federal CWA (Section 308). The table above identifies the attendees that participated in the inspection. This report is based on information supplied by Facility representatives, observations made by the Region 5 inspectors, and records and reports maintained by the permittee and the Region 5 inspectors, including: direct observations made by the Region 5 inspectors, photographs taken by Region 5 inspectors, physical evidence collected by the Region 5 inspectors, verbal or written statements made by or information supplied by Facility representatives (the permittee) during or subsequent to the on-site inspection, and materials, processes, data, photographs, or documents shown, demonstrated, or submitted to the Region 5 inspectors by Facility representatives during or subsequent to the on - site Inspection. In addition, information gathered prior to or subsequent to the inspection from a review of USEPA, State, and public records may be included in this report.

After opening introductions, we went over the inspection plan for the day. I asked if there were any questions. The Manager had no questions.

Facility/Site Description

I began by asking about the Facility information provided in the latest NPDES permit. The Manager confirmed the following (Manager responses are in italics):

- There are three influent pumps that send the water to a 2mm fine screen. *Correct*
- an automatic sampler is located in between the pumps and drum screen. *Correct*
- Wastewater is then gravity fed into one of two membrane bioreactor (MBR) units. *Correct. Collection system is all gravity.*
- The water is then pumped through the three chambers located in the MBR unit where Aluminum Sulfate is added for phosphorus removal. *Correct.*
- Mixed liquor is then pumped into the filter unit located at the head of the MBR where it is filtered out at approximately 75 gallons per minute. *Correct. (50-75 gpm)*
- Treated water then flows through a UV disinfection unit where an automatic sampler is located. *Correct.*
- Water can be diverted into ponds around the building and/or has the option of discharging through Outfall 001 (Lat: 43.921478; Long: -83.906254) to an unnamed tributary to Saginaw Bay of Lake Huron. *Correct.*
- The plant has a design flow of 0.4 million gallons per day (mgd). At this time, the plant only processes approximately .025 mgd with an average of 1500 gallons of sludge wasted. *Now up to about 0.058 mgd.*
- The sludge is wasted from the filter area of the MBR with storage tanks located outside. *The sludge is allowed to settle and the decant is brought back into the headworks. We try to decant as best as possible, return to head of the plant influent wet well.*
- The sludge is ultimately taken to the Saginaw Chippewa Indian Tribe of Michigan's Isabella Reservation WWTP for treatment followed by land application. *Correct, but currently looking to haul to City of Bay City.*
- Any lift stations? *One lift station at the head of the plant.*
- Is a copy of the current permit onsite? *Yes.*

Facility/Site Information

Responses below provided by the Manager.

Responsible official	Jonas Wilcox
WWTP Design Capacity & Average Daily Flow	Max 0.4 mgd, avg 0.05-0.06 mgd since hotel added 2019
WWTP Approx. # of residents served	Casino, campground, tribal center, laundry warehouse, no residential
Contributing (or shared) Jurisdictions	No
Outfalls: (and do the numbers, locations, and receiving waters match the permit?)	001, unnamed tributary, ("private ditch") to the bay.
Operation schedule (days of operation, # shifts/day, # operators/shift, coverage overnight, weekends & emergencies), and is staffing sufficient for proper operation?	7am-5pm, 5 days/week; weekends one operator 8am-1pm; one certified wastewater operator (Jonas Wilcox)
Do you use in-house or contract out for laboratory analyses? (including for metals or WET testing?)	In-house TSS , BOD, ammonia, Phosphorus, <i>E.coli</i> . mercury and any additional metals sent to outside lab
Do you accept waste from septage haulers? If so, what problems have you experienced?	No
Is there currently any portion of the treatment train that is non-operational?	One composite effluent composite sampler is down. They have one composite sampler for each of the two MBR units
Are there any plans for renovation or additional equipment to allow for increased wastewater flow?	Phase 1 - October will add bypass to wet well for cleaning; Phase 2 - add another MBR and new EQ basin, add mixers in sludge tank, possible sludge treatment. Phase 2 estimated for 2024
Any CBI concerns?	Manager not aware of any CBI concerns

Inspection Units

Unit/Area	Description
DMR Review	Interview questions and observations
Other Permit Reports	
Flow Measurement	
Self Monitoring	
Operations and Maintenance	
Sanitary Sewer Overflows	
Records Review	
Wastewater Treatment Plant Components	Physical inspection
Laboratory	
Headworks	
MBR	
Ultraviolet ("UV") Disinfection	
Outfall	
Chemical Room	
Generator	
SCADA	

SECTION II – OBSERVATIONS

Observations may not be in sequential order.

Unit: Interview/DMR Review	Contains CBI: No
Observation #: DM1-OB-001	Date: 08/25/2022
According to NetDMR, no monthly discharge monitoring reports (“DMRs”) have been submitted to EPA for the Saganing WWTP since September 2020. On May 18, I sent an email to the Manager asking to please submit all late DMRs as soon as possible. The Manager said he will try to submit the overdue DMRs by the end of the week after the inspection. In lieu of DMRs, I asked for copies of the last six months of sampling reports. The Manager provided copies of monthly sampling reports for January thru July 2022.	
Unit: Interview/Other Permit Reports	Contains CBI: No
Observation #: DM1-OB-002	Date: 08/25/2022
We reviewed non-DMR Permit reporting. The Manager provided the responses below. 1) Pollutant Minimization Program for Mercury Status Report due by January 31, each year (Part I.A.4). Status: The Manager was not aware of submitting the Mercury Status Report by January 31, 2022. 2) Operation and Maintenance Plan Report due by January 31, each year (Part I.A.7.b). Status: The Manager was not aware of submitting the O&M Report by January 31, 2022. 3) Sewage Sludge Removal Report by January 31, each year (Part I.C). Status: The Manager was not aware of submitting Sewage Sludge Removal Report by January 31, 2022. 4) As a condition of this permit, the permittee shall monitor the discharge from monitoring point 001 for the constituents listed below. Testing shall be conducted in September 2020, March 2021, May 2022 and July 2023. Status: The Manager said they probably haven't collected additional samples per this requirement. Total Kjeldahl Nitrogen (TKN) Total Dissolved Solids (TDS) Nitrate plus Nitrite Nitrogen Oil and Grease The Manager confirmed that records and reports are maintained for at least 3 years.	
Unit: Interview/Flow Measurement	Contains CBI: No
Observation #: DM1-OB-003	Date: 08/25/2022
The Manager answered the following flow measurement questions (responses in italics): 1) How do you measure daily influent and effluent flow (Permit Part I.1 and I.2)? <i>Influent flow is measured by a mag meter; effluent flow is measured by a mag meter after each of the two MBR units.</i> 2) Are influent and effluent flow measuring devices professionally calibrated, at least once per year? (40CFR122.41(e). <i>Yes, they are calibrated every year. However, the last calibration was at the end of 2020, due to COVID. The Manager hopes to reschedule calibration for October 2022.</i>	

3) Do facility personnel check the calibration of the flow measuring device(s), between the annual professional calibrations, at least three times per year? (Recommendation only) If no, explain frequency. *No.*

Unit: Interview/Self Monitoring

Contains CBI: No

Observation #: DM1-OB-004

Date: 08/25/2022

Unless noted otherwise, the Manager provided the responses (in italics) to the self-monitoring questions below:

Are the influent and effluent sampling locations as specified in permit representative of the waste stream? *Influent samples are collected at the head of plant at the pump control room. Effluent samples are collected after each of the MBR units. One autosampler (MBR #2) is out of service (approximately 1.5 years). Currently, for compliance sampling they collect composite samples from MBR #1 and grab samples from MBR #2. Stacy Ancel added that for DMR reporting for effluent parameters requiring 24-composite samples, they use only composite samples from MBR #1, which has the only working composite sampler. Required effluent grab samples are collected from one MBR train or the other on any given day. They usually alternate.*

Conduct sampling and analysis in frequency specified by permit? *Yes.*

Are the correct effluent sample types (grab or composite) taken? *Not currently, they cannot collect composite samples from MBR #2.*

If composite samples are required, are they flow proportioned (note permit allows time or volume flow proportioning)? *flow proportioned.*

Are composite samples cooled to <4°C to properly preserve them during the compositing period? *Composite samplers are refrigerated.*

a) If the composite sample is cooled with ice or gel packs, do you measure the final composite sample temperature to make sure that the cooling is sufficient? *Yes.*

b) Do you record these results? *The facility does not keep logs of temperatures within each composite sampler.*

If a refrigerator is used for preserving composite samples, is there a thermometer in the refrigerator? *Yes, and they maintain a temperature log.*

Are all grab samples cooled with ice, gel packs or refrigerated to <6° C from the time of collection until analysis including shipping time, if applicable? *E.coli - 100ml sterile container, sample collected right from container. Samples are processed immediately so no need for cooling.*

Are all samples which require preservation properly preserved? *Most samples analyzed immediately, so no need. Unless they are samples sent out to lab, then yes.*

Are pH and DO readings collected within 15 minutes of sample collection and is this documented? *Samples are collected and analyzed in the on-site laboratory within 15 minutes.*

I commented about the consistent record of 0 *E.coli*/100ml for effluent samples. Stacy Ancel said they also consistently measure "0" *E.coli*/100ml before UV disinfection. I asked if they could collect an *E.coli* sample pre-MBR, just to confirm that their *E.coli* laboratory analysis procedures are able to detect *E.coli*. Stacy Ancel agreed to collect the sample and provide the results.

Unit: Interview/Operations and Maintenance	Contains CBI: No
Observation #: DM1-OB-005	Date: 08/25/2022
The Manager answered (in italics) the following O&M-related questions: Maintenance record system exists and include: a. As-built drawings - <i>yes</i> b. Shop drawings -<i>yes</i> c. Construction specifications- <i>yes</i> d. Maintenance history- daily log book. <i>No other maintenance tracking.</i> e. Repair history- also daily log book. <i>Each MBR has a maintenance record.</i> f. Records of equipment repair and timely return to service - <i>no</i> g. instruction files for operation and maintenance of each item of major equipment. <i>Yes.</i> h. Operation and maintenance manual is available? <i>Other than manufacturers manuals, they are working on a comprehensive O&M plan.</i> Does the facility have an adequate, qualified operating staff to carry out the operations at the facility? <i>The Manager is the only certified wastewater operator (Class C&D, Michigan). The two other non-certified operators are trying to work on wastewater certificates. According to the Manager, they could use "2 or 3 more wastewater operators" to help stay on top of maintenance, recordkeeping, and reporting requirements.</i> <i>Operators conduct settleability tests 3x/week, and they need to get back to daily testing. They collect samples from mixed liquor after the MBR bio tank and filters.</i> Any Bypasses over the last three years? <i>No bypasses.</i> Does the wastewater treatment facility have an alarm system for all essential equipment? <i>Yes, they have a Sensaphone application that alerts operators if generator runs, influent is high level, or MBR is high level. Alarm capability will be upgraded with a new SCADA system (approx. 2023).</i> Are alarms sent to qualified personnel who can respond immediately to remedy the problem? <i>Yes, alarm sent in series and to all operators.</i> Does the facility maintain written procedures for responding to emergencies such as power failures, floods, fires, and other natural disasters? <i>Yes, follow an emergency plan.</i> Is a logbook kept which documents all plant activities on a daily basis? <i>Yes.</i> Does the facility maintain an inventory of spare parts, either at the facility or close by, sufficient to keep all of its treatment units operational? <i>Not currently, but working on it.</i> Does the facility have standby power for all treatment units? ((40CFR122.41(e). <i>Yes</i> Is the standby power regularly exercised under load? ((40CFR122.41(e). <i>Yes, monthly. Diesel generator.</i> The Manager provided copies of the MBR Maintenance Procedure Plan, and the Saganing Water and Wastewater Improvements presentation (see Appendix 2, Inspection Documents).	
Document(s)	

1. Pages from Saganing Inspection_Records Received_OM Records.pdf	
Unit: Interview/Sanitary Sewer Overflows	Contains CBI: No
Observation #: DM1-OB-006	Date: 08/25/2022
I asked if there had been any backups or overflows in the sanitary sewer collection system, including pump stations, manholes and piping over the last three years? The Manager said that they have not experienced any backups or overflows in the collection system.	
Unit: Physical Inspection/Laboratory	Contains CBI: No
Observation #: DM1-OB-007	Date: 08/25/2022
We began the physical inspection of the Facility at 12:05 pm ET. We started in the laboratory. Stacy Ancel and Cory Berk represented the Facility to start the lab inspection. The Manager arrived shortly after we began. I asked Stacy Ancel to review the sample analysis procedures for <i>E.coli</i>, BOD, Ammonia, Phosphorus, pH, and TSS. Some observations are provided below: <i>E.coli</i>: I noted that one of the <i>E.coli</i> M-Colibblue 24 sample broths was expired (5/31/2019). Some of the M-Colibblue 24 sample broth packages were still within expiration dates. Facility representatives could not locate the written procedure currently used for <i>E.coli</i> analysis. I noted several instances where "dates received" and "dates opened" were left blank on opened laboratory chemical and standards containers. Before concluding the laboratory review, I asked for copies of the SOPs for Phosphorus and Ammonia-Nitrogen analyses (see Appendix 2, Inspection Documents). I also received copies of a lab equipment list and an analytical methods summary (see Appendix 2, Inspection Documents).	
Document(s): Saganing Inspection_Records Received_Lab SOPs_EquipList_Methods.pdf	
Unit: Physical Inspection/Headworks	Contains CBI: No
Observation #: DM1-OB-008	Date: 08/25/2022
The Manager led the tour of the wastewater plant, along with Cody Berk. We started at the influent wet well (see Photo Log image SAGA0100). The influent wet well has a basket/rag screen at the bottom of the rail (see Photo Log image SAGA0101). The Manager pointed out where the sludge decant flows returned to the influent wet well and noted that they estimate the amount of return flows and subtract from influent flow totals to avoid double counting of flows. We then entered the treatment plant building and stopped in the influent room to observe the influent flow meter (see Photo Log image SAGA0102) and ISCO influent composite sampler. I noted a thermometer in the ISCO sampler (see Photo Log image SAGA0103). Next we entered the fine screen room and observed the twin fine screen units (see Photo Log image SAGA0104). The Manager said the fine screens are working well.	

Photo(s) 1. SAGA0101.JPG 2. SAGA0102.JPG 3. SAGA0103.JPG 4. SAGA0100.JPG 5. SAGA0104.JPG	
Unit: Physical Inspection/MBR	Contains CBI: No
Observation #: DM1-OB-009	Date: 08/25/2022
We observed the twin MBR units from the upstairs balcony (see Photo Log image SAGA0105). The Manager explained that flows go from the fine screens and split to each of the two MBR units, MBR #1 and MBR #2. Each MBR unit has three tanks (aerated anoxic 1, aerated anoxic 2, and aerobic). From the tanks, flows go to the MBR membrane units. Each MBR membrane unit consists of two tanks, each with four racks. Each rack has five filters. So each MBR membrane unit has a total of 40 membrane filters. The inside of one of the tanks is shown in Photo Log image SAGA0106. We walked down to floor level and observed the MBR control panel and screen (see Photo Log image SAGA0107). Last, I observed the composite sampler for MBR #2, which is currently out of service (see Photo Log image SAGA0108). The Manager showed us the port where they are currently collecting grab samples in lieu of composite samples for the MBR #2 treatment train.	
Photo(s) 1. SAGA0106.JPG 2. SAGA0107.JPG 3. SAGA0108.JPG 4. SAGA0105.JPG	
Unit: Physical Inspection/UV	Contains CBI: No
Observation #: DM1-OB-010	Date: 08/25/2022
I observed the ultraviolet light (UV) disinfection units for MBR #1 (see Photo Log image SAGA0109), and MBR #2 (see Photo Log image SAGA0110).	
Photo(s) 1. SAGA0110.JPG 2. SAGA0109.JPG	
Unit: Physical Inspection/Outfall	Contains CBI: No
Observation #: DM1-OB-011	Date: 08/25/2022
After viewing the UV systems, we left the building and headed to final outfall 001. First, we stopped at the manhole used to control the direction of treated flow to the ponds or the final outfall (see Photo Log image SAGA0111). At the time of the inspection, treated flows in the manhole were clear and were directed to the final outfall. We then walked to final outfall 001, where I observed a turbid discharge into the receiving water (see Photo Log image SAGA0112). The Manager attributed the turbidity to muskrat activity within outfall piping.	

He said they will install a screen to keep muskrats from entering the outfall. Before leaving the outfall, I recorded the coordinates 43°55'17"N; 83°54'23"W.

Photo(s)

1. [SAGA0112.JPG](#)
2. [SAGA0111.JPG](#)

Unit: Physical Inspection/Chemical Room**Contains CBI:** No**Observation #:** DM1-OB-012**Date:** 08/25/2022

We returned to the treatment building and viewed the Chemical Room. I observed the areas where MBR cleaning chemical are stored, including the sodium hypochlorite area (see Photo Log image SAGA0113), and 50% citric acid area (see Photo Log image SAGA0114). I also observed the aluminum sulfate storage area (see Photo Log image SAGA0115). Aluminum sulfate is used for phosphorus removal.

I asked about the cleaning schedule for the MBR units. The Manager explained that each MBR is cleaned with chlorine once every two weeks, and with citric acid once a month.

Photo(s)

1. [SAGA0114.JPG](#)
2. [SAGA0115.JPG](#)
3. [SAGA0113.JPG](#)

Unit: Physical Inspection/Generator**Contains CBI:** No**Observation #:** DM1-OB-013**Date:** 08/25/2022

I observed the diesel Caterpillar generator which provides backup power for the Facility (see Photo Log image SAGA0116).

Photo(s)

1. [SAGA0116.JPG](#)

Unit: Physical Inspection/SCADA**Contains CBI:** No**Observation #:** DM1-OB-014**Date:** 08/25/2022

Before concluding the physical inspection we stopped in the office and viewed the wastewater SCADA system display. See Photo Log image SAGA0117 of the SCADA totalizer screen.

We concluded the physical inspection and returned to the conference room to review our notes prior to the closing conference.

Photo(s)

1. [SAGA0117.JPG](#)

SECTION III – RECORDS REVIEW

Record: Laboratory Analysis Reports		AOC: No
Ref #: DM1-RR-001	Reviewed By: Dean Maraldo	Reviewed Date: 08/25/2022
We reviewed Lab Analysis Reports for January - July 2022. No issues were identified. The reports are included in Appendix 2 (Inspection Documents).		
Document(s)		
1. Saganing Inspection_Records Received_Lab Reports.pdf		
Record: Facility Map		AOC: No
Ref #: DM1-RR-002	Reviewed By: Dean Maraldo	Reviewed Date: 08/25/2022
The map below is included in Appendix 2 (Inspection Documents).		
Area Topo Map		
Document(s)		
1. Saganing Inspection_Records Received_Facility Map.pdf		
Record: Other - Wastewater Improvement Plan		AOC: No
Ref #: DM1-RR-003	Reviewed By: Dean Maraldo	Reviewed Date: 08/25/2022
The Wastewater Improvement Plan is included in Appendix 2 (Inspection Documents).		
Document(s)		
1. Saganing Inspection_Records Received_WW Improvement Plan.pdf		
Record: Process Description/Flow Diagram		AOC: No
Ref #: DM1-RR-004	Reviewed By: Dean Maraldo	Reviewed Date: 08/25/2022
The maps and diagrams below are included in Appendix 2 (Inspection Documents).		
- Flow schematic of Saganing WWTP - Saganing District Sanitation Map (2) - Saganing WWTP discharge map - Saganing WWTP Piping Plans (2)		
Document(s)		
1. Saganing Inspection_Records Received_Schematics_flow.pdf		

SECTION IV – SAMPLING ACTIVITIES AND ANALYTICAL RESULTS

No sampling was conducted.

SECTION V - AREAS OF CONCERN

Areas of Concern may not be in sequential order.

The presentation of areas of concern does not constitute a formal compliance determination or violation.

Unit: Interview	Area: DMR Review
DM1-OB-001	
According to NetDMR, and confirmed by the Manager, no monthly discharge monitoring reports have been submitted to EPA for the Saganing WWTP since September 2020.	Citations: Permit Part I.A.6
Unit: Interview	Area: Other Permit Reports
DM1-OB-002	
As a condition of this permit, the permittee shall monitor the discharge from monitoring point 001 for the constituents listed below. Testing shall be conducted in September 2020, March 2021, May 2022 and July 2023. The Manager said they probably haven't collected additional samples per this requirement. Total Kjeldahl Nitrogen (TKN) Total Dissolved Solids (TDS) Nitrate plus Nitrite Nitrogen Oil and Grease	Citations: Permit Part I.A.3.b
The Manager was not aware of submitting a Sewage Sludge Removal Report by January 31, 2022.	Citations: Permit Part I.C
The Manager was not aware of submitting a Mercury Status Report by January 31, 2022.	Citations: Permit Part I.A.1
The Manager was not aware of submitting an Operation and Maintenance Plan Report by January 31, 2022.	Citations: Permit Part I.A.7.b
Unit: Interview	Area: Flow Measurement
DM1-OB-003	
Influent and effluent flow measuring devices are usually professionally calibrated at least once per year. However, the last calibration was at the end of 2020, due to COVID. The Manager hopes to reschedule calibration for October 2022.	Citations: 40 CFR Part 122.41(e)
Unit: Interview	Area: Self Monitoring
DM1-OB-004	
The Facility does not keep logs of temperatures within each composite sampler.	Citations: 40 CFR Part 136

Effluent samples are collected after each of the MBR units. One autosampler (MBR #2) is out of service (approximately 1.5 years). Currently, for compliance sampling they collect composite samples from MBR #1 and grab samples from MBR #2. Stacy Ancel explained that they only use composite samples from MBR #1 for DMR reporting for effluent parameters requiring 24-composite samples.	Citations: Permit Part I.A.1; Permit Part I.A.7
Unit: Interview	Area: Operations and Maintenance
DM1-OB-005	
The Facility does not maintain an inventory of spare parts sufficient to keep all of its treatment units operational.	Citations: 40 CFR Part 122.41(e); Permit Part I.A.7.a.G
The Manager said they could use "2 or 3 more wastewater operators" to help stay on top of maintenance, recordkeeping, and reporting requirements.	Citations: Permit Part I.A.7.a.B
Unit: Physical Inspection	Area: Laboratory
DM1-OB-007	
I noted that one of the <i>E.coli</i> M-Colibblue 24 sample broths was expired (5/31/2019).	Citations: 40 CFR Part 136; Permit Part II.B.1
Facility representatives could not locate the written procedure currently used for <i>E.coli</i> analysis.	Citations: 40 CFR Part 136; Permit Part II.B.1
I noted several instances where "dates received" and "dates opened" were left blank on opened laboratory chemical and standards containers.	Citations: 40 CFR Part 136; Permit Part II.B.1
Unit: Physical Inspection	Area: Outfall
DM1-OB-011	
I observed a turbid discharge from final outfall 001 into the receiving water (see Photo Log image SAGA0112). The Manager attributed the turbidity to muskrat activity within outfall piping.	Citations: Permit Part I.A.1.a

SECTION VI – CLOSING CONFERENCE AND FOLLOW UP

Closing Conference

I held the inspection closing conference with Facility personnel at 02:15 PM (ET) on 08/25/2022. During the closing conference, I discussed the observations and potential Areas of Concern identified during the inspection. Observations and Areas of Concern have not yet been evaluated for a formal compliance determination.

Next, I reviewed records received during the inspection, including:

- 1) Area Topo Map
- 2) Flow schematic of Saganing WWTP
- 3) Saganing District Sanitation Map (2)
- 4) Saganing WWTP discharge map
- 5) Saganing WWTP Piping Plans (2)
- 6) Wastewater Improvement Plan
- 7) Lab Instrument list
- 8) Lab Methods
- 9) MBR O&M Procedures
- 10) Plant influent and effluent sheets - Jan-July 2022
- 11) Saganing Water and Wastewater Improvements Presentation
- 12) Hach SOPs sheets for Nitrogen-ammonia and Phosphorus

Copies of the above records are included in Appendix 2 of this report.

There was one follow-up item. I asked that they collect an *E.coli* sample pre-MBR, just to confirm that their *E.coli* laboratory analysis procedures are able to detect *E.coli*. Stacy Ancel agreed to collect the sample and provide the results.

Before concluding, I asked if there were any questions. The Manager asked if we observed any safety concerns. I replied that we did not observe any safety issues.

I provided a timeframe for completing the inspection report and we concluded the inspection.

Communication Log

No additional information was received by EPA after exiting the Facility on 08/25/2022.

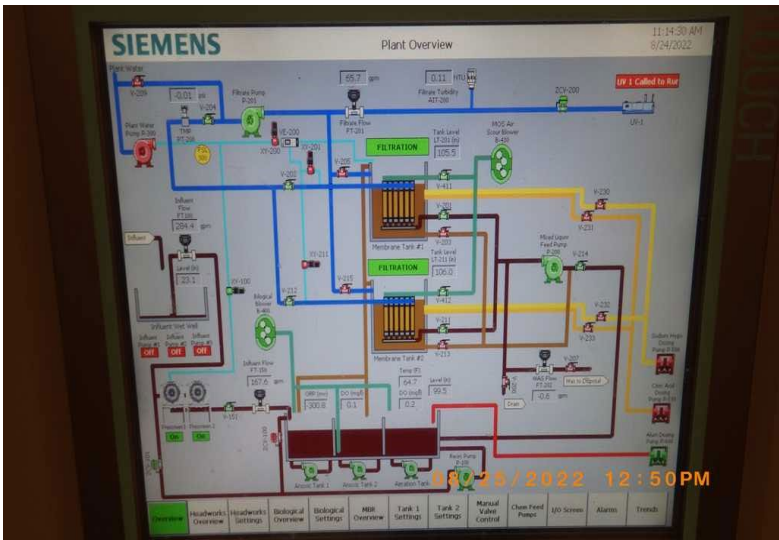
SECTION VII – LIST OF APPENDICES

1. Photo Log
2. Inspection Documents

APPENDIX 1: PHOTOLOG

Influent wet well	
SAGA0100.JPG	
08/25/2022 12:35 PM (ET)	
Dean Maraldo	
Physical Inspection/Headworks	
No CBI	
No PII	
Influent wet well	
SAGA0101.JPG	
08/25/2022 12:35 PM (ET)	
Dean Maraldo	
Physical Inspection/Headworks	
No CBI	
No PII	
Note basket/rag screen at bottom of rails.	
Influent flow meter	
SAGA0102.JPG	
08/25/2022 12:38 PM (ET)	
Dean Maraldo	
Physical Inspection/Headworks	
No CBI	
No PII	

Influent Autosampler (ISCO)	
SAGA0103.JPG	
08/25/2022 12:39 PM (ET)	
Dean Maraldo	
Physical Inspection/Headworks	
No CBI	
No PII	
Note, thermometer located inside unit.	
Twin fine screens	
SAGA0104.JPG	
08/25/2022 12:45 PM (ET)	
Dean Maraldo	
Physical Inspection/Headworks	
No CBI	
No PII	
View of MBR units	
SAGA0105.JPG	
08/25/2022 12:42 PM (ET)	
Dean Maraldo	
Physical Inspection/MBR	
No CBI	
No PII	

View of MBR Tank	 08/25/2022 12:48 PM
SAGA0106.JPG	
08/25/2022 12:48 PM (ET)	
Dean Maraldo	
Physical Inspection/MBR	
No CBI	
No PII	
MBR control screen	 08/25/2022 12:50 PM
SAGA0107.JPG	
08/25/2022 12:50 PM (ET)	
Dean Maraldo	
Physical Inspection/MBR	
No CBI	
No PII	
Effluent Autosampler	 08/25/2022 12:52 PM
SAGA0108.JPG	
08/25/2022 12:52 PM (ET)	
Dean Maraldo	
Physical Inspection/MBR	
No CBI	
No PII	

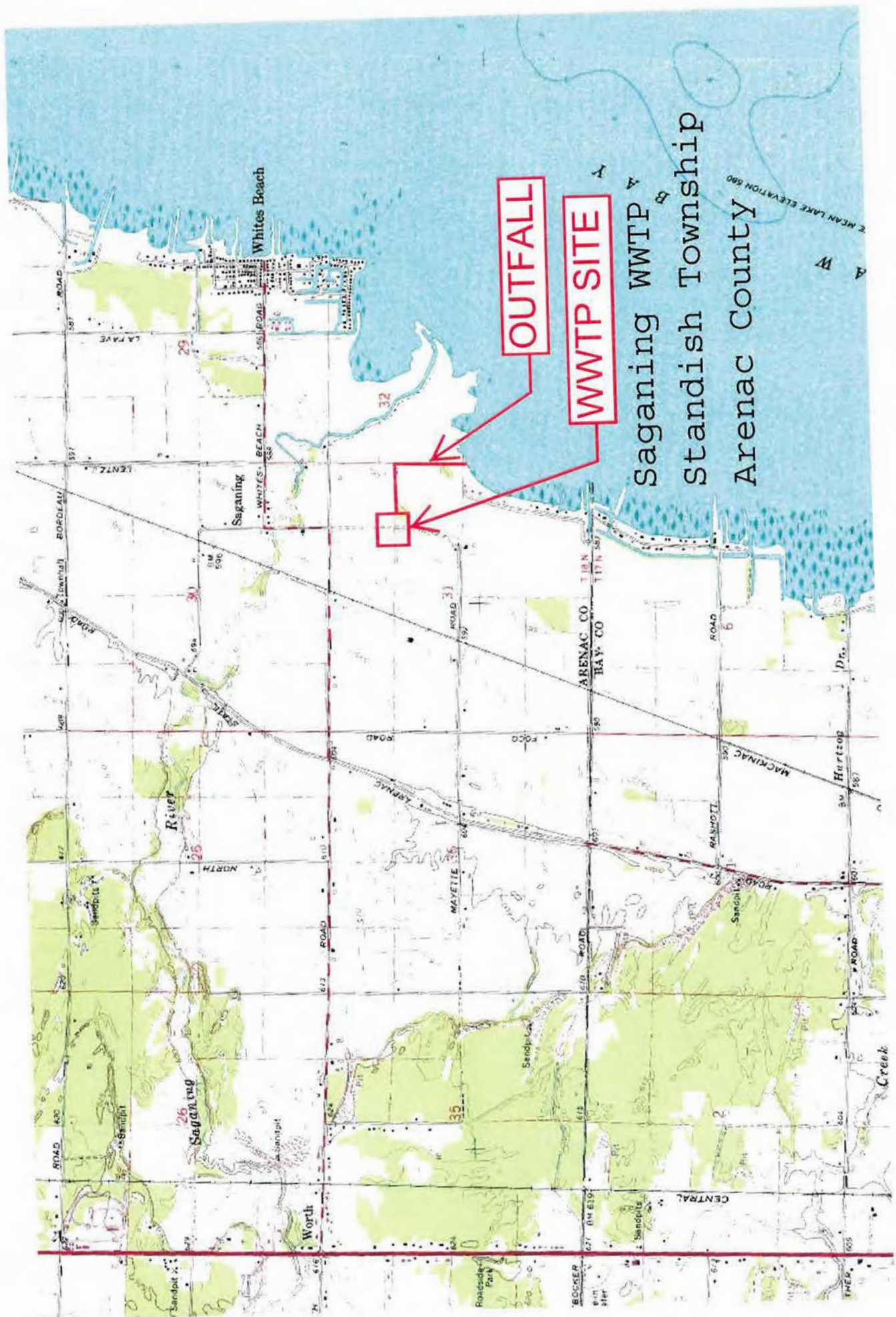
MBR#1 UV system	
SAGA0109.JPG	
08/25/2022 12:54 PM (ET)	
Dean Maraldo	
Physical Inspection/UV	
No CBI	
No PII	
MBR#2 UV system	
SAGA0110.JPG	
08/25/2022 12:56 PM (ET)	
Dean Maraldo	
Physical Inspection/UV	
No CBI	
No PII	
Manhole with access to pond/outfall flow controls	
SAGA0111.JPG	
08/25/2022 12:58 PM (ET)	
Dean Maraldo	
Physical Inspection/Outfall	
No CBI	
No PII	

Final outfall 001	
SAGA0112.JPG	
08/25/2022 1:03 PM (ET)	
Dean Maraldo	
Physical Inspection/Outfall	
No CBI	
No PII	
Note turbid discharge.	
Sodium hypochlorite area	
SAGA0113.JPG	
08/25/2022 1:08 PM (ET)	
Dean Maraldo	
Physical Inspection/Chemical Room	
No CBI	
No PII	
50% citric acid area	
SAGA0114.JPG	
08/25/2022 1:09 PM (ET)	
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Physical Inspection/Chemical Room	
No CBI	
No PII	

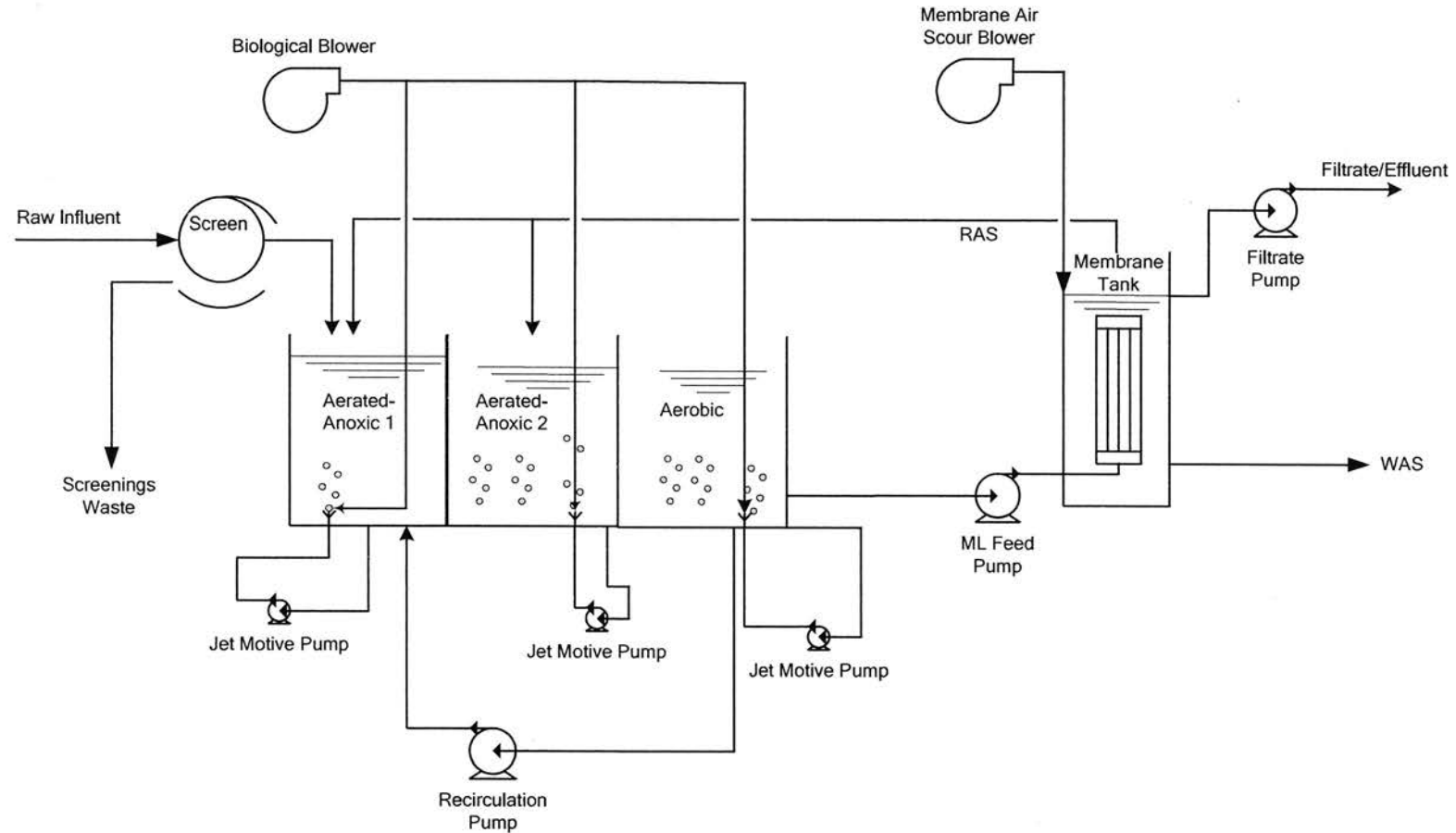
Aluminum sulfate storage area	
SAGA0115.JPG	
08/25/2022 1:09 PM (ET)	
Dean Maraldo	
Physical Inspection/Chemical Room	
No CBI	
No PII	
Facility backup generator (Diesel)	
SAGA0116.JPG	
08/25/2022 1:11 PM (ET)	
Dean Maraldo	
Physical Inspection/Generator	
No CBI	
No PII	
WWTP SCADA Totalizer Screen	
SAGA0117.JPG	
08/25/2022 1:17 PM (ET)	
Dean Maraldo	
Physical Inspection/SCADA	
No CBI	
No PII	

APPENDIX 2: INSPECTION DOCUMENTS (attached below)

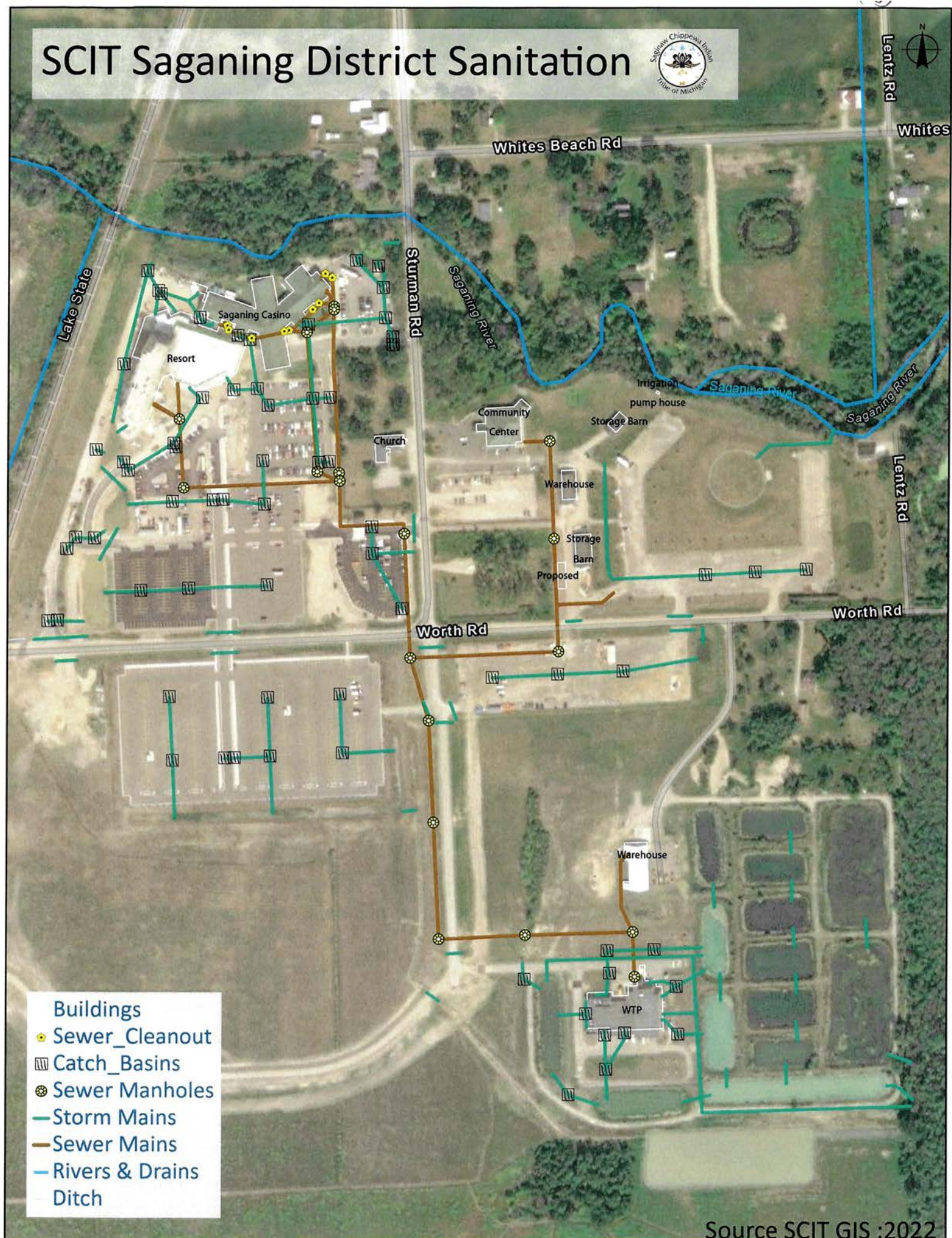
Document Type	Document Name	Contains CBI	Contains PII	Date Received
Process Description/Flow Diagram	Saganing Inspection_Records Received_Schematics_flow.pdf	No	No	08/25/2022
Facility Map	Saganing Inspection_Records Received_Facility Map.pdf	No	No	08/25/2022
Laboratory Analysis Reports	Saganing Inspection_Records Received_Lab Reports.pdf	No	No	08/25/2022
Other - Wastewater Improvement Plan	Saganing Inspection_Records Received_WW Improvement Plan.pdf	No	No	08/25/2022
Facility SOPs	Pages from Saganing Inspection_Records Received_OM Records.pdf	No	No	08/25/2022
Laboratory SOPs	Saganing Inspection_Records Received_LabSOPs_EquipList_Methods.pdf	No	No	08/25/2022



The diagram below depicts the overall flow scheme for the Saganing WWTP:



SCIT Saganing District Sanitation



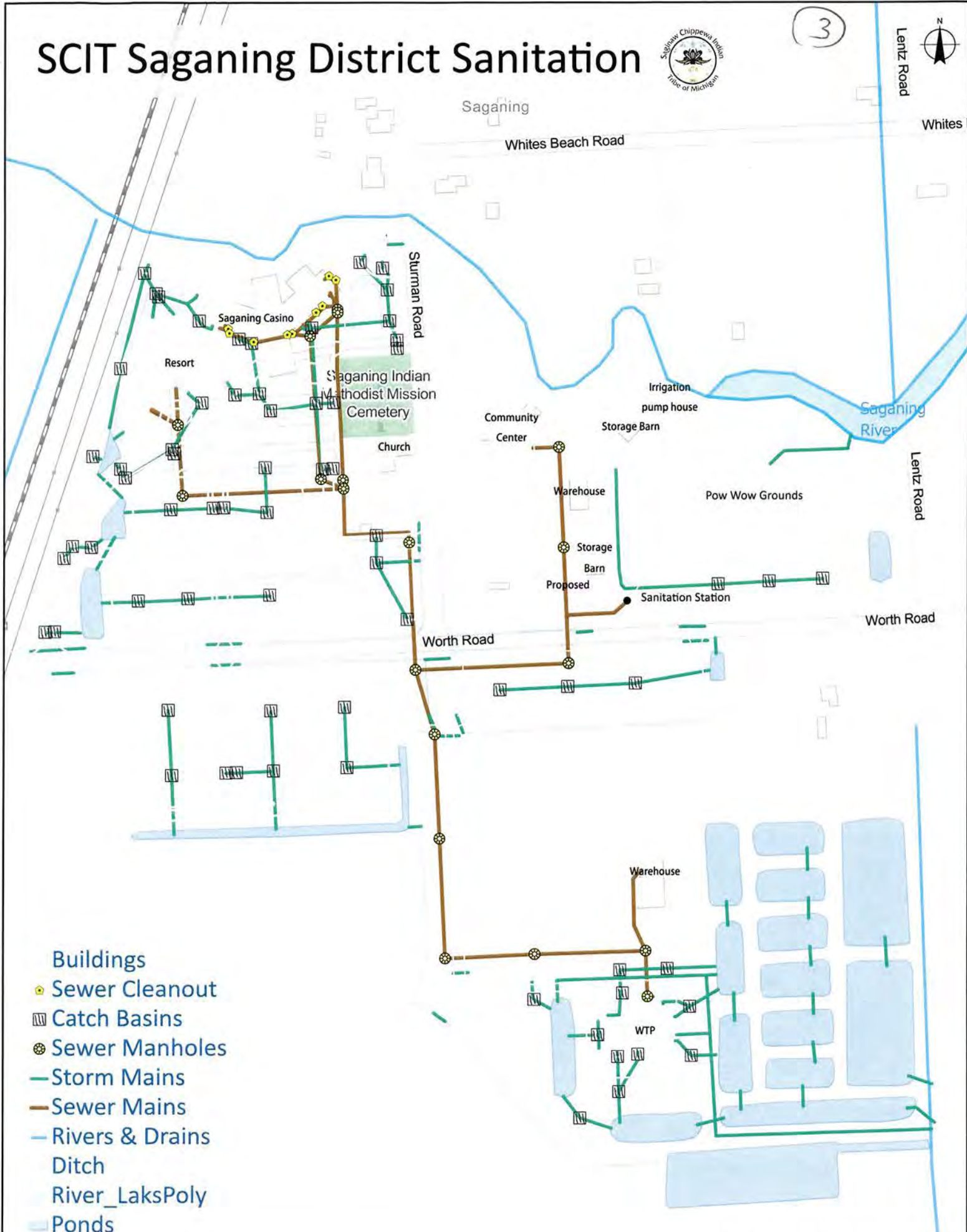
- Buildings
- Sewer_Cleanout
- ▤ Catch_Basins
- Sewer Manholes
- Storm Mains
- Sewer Mains
- Rivers & Drains
- Ditch

Source SCIT GIS :2022

SCIT Saganing District Sanitation



3



- Buildings
- Sewer Cleanout
- ▢ Catch Basins
- Sewer Manholes
- Storm Mains
- Sewer Mains
- Rivers & Drains
- Ditch
- River_LaksPoly
- Ponds

Source SCIT GIS :2022

Saganing Water Treatment Plant Discharge

④ μ

010-1-032-200-005-00

010-1-031-100-025-01

010-1-031-100-025-02

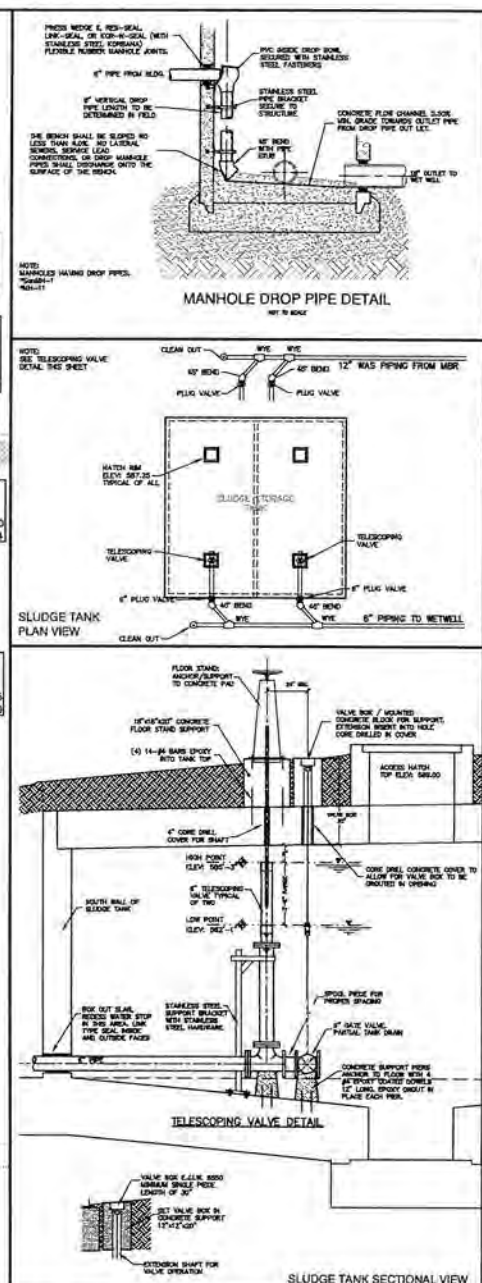
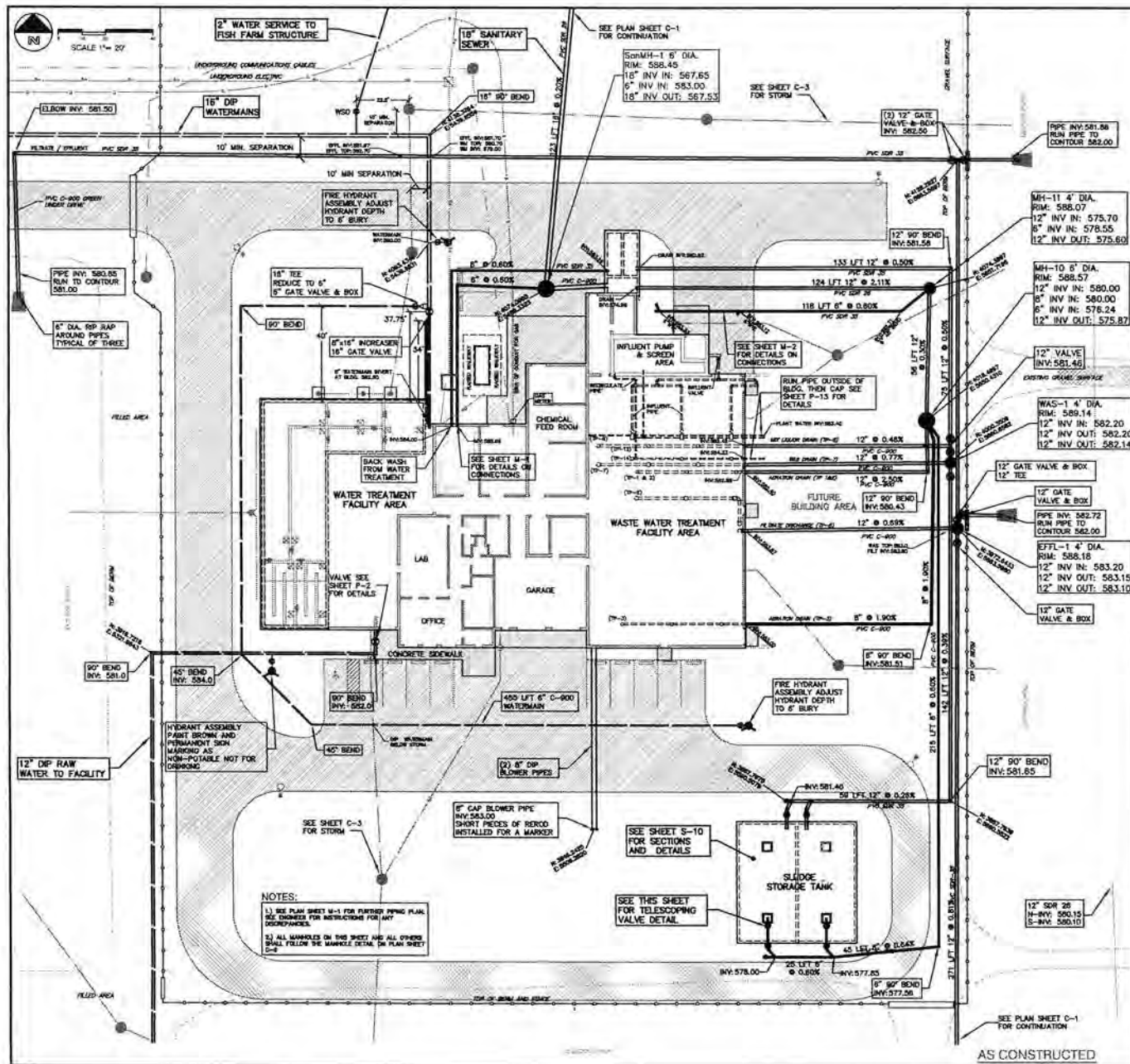
010-1-032-200-005-10

Saginaw Bay

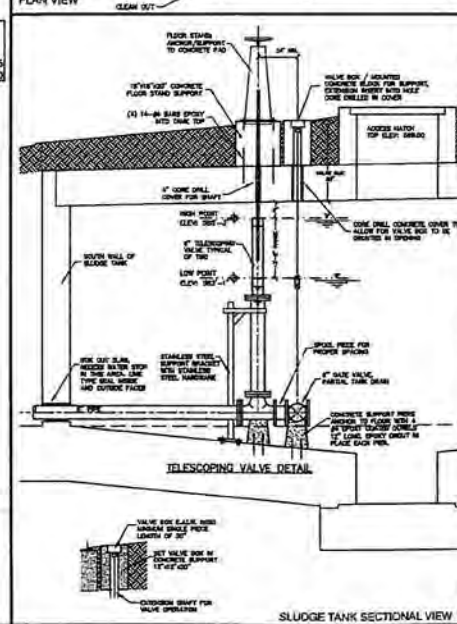
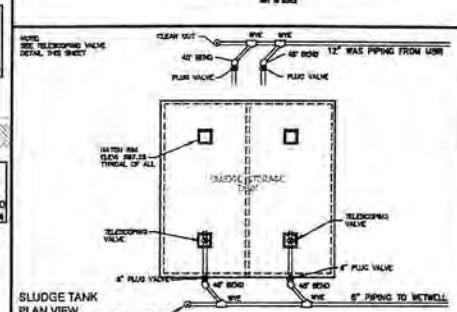
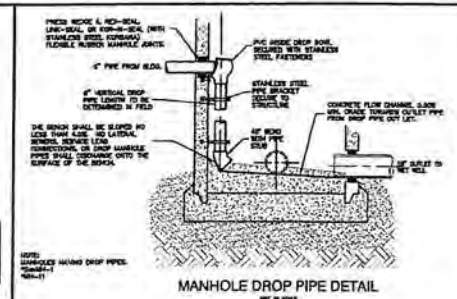
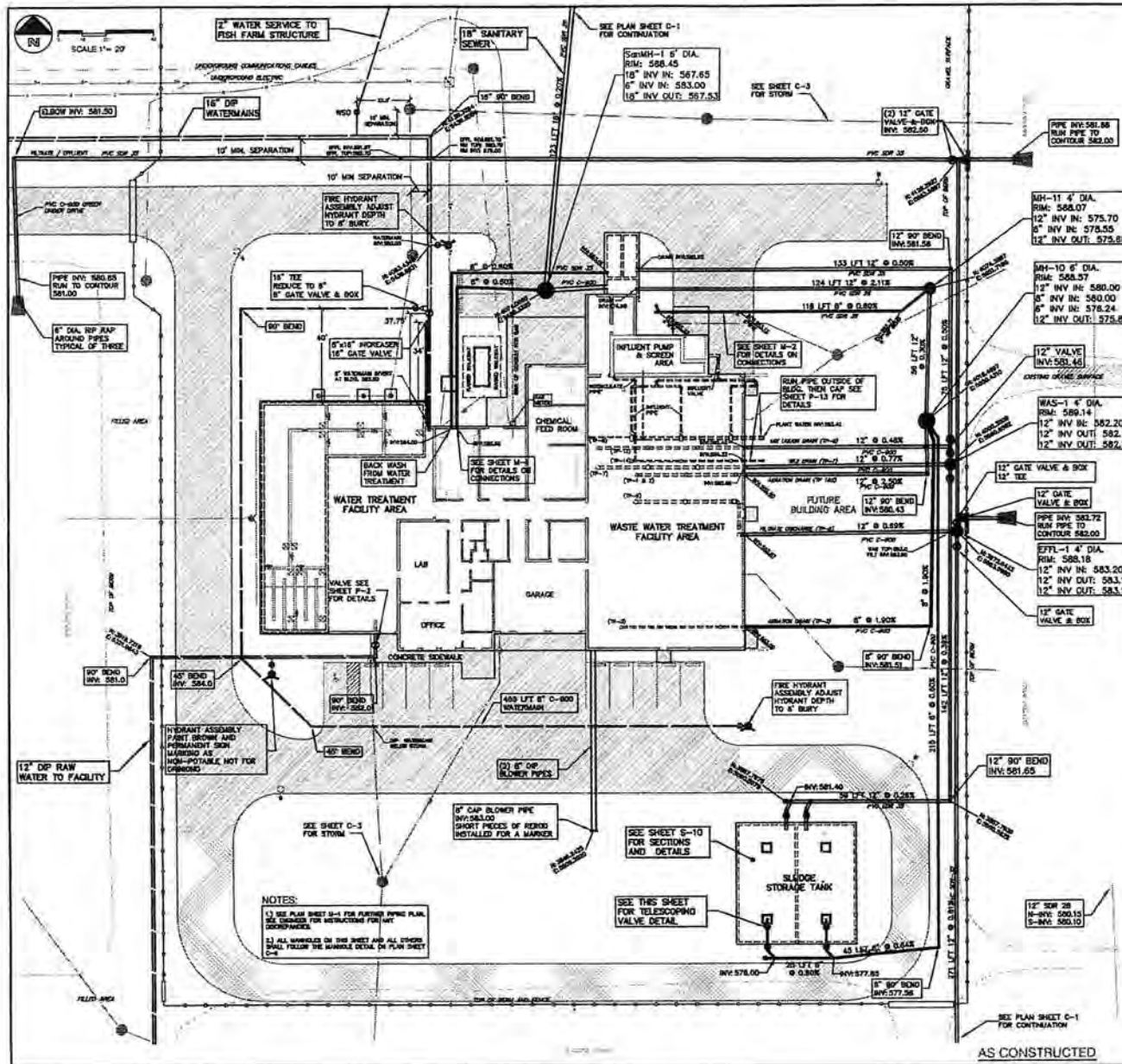
Legend

- Catch_Basins
- Discharge Line
- Storm Mains
- SCIT Parcels
- Driveway

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



Townley Engineering, LLC 11715 Saganing Road Grand Rapids, MI 49508 (616) 464-2200 Fax (616) 464-2201 www.townleyeng.com		DATE:	1-1-11
		BY:	SKW
SCIT - SAGANING WATER TREATMENT FACILITIES WATER AND WASTE WATER LAYOUT YARD PIPING PLAN		DATE:	1-1-11
		BY:	SKW
REVISIONS 1-1-11 ISSUED FOR BIDDING 3-11-11 ADDENDUM #1 6-23-11 ADDENDUM #2 8-30-11 BASED UP 2" BULLETIN 3 May 2012 AS CONSTRUCTED		DATE:	1-1-11
		BY:	SKW
APPROVED 4-14-11 CONFORMING TO CONSTRUCTION RECORDS		DATE:	4-14-11
		BY:	SKW
SCALE 1" = 20' FILE NUMBER WW-0026 SHEET NUMBER C-2			



Townley Engineering, LLC		SCIT - SAGANING	
DATE: 11-11-11		WATER TREATMENT FACILITIES	
BY: [Signature]		WATER AND WASTE WATER LAYOUT	
DRAWN: [Signature]		YARD PIPING PLAN	
CHECKED: [Signature]		SCALE: 1" = 20'	
APPROVED: [Signature]		FILE NUMBER: WW-0026	
CONFORMING TO: CONSTRUCTION RECORDS		SHEET NUMBER: C-2	

Saganing Wastewater Improvement Plan
Developed by Fishbeck (fch) Engineering
9-17-20

To: Mr. Dean Maraldo
Water Enforcement and Compliance Assurance Branch
U.S. EPA - Region 5

Wastewater Treatment System Improvements

The following improvements to the wastewater treatment system are recommended to increase capacity and improve reliability to handle current wastewater flow from existing Tribal operations and projected future wastewater flow from the Standish Township Whites Beach Service Area (WBSA). The recommended wastewater treatment improvements presented in the study are as follows. SCIT Tribal Council and Tribal Administration has committed to developing these fch recommendations. Fch expects to complete the WWTP improvement design by 9-30-22. Finally, SCIT has an agreement with Kennedy Industries for headwork's pump replacement those improvements should be completed soon.

Influent Pumping Station/Screen Building

- Provide an odor control system at the location of the onsite WBSA junction manhole.
- Install a new bar screen or influent chopper pumps to handle excessive solids and rags in the influent wastewater.
- Replace the combustible gas detection system in the Screen Building.

Influent Equalization

- Construct a new 100,000-gallon above grade equalization tank. Fishbeck will consider steel versus concrete and present advantages of each alternative.

MBR System

- Add a third EVOQUA Xpress membrane bioreactor (MBR) unit.
- Install overflow pipes on bioreactor tanks and route to equalization tank.

Effluent Discharge and Disinfection System

- Install a new effluent sampler on common effluent discharge piping from all MBR systems.
- Install redundant ultraviolet (UV) disinfection units on each MBR system, or provide a centralized UV disinfection system with an appropriate level of redundancy.

Biosolids Storage and Treatment

- Evaluate biosolids stabilization systems and current biosolids storage capacity.
- Design the selected biosolids stabilization system.

Remote Monitoring System

- Provide a SCADA system to be able to remotely monitor and control lift stations.
- Upgrade the WWTP SCADA system to include remote monitoring and control capabilities, and an alarm callout system.

furnace [manual](#)
autoclave [manual](#)
refrigerator [manual](#)
dessicator [manual](#)
spectrophotometer [manual](#)
oven [manual](#)
scale [manual](#)
pH probe [manual](#)
D.O. probe [manual](#)
Ambient Chamber [manual](#)
Water Bath [manual](#)
Flow Meter Influent [manual](#)
Flow Meter Effluent [manual](#)

Thermo Scientific Thermolyne FB1415M
10-6226-D 230-250 F 0-30 psi
Danby Designer
Bel-Art Secador Scienceware 8255
Hach DR3900 2020513
Fisher Isotemp 151030503
Ohaus Adventurer-Pro AV264 B033141159
Orion 8102BNUWP
Thermo Fisher Optical RDO
Fisher Isotemp 3720 Incubator
Fisher Isotemp 205
Water Master Hart fax 100 ABB FET1211A0Y1B1A
Magflo Mag 5000/ Siemens Sitrans F M MAG 3100

CFR Title
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Vol 25

§ 141.852

(8)

Ch 1 Sub D
Part 141 Sub Y

pH electrometric

150 1

residue gravimetric, dried 103-105°C 1120 3
volatile, ignition 550°C 1120 4

temp thermometric

176 1

alkalinity titrimetric

310 1

ammonia TWT 830, Salicylate 10205
as Nitrogen .015 - 2 mg/L

✓ 350 1

phosphorus TWT 843, Ascorbic acid 10209, 10210
reactive & total .15 - 4.5 mg/L

✓ 3125 1

e.coli m-coli blue 24 P-A Test

11204 2



SECTION 6: MAINTENANCE PROCEDURES

The maintenance procedures for the Memjet® Xpress are minimal. The following document details the maintenance procedures for the mechanical equipment as well as the membranes cleaning procedures and repair as required. The instructions and recommendations in this document are intended to assist the Plant Operator and Maintenance Personnel.

6.1 Summary of Maintenance Requirements

The following table gives a quick lookup of the maintenance requirements for major equipment and components of the Xpress Unit.

Equipment	Maintenance Requirement	Daily	Weekly	Monthly	Quarter	Annual
Pump	Re-grease bearings				X	
	Check Mechanical Seal			X		
	Record suction and discharge pressures (Pressure indicators)		X			
Blower	Check oil levels		X			
	Lubrication - fill the oil sump on each end of the blower				X	
	Check for hot spots - detected by observing the surface of the casing					
	Check for changes in vibration & noise	X				
	Record operating pressures and temperatures		X			
Screen	Re-grease bearings					X
	Check oil levels				X	
	Check nozzles for blockages					X
Mixer	Monitor the current consumption			X		
	Check power supply cable insulation resistance				X	
	Visual inspection of power supply cable				X	
	Visual inspection of the cable holder and the cable bracing				X	
	Visual inspection of accessories, e.g. lowering device, hoisting gears, etc.				X	
	Oil check and oil change of sealing chamber, if necessary					X
	Functional inspection of the safety and monitoring devices and auxiliary hoisting gear					X
	Coating check and touch-up as required					X



Equipment	Maintenance Requirement	Daily	Weekly	Monthly	Quarter	Annual
Chemical Dosing Pumps	The pump should be run with water for one minute		X			
	The tubing should be flushed out with water after every chemical clean			X		
	A visual check should be performed on the motor flange and the stroke adjustment knob for leaks.				X	
Dissolved Oxygen Probe	Clean sensor with a soft, wet cloth				X	
	Check sensor cap inspected for damage				X	
	Calibrate probe					X
Turbidimeter	Clean sensor with a soft, wet cloth				X	
	Calibrate sensor				X	
	Check lamp assembly					X
Pressure Transmitters	Check calibration of instrument					X
Fine bubble diffusers	Check aeration patterns				X	
	Dewater and clean diffusers	AS REQUIRED – LONGER THAN ANNUAL				
Membranes	Check TMP, aeration & MLSS level	X				
	Check alarms – shutdown & warning	X				
	Clean-in-Place				X	
	Perform leak test					X
Influent/ Effluent Quality	Influent – BOD, TKN, NH ₃ -N, TP, TSS, pH, Alkalinity, Flow rates		X			
	Mixed Liquor – MLSS, SRT		X			
	Effluent – BOD, TN, TP, TSS, Turbidity, other parameters required for permit		X			
Valves	Manually stroke to ensure valves are not sticking				X	

For details of how to perform the preventive maintenance schedule see specific Vendor Literature.

Saganing WWTP January 2022

Plant Effluent Sheet

	Weather		Flow	Treated Sewage							
	Type	Temp.	Total	Temp.	pH	DO	TSS	CBOD	Ammonia	Phos	E. coli
Day		F	MGD	C	S.U.	mg/L	mg/L	mg/L	mg/L	mg/L	ct/100ml
1	0	30	0.065								0
2	0	17	0.07								0
3	0	19	0.067								0
4	0	21	0.064								0
5	snow	37	0.061	21.7	7.6	8.4	0.02	-1.06	0.06	0.11	0
6	sunny	23	0.062	17.6	7.4	8.3	0.06	-0.38	0.09	0.85	0
7	sunny	0	0.062	21.5	7.4	8.7	0.07	-0.21	0.08	0.62	0
8	0	15	0.078								0
9	0	30	0.091								0
10	0	11	0.092								0
11	0	7	0.091								0
12	cloudy	35	0.087	15.7	7.4	9	0.14	-0.16	0.03	0.14	0
13	cloudy	32	0.074	18.9	7.2	7.8		-0.7	0.01	0.12	0
14	cloudy	21	0.082	20.8	6.6	8.6	0.18	0.21	0.02	0.15	0
15	0	22	0.077								0
16	0	46	0.071								0
17	0	31	0.066								0
18	0	29	0.07								0
19	p/c	37	0.07	18.8	7.4	8.3	0.04	0.15	0.02	0.15	0
20	p/c	20	0.072	17.4	7.4	7.5	0.03	0.09	0.01	0.13	0
21	sunny	15	0.072	15.9	7.7	8.9	0.07	1.18	0.04	0.05	0
22	0	21	0.071								0
23	0	14	0.069								0
24	0	20	0.071								0
25	0	7	0.066								0
26	clear	2	0.07	15.7	7.7	8.9	0.02	-0.51	0.01	0.16	0
27	0	18	0.055	17.2	7.7	8.7	0.02	0.49	0.02	0.22	0
28	cloudy	10	0.066	17.7	7.6	8.2	0.06	-1.09	0.01	0.16	0
29	0	2	0.069								0
30	0	14	0.068								0
31	0	25	0.069								0
Total	X	X	2.218	X	X	X	X	X	X	X	0
Avg.	X	20.35484	0.07155	18.24167	7.425	8.44167	0.06455	-0.16583	0.033333333	0.238333	0
Min.	X	0	0.055	15.7	6.6	7.5	0.02	-1.09	0.01	0.05	0
Max.	X	46	0.092	21.7	7.7	9	0.18	1.18	0.09	0.85	0

Saganing WWTP January 2022		
Day	CBOD %Removal	TSS %Removal
1	#DIV/0!	#DIV/0!
2	#DIV/0!	#DIV/0!
3	#DIV/0!	#DIV/0!
4	#DIV/0!	#DIV/0!
5	100.816036	99.92966719
6	100.2419333	99.70284217
7	100.2647154	99.57747987
8	#DIV/0!	#DIV/0!
9	#DIV/0!	#DIV/0!
10	#DIV/0!	#DIV/0!
11	#DIV/0!	#DIV/0!
12	100.2884352	99.52627096
13	101.6626011	#DIV/0!
14	99.76693857	99.74566546
15	#DIV/0!	#DIV/0!
16	#DIV/0!	#DIV/0!
17	#DIV/0!	#DIV/0!
18	#DIV/0!	#DIV/0!
19	99.84504704	99.90731239
20	99.63436103	99.7718101
21	98.90097381	99.65468099
22	#DIV/0!	#DIV/0!
23	#DIV/0!	#DIV/0!
24	#DIV/0!	#DIV/0!
25	#DIV/0!	#DIV/0!
26	100.4719943	99.95837917
27	99.31135372	99.86361664
28	101.8002868	99.79816308
29	#DIV/0!	#DIV/0!
30	#DIV/0!	#DIV/0!
31	#DIV/0!	#DIV/0!
Average	#DIV/0!	#DIV/0!
Min.	#DIV/0!	#DIV/0!
Max.	#DIV/0!	#DIV/0!

Saganing WWTP January 2022								
	Aeration Vol.	F:M	MLSS	MLVSS	Settle	SVI	Wasted	CRT
Day	MGD	Ratio	mg/L	mg/L	30 min.		Gallons	Days
1	0.036	#DIV/0!				#DIV/0!	0	#DIV/0!
2	0.036	#DIV/0!				#DIV/0!	0	#DIV/0!
3	0.036	#DIV/0!				#DIV/0!	1500	24
4	0.036	#DIV/0!				#DIV/0!	0	#DIV/0!
5	0.036	0.216328	12708	2017	990	77.904	1500	17.06161
6	0.036	0.320843	8656	1619	950	109.75	0	19.35484
7	0.036	0.318435	5608	977	960	171.18	0	16.58986
8	0.036	#DIV/0!				#DIV/0!	0	#DIV/0!
9	0.036	#DIV/0!				#DIV/0!	0	#DIV/0!
10	0.036	#DIV/0!				#DIV/0!	1500	24
11	0.036	#DIV/0!				#DIV/0!	0	#DIV/0!
12	0.036	0.121335	12036	1978	990	82.253	0	5.91133
13	0.036	#DIV/0!				#DIV/0!	1500	24
14	0.036	#DIV/0!	12200		990	81.148	0	4.878049
15	0.036	#DIV/0!				#DIV/0!	0	#DIV/0!
16	0.036	#DIV/0!				#DIV/0!	0	#DIV/0!
17	0.036	#DIV/0!				#DIV/0!	0	#DIV/0!
18	0.036	#DIV/0!				#DIV/0!	0	#DIV/0!
19	0.036	0.27924	14016	1159	990	70.634	3000	8.181818
20	0.036	0.131607	12452	2060	980	78.702	0	33.33333
21	0.036	0.094164	12460	2652	970	77.849	0	14.28571
22	0.036	#DIV/0!				#DIV/0!	0	#DIV/0!
23	0.036	#DIV/0!				#DIV/0!	0	#DIV/0!
24	0.036	#DIV/0!				#DIV/0!	0	#DIV/0!
25	0.036	#DIV/0!				#DIV/0!	0	#DIV/0!
26	0.036	0.230573	12988	1713	990	76.224	0	51.42857
27	0.036	0.185626	9032	1175	990	109.61	0	65.45455
28	0.036	0.122828	12816	1925	970	75.687	3000	7.228916
29	0.036	#DIV/0!				#DIV/0!	0	#DIV/0!
30	0.036	#DIV/0!				#DIV/0!	0	#DIV/0!
31	0.036	#DIV/0!				#DIV/0!	3000	12
Total	X	X	X	X	X	X	15000	X
Avg.	X	#DIV/0!	11361.09	1727.5	979.0909	#DIV/0!	483.871	#DIV/0!
Min.	X	#DIV/0!	5608	977	950	#DIV/0!	0	#DIV/0!
Max.	X	#DIV/0!	14016	2652	990	#DIV/0!	3000	#DIV/0!

Saganing WWTP January 2022				
	Aluminum Sulfate, 50%	Citric Acid, 50% (cleaning)	Sodium Bicarb	Sodium Hypochlorite, 12.5% (cleaning)
Day	Pounds	Pounds	Pounds	Pounds
1	48		0	
2	40		0	
3	48		0	
4	46		0	
5	46		100	
6	46		0	
7	20		0	
8	28		0	
9	34		0	
10	32		0	
11	32		50	
12	22		0	
13	24		100	
14	28		0	
15	32		0	
16	28		0	
17	24		0	
18	22		0	
19	28		100	
20	30		100	
21	26		0	
22	26		0	
23	30		0	
24	28		0	
25	28		0	
26	30		0	
27	28		50	
28	28		100	
29	28		0	
30	26		0	
31	30		100	
Total Lbs. Soln.	966	0	700	0
Total Lbs. Chemical	483	0	693	0
Average	31.16129032	#DIV/0!	22.58064516	#DIV/0!
Max.	48	0	100	0
Min.	20	0	0	0

(10)

Saganing WWTP February 2022

Plant Influent Sheet

	Weather			Flow	Raw Sewage						TSS mg/L 7 Day Average
	Type	Temp.	Precip.	Total	Temp.	pH	DO	TSS	BOD	CBOD	
Day		F	inches	MGD	C	S.U.	mg/L	mg/L	mg/L	mg/L	
1		27	0	0.061							111
2	snow	34	0.02	0.059	14.3	7.4	8.8	67	185	166	
3	cloudy	15	0	0.054	17.6	7.6	7.8	112	256	203	
4	sunny	2	0	0.055	17.4	7.6	7.1	154	110	-154	
5		11	0.03	0.055							
6		18	0.01	0.067							
7		24	0.02	0.064							168
8		21	0.01	0.086							
9	cloudy	24	0	0.049	17.6	7.7	7.2	150	108	147	
10	cloudy	32	0.03	0.103	17.6	7.7	7.3	134	74	69	
11	snow	35	0	0.077	17.6	7.6	7.4	220	59	110	
12		25	0.07	0.057							127.6666667
13		10	0.01	0.069							
14		1	0	0.064							
15		17	0	0.07							
16	cloudy	42	0	0.064	15.2	7.3	7.9	91	227	224	
17	p/c	35	0.26	0.058	16.1	8	7.9	214	175	187	76.6666667
18	cloudy	15	0	0.054	15.7	7.8	6.8	78	27	90	
19		20	0.1	0.062							
20		20	0	0.062							
21		28	0	0.064							
22		32	0.3	0.06							
23	p/c	23	0.66	0.063	14.4	7.5	8.1	98	282	243	
24	sunny	19	0	0.058	15.4	6.9	8.1	45	239	206	
25	snow	17	0.01	0.07	15.4	7.1	8.1	87	172	142	
26		15	0.2	0.068							
27		26	0	0.068							
28		23	0	0.066							
Total	X	X	1.73	1.807	X	X	X	X	X	X	
Avg.	X	21.82143	0.06178571	0.0645357	16.1917	7.51667	7.708333	120.8333333	159.5	136.0833333	120.8333333
Min.	X	1	0	0.049	14.3	6.9	6.8	45	27	-154	
Max.	X	42	0.66	0.103	17.6	8	8.8	220	282	243	

Saganing WWTP February 2022				
Plant Influent Sheet				
	Raw Sewage			
	Flow	TSS	BOD	CBOD
Day	MGD	lbs.	lbs.	lbs.
1	0.061	0	0	0
2	0.059	32.96802	91.0311	81.68196
3	0.054	50.44032	115.29216	91.42308
4	0.055	70.6398	50.457	-70.6398
5	0.055	0	0	0
6	0.067	0	0	0
7	0.064	0	0	0
8	0.086	0	0	0
9	0.049	61.299	44.13528	60.07302
10	0.103	115.1087	63.56748	59.27238
11	0.077	141.2796	37.88862	70.6398
12	0.057	0	0	0
13	0.069	0	0	0
14	0.064	0	0	0
15	0.07	0	0	0
16	0.064	48.57216	121.16352	119.56224
17	0.058	103.5161	84.651	90.45564
18	0.054	35.12808	12.15972	40.5324
19	0.062	0	0	0
20	0.062	0	0	0
21	0.064	0	0	0
22	0.06	0	0	0
23	0.063	51.49116	148.16844	127.67706
24	0.058	21.7674	115.60908	99.64632
25	0.07	50.7906	100.4136	82.8996
26	0.068	0	0	0
27	0.068	0	0	0
28	0.066	0	0	0
29	0	0	0	0
30	0	0	0	0
31	0	0	0	0
Total	1.807	783.0009	984.537	853.2237
Avg.	0.064536	25.25809	31.7592581	27.523345
Min.	0.049	21.7674	12.15972	0
Max.	0.103	141.2796	148.16844	127.67706

7 Day Averages												
Plant Effluent Sheet						7 Day Averages						
						CBOD			TSS		E. coli	Ammonia
	Flow	TSS	CBOD	Amm.	Phos.	Day	mg/L	lbs.	mg/L	lbs.	ct/100ml	lbs.
Day	MGD	lbs.	lbs.	lbs.	lbs.	25	0.59	0.110302	0.03	0.005397	0	0.187459371
1	0.067	0	0	0	0	26	1.16143	0.222535	0.04142857	0.007959	0	0.2345208
2	0.065	0.016263	-0.0705	0.032526	0.043	27	1.25571	0.242325	0.04428571	0.009174	0	0.240334971
3	0.063	0.005254	0.83542	0.010508	0.053	28	1.39	0.261888	0.03857143	0.007697	0	0.243813943
4	0.063	0.005254	-1.1717	0.005254	0.053	29	1.27714	0.265498	0.06	0.013952	0	0.258182571
5	0.059	0	0	0	0	30	1.23286	0.254179	0.09	0.019635	0	0.225656571
6	0.064	0	0	0	0	31	1.41	0.294926	0.08714286	0.01942	0	0.189163114
7	0.053	0	0	0	0	1	1.18816	0.235951	0.05591837	0.01189	0	0.225590192
8	0.055	0	0	0	0	2	1.27362	0.2539	0.05962099	0.012818	0	0.231037452
9	0.044	0.022018	0.28256	0.014678	0.037	3	1.28964	0.258381	0.06221991	0.013512	0	0.230539831
10	0.087	0.021767	0.31926	0.021767	0.007	4	1.29449	0.260675	0.06478194	0.014132	0	0.229140525
11	0.067	0.016763	0.2738	0.005588	0.056	5	1.28084	0.260501	0.06852629	0.015051	0	0.227044322
12	0.071	0	0	0	0	6	1.28137	0.259788	0.06974434	0.015208	0	0.222596001
13	0.07	0	0	0	0	7	1.2883	0.260589	0.06685067	0.014576	0	0.222158777
14	0.077	0	0	0	0	8	-0.2567	-0.05811	0.01666667	0.003824	0	0.006898371
15	0.082	0	0	0	0	9	-0.2567	-0.05811	0.01666667	0.003824	0	0.006898371
16	0.078	0.006505	-1.6003	0.058547	0.52	10	0.04333	-0.00767	0.02666667	0.004647	0	0.004348714
17	0.07	0.046704	-0.5955	0.017514	0.058	11	-0.34	-0.08141	0.03333333	0.007006	0	0.005957143
18	0.07	0.052542	0.25687	0.02919	0.082	12	0.56667	0.125088	0.04	0.00865	0	0.0060048
19	0.075	0	0	0	0	13	0.56667	0.125088	0.04	0.00865	0	0.0060048
20	0.077	0	0	0	0	14	0.56667	0.125088	0.04	0.00865	0	0.0060048
21	0.077	0	0	0	0	15	0.56667	0.125088	0.04	0.00865	0	0.0060048
22	0.075	0	0	0	0	16	0.56667	0.125088	0.04	0.00865	0	0.0060048
23	0.076	0.050707	1.2867	0.03803	0.101	17	-0.51	-0.14389	0.02333333	0.006434	0	0.012271714
24	0.076	0.069722	1.16627	0.012677	0.019	18	-0.9967	-0.27456	0.04	0.009996	0	0.011664086
25	0.079	0.039532	-0.9158	0.006589	0.02	19	-1.0133	-0.27698	0.06	0.015107	0	0.015035829
26	0.083	0	0	0	0	20	-1.0133	-0.27698	0.06	0.015107	0	0.015035829
27	0.078	0	0	0	0	21	-1.0133	-0.27698	0.06	0.015107	0	0.015035829
28	0.083	0	0	0	0	22	-1.0133	-0.27698	0.06	0.015107	0	0.015035829
29	0	0	0	0	0	23	-1.0133	-0.27698	0.06	0.015107	0	0.015035829
30	0	0	0	0	0	24	0.48333	0.135442	0.08333333	0.021422	0	0.012104914
31	0	0	0	0	0	25	1.43667	0.387119	0.09333333	0.02471	0	0.011413886
Total	1.984	0.353032	0.06714	0.252869	1.049	26	0.82667	0.219592	0.08333333	0.022852	0	0.008185114
Avg.	0.07086	0.011388	0.00217	0.008157	0.034	27	0.82667	0.219592	0.08333333	0.022852	0	0.008185114
Min.	0.044	0	-1.6003	0	0	28	0.82667	0.219592	0.08333333	0.022852	0	0.008185114
Max.	0.087	0.069722	1.2867	0.058547	0.52	29	0.82667	0.219592	0.08333333	0.022852	0	0.008185114
						30	0.82667	0.219592	0.08333333	0.022852	0	0.008185114
						31	0.225	0.035779	0.085	0.015608	0	0.0027522
						Avg.	0.34273	0.066544	0.05750524	0.013797	0	0.058340168
						Min.	-1.0133	-0.27698	0.01666667	0.003824	0	0.0027522
						Max.	1.43667	0.387119	0.09333333	0.02471	0	0.231037452
						Total	X	2.06286	X	0.427703	0	1.808545214

Saganing WWTP February 2022		
Day	CBOD %Removal	TSS %Removal
1	#DIV/0!	#DIV/0!
2	100.1727036	99.9013894
3	98.18896292	99.97916884
4	96.73677108	99.98512507
5	#DIV/0!	#DIV/0!
6	#DIV/0!	#DIV/0!
7	#DIV/0!	#DIV/0!
8	#DIV/0!	#DIV/0!
9	99.0636849	99.92818906
10	98.92852344	99.96218654
11	99.22778651	99.976272
12	#DIV/0!	#DIV/0!
13	#DIV/0!	#DIV/0!
14	#DIV/0!	#DIV/0!
15	#DIV/0!	#DIV/0!
16	102.7132123	99.97321787
17	101.3253392	99.90980544
18	98.74049235	99.70130147
19	#DIV/0!	#DIV/0!
20	#DIV/0!	#DIV/0!
21	#DIV/0!	#DIV/0!
22	#DIV/0!	#DIV/0!
23	98.00456307	99.80323879
24	97.68626984	99.36143235
25	102.2341379	99.84445604
26	#DIV/0!	#DIV/0!
27	#DIV/0!	#DIV/0!
28	#DIV/0!	#DIV/0!
29	#DIV/0!	#DIV/0!
30	#DIV/0!	#DIV/0!
31	#DIV/0!	#DIV/0!
Average	#DIV/0!	#DIV/0!
Min.	#DIV/0!	#DIV/0!
Max.	#DIV/0!	#DIV/0!

Saganing WWTP February 2022				
	Aluminum Sulfate, 50%	Citric Acid, 50% (cleaning)	Sodium Bicarb	Sodium Hypochlorite, 12.5% (cleaning)
Day	Pounds	Pounds	Pounds	Pounds
1	30		0	
2	28		100	
3	30		0	
4	30		50	
5	30		0	
6	28		0	
7	30		0	
8	32		0	
9	36		0	
10	30		0	
11	36		0	
12	38		100	
13	38		0	
14	38		50	
15	44		0	
16	46		100	
17	52		50	
18	40		0	
19	46		0	
20	48		0	
21	44		0	
22	52		0	
23	40		0	
24	46		100	
25	50		0	
26	40		0	
27	44		0	
28	46		0	
Total Lbs. Soln.	1092	0	550	0
Total Lbs. Chemical	546	0	544.5	0
Average	39	#DIV/0!	19.64285714	#DIV/0!
Max.	52	0	100	0
Min.	28	0	0	0

(10)

Saganing WWTP March 2022

Plant Influent Sheet

	Weather			Flow	Raw Sewage						
	Type	Temp.	Precip.	Total	Temp.	pH	DO	TSS	BOD	CBOD	TSS mg/L 7 Day Average
Day		F	inches	MGD	C	S.U.	mg/L	mg/L	mg/L	mg/L	
1											138.6666667
2	sunny	22	0	0.078	17.2	8	7.9	180	345	263	
3	clear	19	0	0.064	17.2	8	8	192	306	205	
4	sunny	17	0	0.065	16.8	8.1	8.2	44	245	151	
5											
6											
7											61
8											
9	p/c	32	0	0.058	17.1	7.4	7.8	28	123	85	
10	sunny	29	0	0.059	17.2	7.4	7.9	63	-57	-116	
11	p/c	22	0	0.06	13.2	7.8	8.2	92	260	204	
12											72
13											
14											
15											
16	p/c	32	0.06	0.062	15.9	7.7	7.6	114	228	230	
17	sunny	42	0	0.062	15.9	7.8	7.6	58	100	107	
18	p/c	38	0	0.066	16.3	7.7	8.5	44	227	171	
19											
20											
21											
22											155.6666667
23	rain	39	0.51	0.067	17.6	8	7.9	192	218	239	239.5
24	p/c	39	0.58	0.06	17.4	8.2	7.8	155	69	120	
25	p/c	38	0.14	0.048				120	149	359	
26											
27											
28											
29											
30	rain	35	0.15	0.066	16.9	7.9	8.3	344	264	238	
31	rain	55	1	0.066	17.9	7.9	8.4	386	288	226	
Total	X	X	2.44	0.881	X	X	X	X	X	X	
Avg.	X	32.78571	0.17428571	0.0629286	16.6615	7.83846	8.007692	143.7142857	197.5	177.2857143	133.3666667
Min.	X	17	0	0.048	13.2	7.4	7.6	28	-57	-116	
Max.	X	55	1	0.078	17.9	8.2	8.5	386	345	359	

Saganing WWTP March 2022

Plant Effluent Sheet

	Weather		Flow	Treated Sewage							
	Type	Temp.	Total	Temp.	pH	DO	TSS	CBOD	Ammonia	Phos	E. coli
Day		F	MGD	C	S.U.	mg/L	mg/L	mg/L	mg/L	mg/L	ct/100ml
1	0	0									0
2	sunny	22	0.094	14.4	7.9	8.9	0.05	3.98	0.01	0.06	0
3	clear	19	0.08	14.6	7.9	8.8	0.01	3.2	0.01	0.1	0
4	sunny	17	0.082	14.3	7.9	8.7	0.02	-0.67	0.03	0.06	0
5	0	0									0
6	0	0									0
7	0	0									0
8	0	0									0
9	p/c	32	0.075	17.2	7.5	8.3	0.01	-1.09	0.04	0.06	0
10	sunny	29	0.075	17.2	7.5	8.3	0.02	-0.61	0.02	0.08	0
11	p/c	22	0.074	14.2	8.1	8.1	0.01	2.4	0.01	0.08	0
12	0	0									0
13	0	0									0
14	0	0									0
15	0	0									0
16	p/c	32	0.079	21.3	8.1	8.7	0.01	1.33	0.01	0.03	0
17	sunny	42	0.079	21.2	8	8.6	0.01	0.14	0.01	0.02	0
18	p/c	38	0.072	17.8	7.7	8.1	0.01	0.95	0.04	0.03	0
19	0	0									0
20	0	0									0
21	0	0									0
22	0	0									0
23	rain	39	0.083	16.8	7.9	8.9	0.01	0.3	0.02	0.07	0
24	p/c	39	0.076	16.7	7.9	8.2	0.01	0.22	0.02	0.06	0
25	p/c	38	0.066	17.3	7.6	8.5	0.01	0.64	0.01	0.07	0
26	0	0									0
27	0	0									0
28	0	0									0
29	0	0									0
30	rain	35	0.079	16.9	7.8	8.6	0.03	0.09	0.01	0.08	0
31	rain	55	0.077	18.5	7.8	8.7	0.03	-0.55	0.06	0.08	0
Total	X	X	1.091	X	X	X	X	X	X	X	0
Avg.	X	32.78571	0.07793	17.02857	7.829	8.52857	0.01714	0.737857	0.02142857	0.062857	0
Min.	X	17	0.066	14.2	7.5	8.1	0.01	-1.09	0.01	0.02	0
Max.	X	55	0.094	21.3	8.1	8.9	0.05	3.98	0.06	0.1	0

Saganing WWTP March 2022								
	Aeration Vol.	F:M	MLSS	MLVSS	Settle	SVI	Wasted	CRT
Day	MGD	Ratio	mg/L	mg/L	30 min.		Gallons	Days
1	0.036	#DIV/0!				#DIV/0!	0	#DIV/0!
2	0.036	0.994016	3504	752	440	125.57	0	15.31915
3	0.036	0.680851	5088	799	970	190.64	0	90
4	0.036	0.773359	3884	572	810	208.55	0	43.90244
5	0.036	#DIV/0!				#DIV/0!	0	#DIV/0!
6	0.036	#DIV/0!				#DIV/0!	0	#DIV/0!
7	0.036	#DIV/0!				#DIV/0!	0	#DIV/0!
8	0.036	#DIV/0!				#DIV/0!	0	#DIV/0!
9	0.036	0.224679	5060	882	980	193.68	0	96
10	0.036	-0.15339	4840	609	910	188.02	0	48
11	0.036	0.439932	4748	985	870	183.24	0	97.2973
12	0.036	#DIV/0!				#DIV/0!	0	#DIV/0!
13	0.036	#DIV/0!				#DIV/0!	0	#DIV/0!
14	0.036	#DIV/0!				#DIV/0!	0	#DIV/0!
15	0.036	#DIV/0!				#DIV/0!	0	#DIV/0!
16	0.036	0.164364	12320	2389	960	77.922	0	91.13924
17	0.036	0.430556	3956	400	850	214.86	0	91.13924
18	0.036	0.274335	12896	1517	980	75.993	0	100
19	0.036	#DIV/0!				#DIV/0!	0	#DIV/0!
20	0.036	#DIV/0!				#DIV/0!	0	#DIV/0!
21	0.036	#DIV/0!				#DIV/0!	0	#DIV/0!
22	0.036	#DIV/0!				#DIV/0!	0	#DIV/0!
23	0.036	0.507788	5088	799	970	190.64	0	86.74699
24	0.036	0.073342	11920	1568	980	82.215	1500	19.14894
25	0.036	0.149824	13816	1326	970	70.208	0	109.0909
26	0.036	#DIV/0!				#DIV/0!	0	#DIV/0!
27	0.036	#DIV/0!				#DIV/0!	0	#DIV/0!
28	0.036	#DIV/0!				#DIV/0!	0	#DIV/0!
29	0.036	#DIV/0!				#DIV/0!	0	#DIV/0!
30	0.036	0.44	7260	1100	960	132.23	0	30.37975
31	0.036	0.326531	13328	1617	990	74.28	0	31.16883
Total	X	X	X	X	X	X	1500	X
Avg.	X	#DIV/0!	7693.429	1093.929	902.8571	#DIV/0!	48.3871	#DIV/0!
Min.	X	#DIV/0!	3504	400	440	#DIV/0!	0	#DIV/0!
Max.	X	#DIV/0!	13816	2389	990	#DIV/0!	1500	#DIV/0!

Saganing WWTP March 2022				
	Aluminum Sulfate, 50%	Citric Acid, 50% (cleaning)	Sodium Bicarb	Sodium Hypochlorite, 12.5% (cleaning)
Day	Pounds	Pounds	Pounds	Pounds
1	48		0	
2	44		0	
3	36		0	
4	42		0	
5	50		0	
6	46		0	
7	40		0	
8	46		0	
9	46		0	
10	46		0	
11	44		0	
12	46		0	
13	46		0	
14	44		0	
15	44		0	
16	34		0	
17	44		0	
18	14		0	
19	32		0	
20	26		0	
21	24		0	
22	56		0	
23	28		0	
24	28		0	
25	30		0	
26	30		0	
27	32		0	
28	0		0	
29	28		0	
30	26		50	
31	24		0	
Total Lbs. Soln.	1124	0	50	0
Total Lbs. Chemical	562	0	49.5	0
Average	36.25806452	#DIV/0!	1.612903226	#DIV/0!
Max.	56	0	50	0
Min.	0	0	0	0

(10)

Saganing WWTP April 2022

Plant Influent Sheet

	Weather			Flow	Raw Sewage						TSS mg/L 7 Day Average
	Type	Temp.	Precip.	Total	Temp.	pH	DO	TSS	BOD	CBOD	
Day		F	inches	MGD	C	S.U.	mg/L	mg/L	mg/L	mg/L	
1	p/c	34	0.06	0.066	16.9	7.9	8.3	199	162	137	199
2		46	0	0.065							
3		48	0.01	0.068							
4		34	0	0.065							
5		37	0.2	0.064							
6	rain	39	0.01	0.064	15.4	8	9.2	61	97	181	
7	rain	45	0.89	0.063	15.8	8.1	9.1	65	80	138	
8	p/c	39	0.05	0.07	15.6	8.1	9.1	66	100	79	64
9		40	0.15	0.071							
10		43	0	0.072							
11		45	0.03	0.066							
12		40	0	0.077							
13	p/c	44	0.05	0.076	19.8	7.5	6.7	61	163	184	
14	sunny	38	0.52	0.052	16.6	7.8	6.6	47	263	154	
15	sunny	52	0	0.047	16.5	7.7	6.5	66	153	143	58
16		42	0	0.066							
17		53	0	0.07							
18		38	0	0.065							
19		37	0.19	0.065							
20	p/c	29	0	0.07	17.3	7	7.8	82	268	240	
21	sunny	50	0.18	0.066	17.5	7.4	7.5	61	81	132	
22	p/c	41	0	0.081	18.2	7.7	7.6	47	60	58	63.33333333
23		50	0.12	0.073							
24		62	0	0.072							
25		51	0.04	0.072							
26		45	0	0.072							
27	p/c	32	0.03	0.077	17.7	7.8	7.5	51	132	122	
28	sunny	30	0	0.066	19.2	7.8	8.4	44	126	94	
29	p/c	39	0	0.07	17.5	7.9	7.4	42	126	96	45.66666667
30		43	0	0.066							
Total	X	X	2.53	2.037	X	X	X	X	X	X	
Avg.	X	42.2	0.08433333	0.0679	17.2308	7.74615	7.823077	68.61538462	139.3076923	135.2307692	96.08333333
Min.	X	29	0	0.047	15.4	7	6.5	42	60	58	
Max.	X	62	0.89	0.081	19.8	8.1	9.2	199	268	240	

Saganing WWTP April 2022

Plant Effluent Sheet

	Weather		Flow	Treated Sewage							
	Type	Temp.	Total	Temp.	pH	DO	TSS	CBOD	Ammonia	Phos	E. coli
Day		F	MGD	C	S.U.	mg/L	mg/L	mg/L	mg/L	mg/L	ct/100ml
1	p/c	34	0.08	17	7.8	8.5	0.02	-0.18	0.05	0.07	0
2	0	46	0.078								0
3	0	48	0.08								0
4	0	34	0.079								0
5	0	37	0.078								0
6	rain	39	0.076	17.3	8	9.1	0.1	0.6	0.04	0.08	0
7	rain	45	0.077	17.3	8.1	9.1	0.01	0.65	0.09	0.07	0
8	p/c	39	0.081	17.2	8.1	9.1	0.07	0.96	0.06	0.07	0
9	0	40	0.082								0
10	0	43	0.083								0
11	0	45	0.079								0
12	0	40	0.087								0
13	p/c	44	0.086	21.4	7.9	7.4	0.05	0.14	0.03	0.08	0
14	sunny	38	0.068	17	8	9	0.04	0.62	0.05	0.08	0
15	sunny	52	0.068	16.5	7.7	6.5	0.05	0.35	0.19	0.07	0
16	0	42	0.078								0
17	0	53	0.082								0
18	0	38	0.079								0
19	0	37	0.077								0
20	p/c	29	0.083	15.1	7	8.2	0.05	2.17	0.15	0.08	0
21	sunny	50	0.077	16.7	8.1	8	0.14	0.56	0.25	0.08	0
22	p/c	41	0.089	20.3	7.8	8.4	0.03	1.26	0.17	0.07	0
23	0	50	0.084								0
24	0	62	0.075								0
25	0	51	0.077								0
26	0	45	0.081								0
27	p/c	32	0.085	20.5	7.9	8.5	0.02	0.85	0.1	0.09	0
28	sunny	30	0.078	20.1	7.9	8.2	0.02	0.46	0.09	0.08	0
29	p/c	39	0.082	20.4	7.9	8.4	0.09	0.65	0.19	0.08	0
30	0	43	0.078								0
Total	X	X	2.387	X	X	X	X	X	X	X	0
Avg.	X	42.2	0.07957	18.21538	7.862	8.33846	0.05308	0.699231	0.11230769	0.076923	0
Min.	X	29	0.068	15.1	7	6.5	0.01	-0.18	0.03	0.07	0
Max.	X	62	0.089	21.4	8.1	9.1	0.14	2.17	0.25	0.09	0

Saganing WWTP April 2022		
Day	CBOD %Removal	TSS %Removal
1	100.3190217	99.97563872
2	#DIV/0!	#DIV/0!
3	#DIV/0!	#DIV/0!
4	#DIV/0!	#DIV/0!
5	#DIV/0!	#DIV/0!
6	99.21579418	99.61141221
7	98.85522155	99.96240023
8	97.22670014	99.75484632
9	#DIV/0!	#DIV/0!
10	#DIV/0!	#DIV/0!
11	#DIV/0!	#DIV/0!
12	#DIV/0!	#DIV/0!
13	99.82795133	99.81466716
14	98.9525674	99.77766152
15	99.29427114	99.7810266
16	#DIV/0!	#DIV/0!
17	#DIV/0!	#DIV/0!
18	#DIV/0!	#DIV/0!
19	#DIV/0!	#DIV/0!
20	97.87857676	99.85550517
21	99.01497638	99.46591095
22	95.33734985	99.85983038
23	#DIV/0!	#DIV/0!
24	#DIV/0!	#DIV/0!
25	#DIV/0!	#DIV/0!
26	#DIV/0!	#DIV/0!
27	98.47352436	99.91345738
28	98.84997788	99.89261967
29	98.42617336	99.49921625
30	#DIV/0!	#DIV/0!
31	#DIV/0!	#DIV/0!
Average	#DIV/0!	#DIV/0!
Min.	#DIV/0!	#DIV/0!
Max.	#DIV/0!	#DIV/0!

Saganing WWTP April 2022				
	Aluminum Sulfate, 50%	Citric Acid, 50% (cleaning)	Sodium Bicarb	Sodium Hypochlorite, 12.5% (cleaning)
Day	Pounds	Pounds	Pounds	Pounds
1	26		50	
2	30		0	
3	26		0	
4	26		0	
5	28		0	
6	32		0	
7	28		0	
8	30		0	
9	30		0	
10	30		0	
11	28		0	
12	30		0	
13	32		0	
14	36		0	
15	36		50	
16	34		0	
17	28		0	
18	30		0	
19	36		0	
20	34		50	
21	40		0	
22	40		0	
23	42		0	
24	50		0	
25	50		0	
26	42		0	
27	44		0	
28	46		0	
29	46		0	
30	50		0	
Total Lbs. Soln.	1060	0	150	0
Total Lbs. Chemical	530	0	148.5	0
Average	35.33333333	#DIV/0!	5	#DIV/0!
Max.	50	0	50	0
Min.	26	0	0	0

Saganing WWTP May 2022

Plant Influent Sheet

	Weather			Flow	Raw Sewage						
	Type	Temp.	Precip.	Total	Temp.	pH	DO	TSS	BOD	CBOD	TSS mg/L 7 Day Average
Day		F	inches	MGD	C	S.U.	mg/L	mg/L	mg/L	mg/L	
1		50	0.42	0.07							54
2		48	0.04	0.066							50.66666667
3		52	0	0.063							
4	clear	48	0.45	0.071	21.6	7	8.7	67	230	187	
5	clear	42	0	0.07	15.6	7.4	7	49	237	215	
6	cloudy	46	0	0.065	16.7	8.3	6.3	46	152	168	
7		48	0	0.061							
8		49	0	0.052							
9		54	0	0.054							145
10		61	0	0.061							
11	rain	63	0	0.065	17.2	6.1	8.1	39	217	224	
12	sunny	63	0.03	0.061	17.9	7.4	7	50	165	191	
13	sunny	67	0	0.07	19.4	8.6	8.3	63	185	242	
14		78	0	0.067							
15		78	0.04	0.066							
16		61	0.02	0.066							60.66666667
17		52	0	0.064							
18	p/c	55	0	0.064	17.2	7.4	8.3	91	151	232	
19	sunny	58	0.02	0.061	18	7.6	8.1	168	163	135	
20	sunny	70	0	0.061	18.1	7.7	8.2	176	-49	79	
21		64	0.75	0.06							
22		52	0.1	0.065							
23		46	0	0.069							77.58333333
24		51	0	0.065							
25	p/c	54	0	0.069	16.8	6.9	7.4	51	284	303	
26	p/c	70	0.2	0.076	17.5	7.3	4.5	38	187	236	
27	p/c	62	0.19	0.079	17.5	7.5	8.1	93	188	192	
28		56	0.06	0.055							
29		66	0	0.064							
30		72	0	0.066							
31		77	0	0.066							
Total	X	X	2.32	2.012	X	X	X	X	X	X	
Avg.	X	58.48387	0.07483871	0.0649032	17.7917	7.43333	7.5	77.58333333	175.8333333	200.3333333	77.58333333
Min.	X	42	0	0.052	15.6	6.1	4.5	38	-49	79	
Max.	X	78	0.75	0.079	21.6	8.6	8.7	176	284	303	

Saganing WWTP May 2022

Plant Effluent Sheet

	Weather		Flow	Treated Sewage							
	Type	Temp.	Total	Temp.	pH	DO	TSS	CBOD	Ammonia	Phos	E. coli
Day		F	MGD	C	S.U.	mg/L	mg/L	mg/L	mg/L	mg/L	ct/100ml
1	0	50	0.082								0
2	0	48	0.08								0
3	0	52	0.076								0
4	clear	48	0.083	16	7	7.5	0.15	0.37	0.1	0.09	0
5	clear	42	0.082	19.6	8.7	7.7	0.1	-1.87	0.07	0.09	0
6	cloudy	46	0.078	19.7	7.8	7.7	0.02	0.07	0.04	0.09	0
7	0	48	0.076								0
8	0	49	0.069								0
9	0	54	0.072								0
10	0	61	0.076								0
11	rain	63	0.076	19.3	8.7	8.3	0.39	-0.1	0.04	0.07	0
12	sunny	63	0.073	19.2	8.2	8.6	0.09	-0.22	0.05	0.07	0
13	sunny	67	0.082	19.4	8.6	8.3	0.11	0.73	0.04	0.07	0
14	0	78	0.079								0
15	0	78	0.079								0
16	0	61	0.08								0
17	0	52	0.077								0
18	p/c	55	0.078	18.1	8.6	8.5	0.07	-0.94	0.04	0.04	0
19	sunny	58	0.073	18.3	8.6	8.4	0.13	-1.51	0.04	0.05	0
20	sunny	70	0.076	18.4	8.5	8.3	0.12	-1.31	0.04	0.08	0
21	0	64	0.074								0
22	0	52	0.078								0
23	0	46	0.083								0
24	0	51	0.078								0
25	p/c	54	0.081	19.1	8.5	7.5	0.09	-1.49	0.18	0.07	0
26	p/c	70	0.087	17.9	7.9	7.9	0.09	-0.66	0.19	0.07	0
27	p/c	62	0.089	17.4	7.8	8.5	0.03	-1.53	0.14	0.07	0
28	0	56	0.066								0
29	0	66	0.078								0
30	0	72	0.081								0
31	0	77	0.081								0
Total	X	X	2.423	X	X	X	X	X	X	X	0
Avg.	X	58.48387	0.07816	18.53333	8.242	8.1	0.11583	-0.705	0.08083333	0.071667	0
Min.	X	42	0.066	16	7	7.5	0.02	-1.87	0.04	0.04	0
Max.	X	78	0.089	19.7	8.7	8.6	0.39	0.73	0.19	0.09	0

Saganing WWTP May 2022								
	Aeration Vol.	F:M	MLSS	MLVSS	Settle	SVI	Wasted	CRT
Day	MGD	Ratio	mg/L	mg/L	30 min.		Gallons	Days
1	0.036	#DIV/0!				#DIV/0!	0	#DIV/0!
2	0.036	#DIV/0!				#DIV/0!	0	#DIV/0!
3	0.036	#DIV/0!				#DIV/0!	0	#DIV/0!
4	0.036	0.121873	17000	3722	950	55.882	1500	4.660194
5	0.036	0.136462	16968	3377	970	57.166	1500	6.428571
6	0.036	0.078078	15226	3515	980	64.364	0	46.15385
7	0.036	#DIV/0!				#DIV/0!	0	#DIV/0!
8	0.036	#DIV/0!				#DIV/0!	0	#DIV/0!
9	0.036	#DIV/0!				#DIV/0!	0	#DIV/0!
10	0.036	#DIV/0!				#DIV/0!	1500	24
11	0.036	0.290873	6408	1347	950	148.25	0	2.42915
12	0.036	0.143819	15296	1944	970	63.415	0	10.9589
13	0.036	0.553419	6332	650	970	153.19	0	7.982262
14	0.036	#DIV/0!				#DIV/0!	0	#DIV/0!
15	0.036	#DIV/0!				#DIV/0!	0	#DIV/0!
16	0.036	#DIV/0!				#DIV/0!	0	#DIV/0!
17	0.036	#DIV/0!				#DIV/0!	0	#DIV/0!
18	0.036	0.04774	16236	5623	980	60.36	1500	8.510638
19	0.036	0.923727	4332	299	950	219.3	0	7.586934
20	0.036	-0.05973	12644	1390	970	76.716	0	7.894737
21	0.036	#DIV/0!				#DIV/0!	0	#DIV/0!
22	0.036	#DIV/0!				#DIV/0!	0	#DIV/0!
23	0.036	#DIV/0!				#DIV/0!	0	#DIV/0!
24	0.036	#DIV/0!				#DIV/0!	1500	24
25	0.036	0.256277	15576	2124	990	63.559	0	9.876543
26	0.036	0.376696	14032	1048	980	69.84	0	9.195402
27	0.036	0.604034	7040	683	950	134.94	1500	12.69841
28	0.036	#DIV/0!				#DIV/0!	0	#DIV/0!
29	0.036	#DIV/0!				#DIV/0!	0	#DIV/0!
30	0.036	#DIV/0!				#DIV/0!	0	#DIV/0!
31	0.036	#DIV/0!				#DIV/0!	0	#DIV/0!
Total	X	X	X	X	X	X	9000	X
Avg.	X	#DIV/0!	12257.5	2143.5	967.5	#DIV/0!	290.3226	#DIV/0!
Min.	X	#DIV/0!	4332	299	950	#DIV/0!	0	#DIV/0!
Max.	X	#DIV/0!	17000	5623	990	#DIV/0!	1500	#DIV/0!

Saganing WWTP May 2022				
	Aluminum Sulfate, 50%	Citric Acid, 50% (cleaning)	Sodium Bicarb	Sodium Hypochlorite, 12.5% (cleaning)
Day	Pounds	Pounds	Pounds	Pounds
1	46		0	
2	46		0	
3	48		0	
4	46		0	
5	46		0	
6	48		0	
7	46		0	
8	46		0	
9	46		0	
10	46		0	
11	50		0	
12	44		0	
13	48		0	
14	48		0	
15	48		0	
16	42		0	
17	48		0	
18	30		0	
19	36		0	
20	42		0	
21	40		0	
22	38		0	
23	36		0	
24	40		0	
25	42		0	
26	46		0	
27	48		0	
28	42		0	
29	46		0	
30	48		0	
31	52		0	
Total Lbs. Soln.	1378	0	0	0
Total Lbs. Chemical	689	0	0	0
Average	44.4516129	#DIV/0!	0	#DIV/0!
Max.	52	0	0	0
Min.	30	0	0	0

JUNE

(10)

Saganing WWTP 2022

Plant Influent Sheet

	Weather			Flow	Raw Sewage						
	Type	Temp.	Precip.	Total	Temp.	pH	DO	TSS	BOD	CBOD	TSS mg/L 7 Day Average
Day		F	inches	MGD	C	S.U.	mg/L	mg/L	mg/L	mg/L	
1	p/c	73	0.25	0.067	20.2	6.5	6.2	90	234	266	56.33333333
2	p/c	58	0	0.062	18.4	6.5	6.3	38	162	188	
3	p/c	55	0	0.063	18.4	6.6	6.3	41	188	96	
4		55	0	0.065							
5		65	0	0.074							
6		63	0.05	0.068							
7		60	0.07	0.066							
8	sunny	58	0	0.066	18.2	7.9	7.8	45	206	180	46
9	sunny	61	0.16	0.062	18.3	7.8	7.4	45	227	211	
10	sunny	58	0	0.064	18.4	7.7	7.3	48	238	248	
11		67	0.03	0.064							
12		69	0.18	0.064							
13		56	0	0.064							
14		62	0.07	0.066							
15	p/c	73	0	0.064	18.6	7.8	7.4	72	-60	-100	176.6666667
16	sunny	75	0.05	0.067	21.3	7.4	1.8	42	182	204	
17	sunny	69	0	0.066	20.7	7.3	4.2	416	202	207	
18		58	0	0.057							
19		57	0	0.099							
20		65	0.46	0.115							
21		69	0.08	0.157							
22	sunny	78	0	0.061	19.8	7.4	6.4	44	175	159	49
23	clear	65	0	0.064	19.4	6.5	6.7	52	205	189	
24	sunny	69	0	0.066	19.6	7.8	6.6	51	403	328	
25		91	0	0.065							
26		84	0	0.066							
27		63	0	0.08							
28		59	0	0.072							
29	sunny	67	0.63	0.068	19.4	7.2	6.8	128	230	204	141
30	sunny	70	0	0.063	18.2	8.6	4.1	154	-85	-97	
Total	X	X	2.03	2.145	X	X	X	X	X	X	
Avg.	X	65.73333	0.06766667	0.0715	19.2071	7.35714	6.092857	90.42857143	179.0714286	163.0714286	93.8
Min.	X	55	0	0.057	18.2	6.5	1.8	38	-85	-100	
Max.	X	91	0.63	0.157	21.3	8.6	7.8	416	403	328	

Saganing WWTP June 2022

Plant Effluent Sheet

	Weather		Flow	Treated Sewage							
	Type	Temp.	Total	Temp.	pH	DO	TSS	CBOD	Ammonia	Phos	E. coli
Day		F	MGD	C	S.U.	mg/L	mg/L	mg/L	mg/L	mg/L	ct/100ml
1	p/c	73	0.083	19.4	7	7.8	0.02	-1.28	0.17	0.07	0
2	p/c	58	0.078	19	7.8	7.7	0.03	-0.14	0.19	0.07	0
3	p/c	55	0.079	19.1	7.8	7.6	0.08	-1.09	0.17	0.07	0
4	0	55	0.078								
5	0	65	0.089								
6	0	63	0.081								
7	0	60	0.082								
8	sunny	58	0.079	18.1	7.8	8.6	0.07	1.23	0.03	0.04	0
9	sunny	61	0.078	19.5	9	8	0.36	-2.05	0.11	0.02	0
10	sunny	58	0.078	19.4	8.9	7.6	0.15	-2.01	0.18	0.06	0
11	0	67	0.079								
12	0	69	0.079								
13	0	56	0.079								
14	0	62	0.08								
15	p/c	73	0.081	18.5	8.6	7.6	0.05	-1.35	0.19	0.07	0
16	sunny	75	0.081	19.8	8.1	7.6	0.07	-1.38	0.05	0.02	0
17	sunny	69	0.079	19.2	8.4	7.4	0.13	-1.1	0.19	0.08	0
18	0	58	0.07								
19	0	57	0.024								
20	0	65	0.03								
21	0	69	0.031								
22	sunny	78	0.054	20.1	8.6	8.8	0.12	-1.47	0.19	0.08	0
23	clear	65	0.08	19.7	6.8	8.1	0.08	0.78	0.03	0.04	0
24	sunny	69	0.082	20	8.2	8.6	0.02	-2.36	0.19	0.08	0
25	0	91	0.08								
26	0	84	0.091								
27	0	63	0.089								
28	0	59	0.081								
29	sunny	67	0.083	18.4	8.1	7.4	0.06	-1.73	0.18	0.07	0
30	sunny	70	0.079	17.3	8.3	6.2	0.13	-2.45	0.02	0.07	0
Total	X	X	2.237	X	X	X	X	X	X	X	0
Avg.	X	65.73333	0.07457	19.10714	8.1	7.78571	0.09786	-1.17143	0.135	0.06	0
Min.	X	55	0.024	17.3	6.8	6.2	0.02	-2.45	0.02	0.02	0
Max.	X	91	0.091	20.1	9	8.8	0.36	1.23	0.19	0.08	0

Saganing WWTP June 2022		
Day	CBOD %Removal	TSS %Removal
1	101.1993841	99.94495711
2	100.187547	99.80155533
3	102.8886813	99.51184095
4	#DIV/0!	#DIV/0!
5	#DIV/0!	#DIV/0!
6	#DIV/0!	#DIV/0!
7	#DIV/0!	#DIV/0!
8	98.37741303	99.62830151
9	102.4748299	98.00715381
10	101.9952632	99.24117132
11	#DIV/0!	#DIV/0!
12	#DIV/0!	#DIV/0!
13	#DIV/0!	#DIV/0!
14	#DIV/0!	#DIV/0!
15	96.64021753	99.82437311
16	101.6491323	99.59782528
17	101.2802852	99.92521737
18	#DIV/0!	#DIV/0!
19	#DIV/0!	#DIV/0!
20	#DIV/0!	#DIV/0!
21	#DIV/0!	#DIV/0!
22	101.650377	99.51830157
23	98.97354915	99.61612284
24	101.8040055	99.90260242
25	#DIV/0!	#DIV/0!
26	#DIV/0!	#DIV/0!
27	#DIV/0!	#DIV/0!
28	#DIV/0!	#DIV/0!
29	102.0918664	99.88563529
30	93.85999001	99.78851494
31	#DIV/0!	#DIV/0!
Average	#DIV/0!	#DIV/0!
Min.	#DIV/0!	#DIV/0!
Max.	#DIV/0!	#DIV/0!

Saganing WWTP June 2022				
	Aluminum Sulfate, 50%	Citric Acid, 50% (cleaning)	Sodium Bicarb	Sodium Hypochlorite, 12.5% (cleaning)
Day	Pounds	Pounds	Pounds	Pounds
1	46			
2	44			
3	50			
4	46			
5	50			
6	46		50	
7	48			
8	48			
9	46			
10	50			
11	48			
12	50			
13	46			
14	46			
15	50			
16	46			
17	50			
18	26			
19	32			
20	34			
21	32			
22	28			
23	30			
24	32			
25	34			
26	30			
27	22			
28	40			
29	34			
30	32			
Total Lbs. Soln.	1216	0	50	0
Total Lbs. Chemical	608	0	49.5	0
Average	40.53333333	#DIV/0!	50	#DIV/0!
Max.	50	0	50	0
Min.	22	0	50	0

(10)

Saganing WWTP July 2022

Plant Influent Sheet

	Weather			Flow	Raw Sewage						
	Type	Temp.	Precip.	Total	Temp.	pH	DO	TSS	BOD	CBOD	TSS mg/L 7 Day Average
Day		F	inches	MGD	C	S.U.	mg/L	mg/L	mg/L	mg/L	
1	p/c	73	0.04	0.062	20.7	7.1	4.8	71	205	214	71
2		61	0	0.064							
3		64	0	0.063							
4		70	0	0.065							
5		72	0.13	0.06							
6	p/c	69	0	0.067	20	7	3.4	71	597	568	
7	p/c	62	0	0.061	19.7	7.2	5.3	107	222	260	
8	p/c	66	0	0.069	19.6	7.2	5.4	107	175	223	95
9		80	0	0.061							
10		72	0	0.065							
11		69	0	0.061							
12		66	0.29	0.064							
13	p/c	64	0.15	0.088	20.4	7.6	6.7	38	110	120	
14	sunny	62	0.3	0.051	20.3	7.6	6.5	48	439	328	
15	sunny	71	0	0.059	20.8	7.8	5.3	129	161	158	71.66666667
16		70	0	0.051							
17		68	0	0.067							
18		68	0	0.055							
19		76	0	0.053							
20	p/c	77	0	0.051				105	239	207	
21	p/c	74	0.03	0.042				135	184	174	
22	sunny	70	0	0.039	19.8	7.8	4	129	-52	-51	123
23		76	0	0.048							
24		70	0.8	0.067							
25		61	0.05	0.053							
26		63	0	0.074							
27	sunny	69	0	0.055	19.7	8	3.8	23	326	345	
28	sunny	68	0.12	0.045	19.9	8	3.6	39	158	172	
29	sunny	65	0	0.054	19.9	7.6	6.7	39	0.33	10	33.66666667
30		61	0	0.048							
31		79	0	0.05							
Total	X	X	1.91	1.812	X	X	X	X	X	X	
Avg.	X	68.90323	0.0616129	0.0584516	20.0727	7.53636	5.045455	80.07692308	212.6407692	209.8461538	90.16666667
Min.	X	61	0	0.039	19.6	7	3.4	23	-52	-51	
Max.	X	80	0.8	0.088	20.8	8	6.7	135	597	568	

Saganing WWTP July 2022

Plant Effluent Sheet

	Weather		Flow	Treated Sewage							
	Type	Temp.	Total	Temp.	pH	DO	TSS	CBOD	Ammonia	Phos	E. coli
Day		F	MGD	C	S.U.	mg/L	mg/L	mg/L	mg/L	mg/L	ct/100ml
1	p/c	73	0.078	20.3	8.1	8.4	0.09	2.1	0.04	0.02	0
2	0	61	0.079								0
3	0	64	0.079								0
4	0	70	0.079								0
5	0	72	0.078								0
6	p/c	69	0.081	19.8	8.8	7.9	0.1	-5.73	0.17	0.07	0
7	p/c	62	0.078	19.9	8.6	8.1	0.01	-1.23	0.02	0.06	0
8	p/c	66	0.084	19.9	8.4	8.1	0.14	-1.63	0.01	0.07	0
9	0	80	0.075								0
10	0	72	0.08								0
11	0	69	0.076								0
12	0	66	0.08								0
13	p/c	64	0.095	20.7	7.8	6.8	0.15	0.15	0.17	0.07	0
14	sunny	62	0.096	20.7	7.8	6.7	0.01	-0.32	0.19	0.07	0
15	sunny	71	0.058	19.2	8.8	9.2	0.01	-0.08	0.03	0.08	0
16	0	70	0.042								0
17	0	68	0.074								0
18	0	68	0.054								0
19	0	76	0.054								0
20	p/c	77	0.055	23.2	8.1	9.1	0.03	-2.29	0.02	0.06	0
21	p/c	74	0.044	19.6	8.4	9.3	0.05	-2.07	0.01	0.06	0
22	sunny	70	0.042	20.1	6.1	7	0.03	-1.11	0.02	0.07	0
23	0	76	0.048								0
24	0	70	0.069								0
25	0	61	0.064								0
26	0	63	0.076								0
27	sunny	69	0.057	18.4	7.8	9.5	0.02	-3.81	0.02	0.07	0
28	sunny	68	0.047	18.5	7.7	9.3	0.02	-1.8	0.03	0.07	0
29	sunny	65	0.056	19.9	7.8	6.7	0.1	0.04	0.01	0.22	0
30	0	61	0.049								0
31	0	79	0.05								0
Total	X	X	2.077	X	X	X	X	X	X	X	0
Avg.	X	68.90323	0.067	20.01538	8.015	8.16154	0.05846	-1.36769	0.05692308	0.076154	0
Min.	X	61	0.042	18.4	6.1	6.7	0.01	-5.73	0.01	0.02	0
Max.	X	80	0.096	23.2	8.8	9.5	0.15	2.1	0.19	0.22	0

Saganing WWTP July 2022		
Day	CBOD %Removal	TSS %Removal
1	97.56101193	99.68156189
2	#DIV/0!	#DIV/0!
3	#DIV/0!	#DIV/0!
4	#DIV/0!	#DIV/0!
5	#DIV/0!	#DIV/0!
6	102.4693105	99.66002812
7	101.2171991	99.97610214
8	101.7956627	99.68193694
9	#DIV/0!	#DIV/0!
10	#DIV/0!	#DIV/0!
11	#DIV/0!	#DIV/0!
12	#DIV/0!	#DIV/0!
13	99.73047734	99.15134371
14	100.3679641	99.92159937
15	100.099599	99.98476006
16	#DIV/0!	#DIV/0!
17	#DIV/0!	#DIV/0!
18	#DIV/0!	#DIV/0!
19	#DIV/0!	#DIV/0!
20	102.4149055	99.93839433
21	102.5240684	99.92242869
22	95.41957733	99.9499231
23	#DIV/0!	#DIV/0!
24	#DIV/0!	#DIV/0!
25	#DIV/0!	#DIV/0!
26	#DIV/0!	#DIV/0!
27	102.315513	99.81992513
28	102.2102046	99.89293484
29	99.17379758	99.46959651
30	#DIV/0!	#DIV/0!
31	#DIV/0!	#DIV/0!
Average	#DIV/0!	#DIV/0!
Min.	#DIV/0!	#DIV/0!
Max.	#DIV/0!	#DIV/0!

Saganing WWTP July 2022				
	Aluminum Sulfate, 50%	Citric Acid, 50% (cleaning)	Sodium Bicarb	Sodium Hypochlorite, 12.5% (cleaning)
Day	Pounds	Pounds	Pounds	Pounds
1	34		0	
2	30		0	
3	30		0	
4	40		0	
5	30		0	
6	36		0	
7	34		0	
8	34		0	
9	38		0	
10	38		0	
11	38		0	
12	28		0	
13	36		0	
14	36		0	
15	36		0	
16	32		0	
17	32		0	
18	36		0	
19	36		0	
20	38		0	
21	38		0	
22	36		0	
23	40		0	
24	36		0	
25	50		0	
26	48		0	
27	46		0	
28	46		0	
29	46		0	
30	42		0	
31	54		0	
Total Lbs. Soln.	1174	0	0	0
Total Lbs. Chemical	587	0	0	0
Average	37.87096774	#DIV/0!	0	#DIV/0!
Max.	54	0	0	0
Min.	28	0	0	0

11

Saganing Water and Wastewater Improvements

Prepared by Fishbeck
for the Saginaw Chippewa Indian Tribe (SCIT)



Introduction

- Saginaw Chippewa Indian Tribe (SCIT) retained Fishbeck to complete a water and wastewater treatment system evaluation of their facility in Saganing, Michigan. SCIT recently opened a 148-room hotel and signed an agreement with Standish Township to provide water and wastewater services to the nearby Whites Beach Service Area (WBSA).
- In July of 2020, a report was prepared entitled “Saganing Casino Water and Wastewater Treatment System Evaluation.”
- Fishbeck evaluated the existing water demands and wastewater flows, estimated the impact of the future demand and flow associated with the Whites Beach Service Area, and then determined if the SCIT facilities could reliably handle the projected future water demand and wastewater flow.



Background

- In 2018 the SCIT signed an agreement with Standish Township to provide potable water and wastewater treatment services to a defined area in the Township identified as the Whites Beach Service Area (WBSA).
- A 2016 Master Plan prepared by Rowe Engineering is the planning document that projected demands from the Casino and from the 240 acres adjacent to the casino that may be developed.
- Fishbeck has prepared drawings and specifications for Phase 1 improvements at the Water Wastewater Plant in Saganing. The project is out for bids currently.
- Fishbeck is also finishing a Scoping Study for a Phase 2 Expansion at the Saganing plant that will establish future treatment and facilities for the demands on the system over a 20-year planning period. Short Term Phase 1 Improvements are intended to cover a 4-year timeline.
- Fishbeck has prepared a Water System Evaluation Study which looked at the water system, future water system demands, and the location of a possible elevated storage tank. Fishbeck will proceed with the design of the elevated storage tank upon authorization from the SCIT.
- Upon completion of the Scoping Phase Fishbeck will proceed with the design of the selected improvements and facilities for the Phase 2 improvements.

Water System

Current Water Treatment Plant Description

- Constructed in 2011.
- The water treatment plant (WTP) receives raw water from the Saginaw-Midland Municipal Water Supply Corporation (SMMWSC).
- Two Siemens MEMCOR XP18 membrane skids treat the water by using ultrafiltration to remove particulate contaminants.



Water System

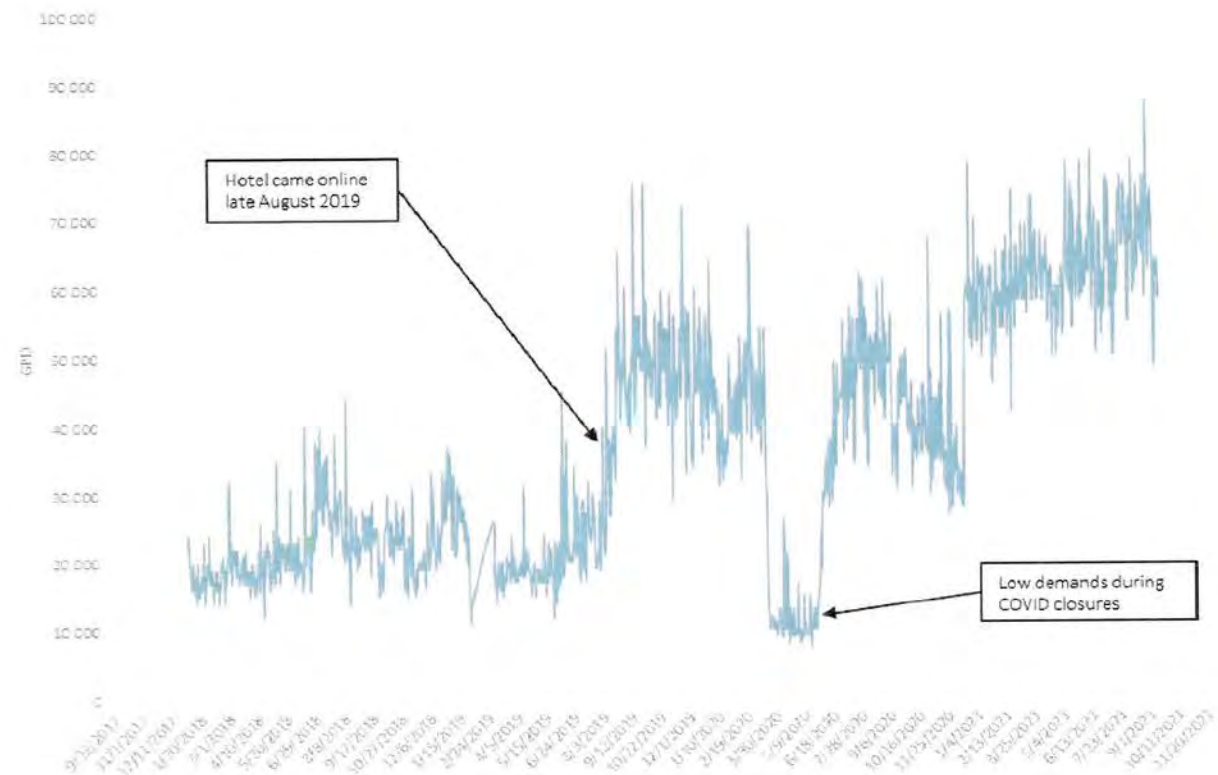
Current Water Treatment Plant Description, Continued

- Each skid has a nominal capacity of 75,000 gallons per day (gpd).
- Filtered water is disinfected and stored in clear wells in the building until it is pumped out to the distribution system that services the casino, hotel, and tribal facilities.
- Medium and high flow pumps deliver treated water to the distribution system.
- Pumps are running continuously to maintain pressure on the system, and a pressure sustaining valve vents water back into the clear wells if not needed in the system.



Water System

Current Demands



Future Development

- Rowe Study
- Other Land Use Planning studies
- Water Demand Projections
 - Water System Evaluation Study projections

Saginaw-Midland Municipal Water Supply Corporation (SMMWSC) and SCIT Agreement

Period	Maximum Allowable Daily Use (gpd)
2011 to 2015, inclusive	40,000
2016 to 2020, inclusive	130,000
2021 to 2025, inclusive	250,000
2026 to 2030, inclusive	500,000
2031 to 2034 and thereafter	1,000,000

gpd – gallons per day

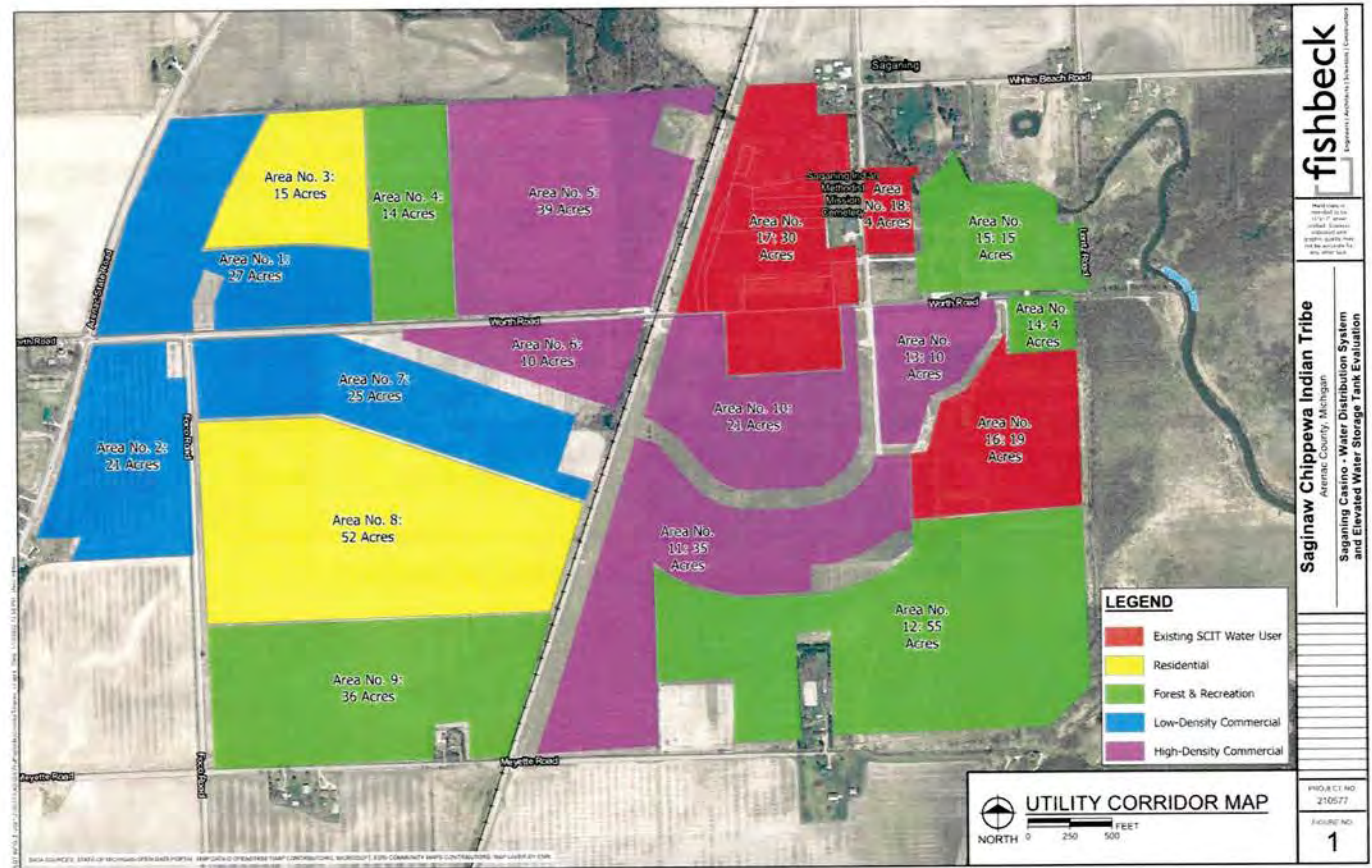
Cumulative Water Demands Through Full Build-Out

Area	Classification	2022-2026 ADD (gal/day)	2027-2031 ADD (gal/day)	2032-2036 ADD (gal/day)	2037-2041 ADD (gal/day)	Full Build-Out ADD (gal/day)
Existing System*		63,000	63,000	63,000	63,000	63,000
WBSA		18,800	18,800	18,800	18,800	18,800
1	Low Density Commercial	-	6,263	18,788	34,445	62,627
2	Low Density Commercial	-	4,731	14,193	26,020	47,309
3	Residential	-	228	684	1,254	2,280
4	Forest & Recreation	-	1,348	4,044	7,414	13,479
5	High Density Commercial	12,091	30,228	54,410	84,638	120,912
6	High Density Commercial	2,970	7,424	13,364	20,788	29,698
7	Low Density Commercial	6,037	15,094	27,169	42,262	60,375
8	Residential	7,996	19,990	35,981	55,971	79,958
9	Forest & Recreation	3,491	8,728	15,710	24,437	34,910
10	High Density Commercial	9,818	19,637	32,728	49,092	65,456
11	High Density Commercial	10,728	26,819	48,274	75,093	107,275
12	Forest & Recreation	6,109	15,273	27,492	42,765	61,093
14	High Density Commercial	4,455	8,909	14,849	22,273	29,698
15	Forest & Recreation	330	824	1,484	2,308	3,297
18	Forest & Recreation	1,610	4,024	7,244	11,268	16,097
Total System ADD (mgd)		0.15	0.25	0.40	0.58	0.82
Total System MDD (mgd)		0.25	0.46	0.75	1.12	1.59
Total System PKHR (mgd)		0.58	0.89	1.33	1.88	2.58

*Existing system is at full buildout according to Rowe's study

Future Development, Continued

Utility Corridor Map



Future Development, Continued

Utility Corridor Development Timeline

Area No.	Zone	2022-2026	2027-2031	2032-2036	2037-2041
1	Low Density Commercial	0%	10%	30%	55%
2	Low Density Commercial	0%	10%	30%	55%
3	Residential	0%	10%	30%	55%
4	Forest & Recreation	0%	10%	30%	55%
5	High Density Commercial	10%	25%	45%	70%
6	High Density Commercial	10%	25%	45%	70%
7	Low Density Commercial	10%	25%	45%	70%
8	Residential	10%	25%	45%	70%
9	Forest & Recreation	10%	25%	45%	70%
10	High Density Commercial	15%	30%	50%	75%
11	High Density Commercial	10%	25%	45%	70%
12	Forest & Recreation	10%	25%	45%	70%
13	High Density Commercial	15%	30%	50%	75%
14	Forest & Recreation	10%	25%	45%	70%
15	Forest & Recreation	10%	25%	45%	70%
16	Existing SCIT Water User	100%	100%	100%	100%
17	Existing SCIT Water User	100%	100%	100%	100%
18	Existing SCIT Water User	100%	100%	100%	100%

Phase 1 Water System

The following improvements are included in the Phase 1 design documents:

- Demolition of the low flow pumps and controls.
- One redundant medium flow pump.
- One redundant pressure sustaining valve (PSV).
- Two Ultrafiltration (UF) equipment skids (procured equipment).
- Installation of the UF procured equipment.
- New finished water pump control and control panel.
- An additional inline booster pump and new control panel.
- Process piping Improvements.
- Associated control and electrical conduit and wiring.

Water System Build out Capacity

Memcor XPsr18 Skid Production Volumes

No. of Skids	Filtrate Produced (gal) One 8-hour Shift	Filtrate Produced (gal) Two 8-hour Shifts	Filtrate Produced (gal) Three 8-hour Shifts
1	25,000	50,000	75,000
2	50,000	100,000	150,000
3	75,000	150,000	225,000
4	100,000	200,000	300,000
5	125,000	250,000	375,000
6	150,000	300,000	450,000

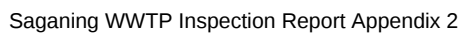
Water System

Elevated Tank Recommendations:

- The Water System Evaluation Study has recommended the construction of a minimum 250,000-gallon tank.
- Various selections of site locations were identified with the most favorable as indicated in the next slides.

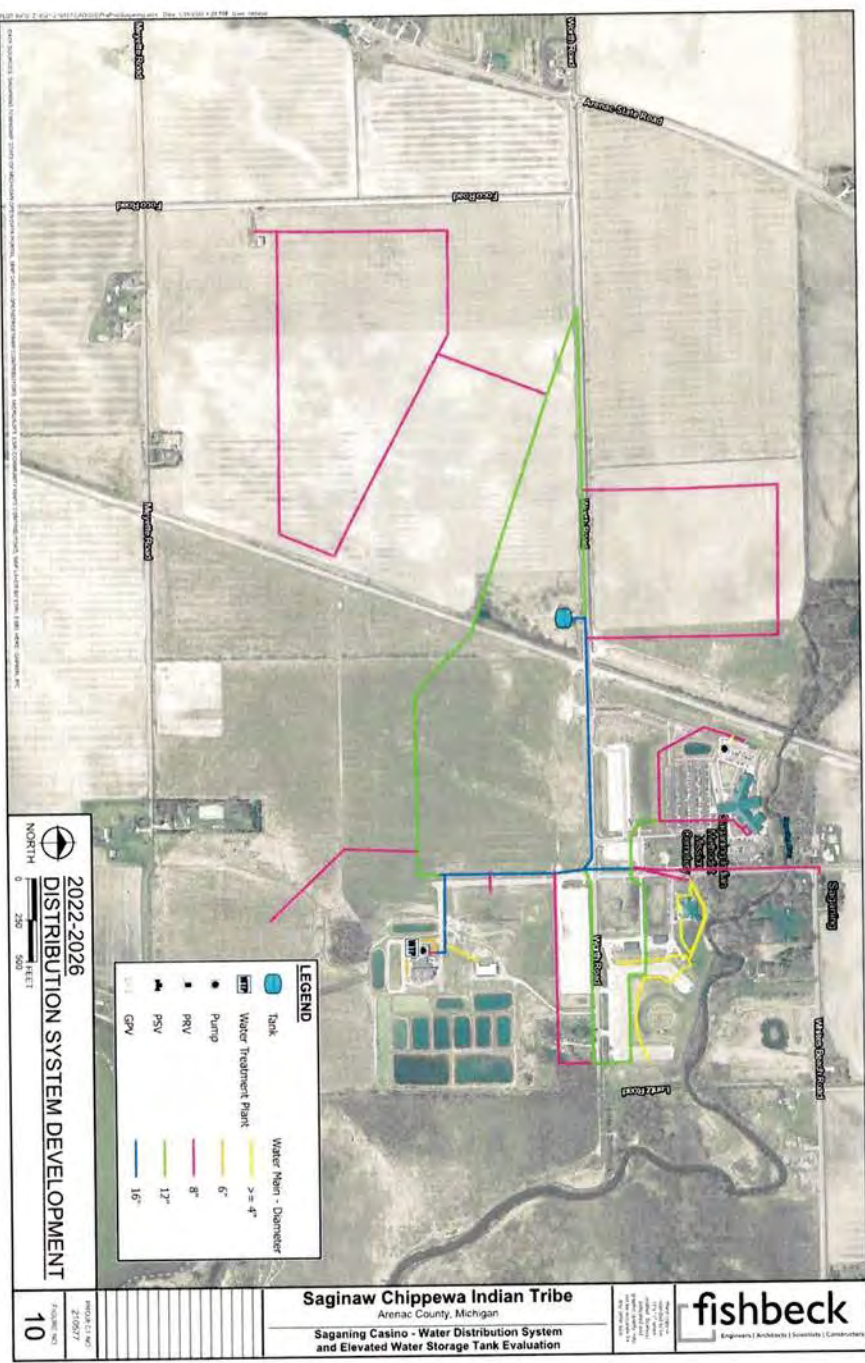


Existing Water Distribution System Pressure Contours



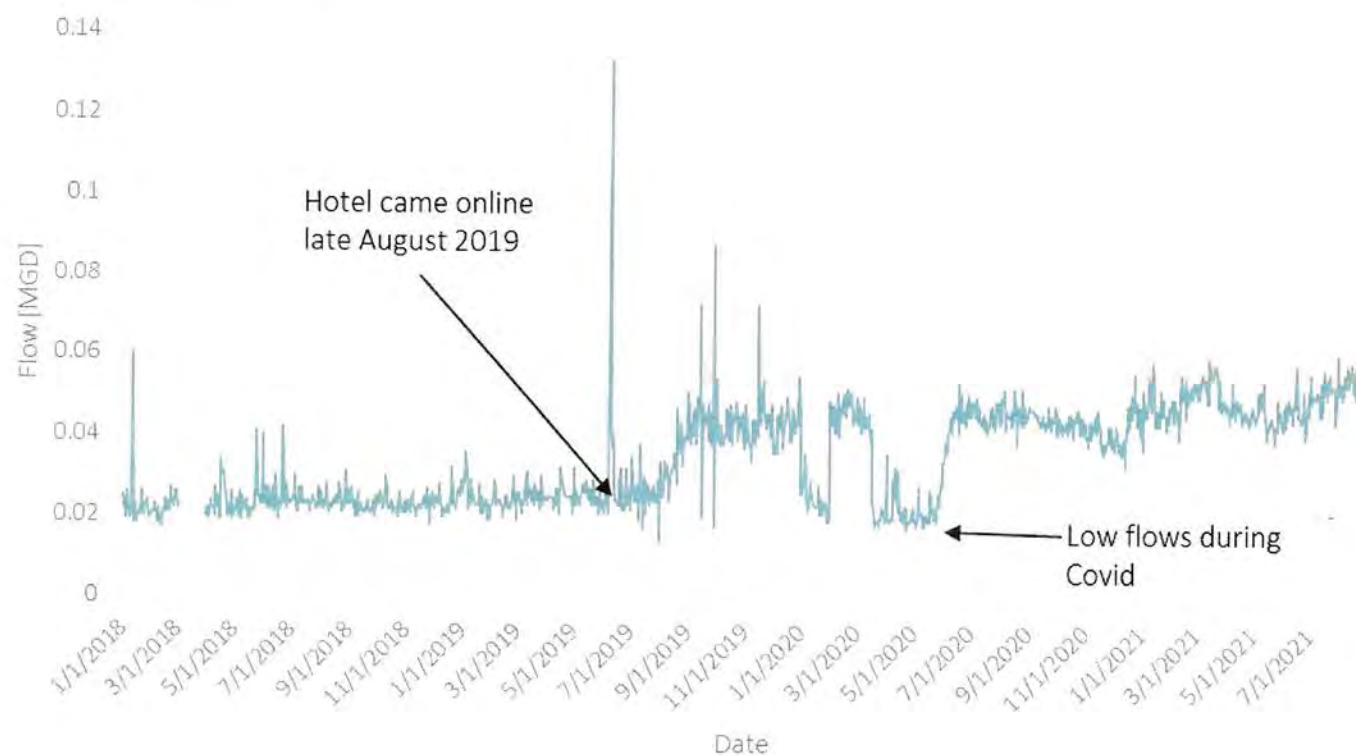
Water System

Preferred Elevated Tank Location



Wastewater System

Current Wastewater Flows



Wastewater System

Wastewater System Capacity

- The current treatment system consists of 2 Siemens Xpress Membrane Biological Reactor (MBR) treatment units.

Table 5 - MBR Treatment Unit Capacity

Number of Units in Service	Allowable Sustained Continuous Flow (gpm)	Net Throughput for Sustained Flow with Relaxation Periods (gpd)	Allowable Peak Flow or Three Day Sustained Flow (gpm)	Allowable Peak Flow with Relaxation Period (gpd)
1	70	100,800	140	201,600
2	140	201,600	280	403,200

Wastewater System

Projected Wastewater Treatment plant flows:

- Typical wastewater generation is about 80% of the water flow.
- Assuming that relationship holds true for future water wastewater design flows the following projections of wastewater flow are made over the 20-year planning period.



Wastewater Treatment System

Wastewater Flows Projections

Area	Classification	2022-2026 ADF (gal/day)	2027-2031 ADF (gal/day)	2032-2036 ADF (gal/day)	2037-2041 ADF (gal/day)	Full Build-Out ADF (gal/day)
Existing System		49,500	49,500	49,500	49,500	49,500
WBSA		15,000	15,000	15,000	15,000	15,000
1	Low Density Commercial	0	5,010	15,030	27,556	50,102
2	Low Density Commercial	0	3,785	11,354	20,816	37,847
3	Residential	0	182	547	1,003	1,824
4	Forest & Recreation	0	1,078	3,235	5,931	10,783
5	High Density Commercial	9,673	24,182	43,528	67,710	96,730
6	High Density Commercial	2,376	5,939	10,691	16,630	23,758
7	Low Density Commercial	4,830	12,075	21,735	33,810	48,300
8	Residential	6,397	15,992	28,785	44,777	63,966
9	Forest & Recreation	2,793	6,982	12,568	19,550	27,928
10	High Density Commercial	7,854	15,710	26,182	39,274	52,365
11	High Density Commercial	8,582	21,455	38,619	60,074	85,820
12	Forest & Recreation	4,887	12,218	21,994	34,212	48,874
14	High Density Commercial	3,564	7,127	11,879	17,818	23,758
15	Forest & Recreation	264	659	1,187	1,846	2,638
18	Forest & Recreation	1,288	3,219	5,795	9,014	12,878
Total System ADF (mgd)		0.12	0.20	0.32	0.46	0.65
Total System MDF (mgd)		0.16	0.28	0.44	0.64	0.90
Total System PKHR (mgd)		0.46	0.78	1.24	1.81	2.54

Wastewater System

The following WWTP improvements are included in the Phase 1 design documents:

- Demolition of the influent pumps and replacement of 3 existing pumps.
- Piping improvements to allow the bypass of the raw wastewater wetwell for repair, cleaning and maintenance.
- Process piping Improvements.
- Control panel updating and associated control and electrical conduit and wiring.





Water Wastewater System Conclusions

- Current system reliability and redundancy concerns and the necessity to handle immediate demands requires that the Phase 1 project be constructed.
- Improvements for Phase 1 are interim measures, and a Phase 2 design report is currently being completed for recommended improvements over the 20-year planning period.

Water Wastewater System Conclusions, Continued

Expected Phase 2 water improvements:

- Additional UF skids or other membrane system in a building expansion.
- Associated booster pump and air compressor capacity.
- SCADA system for better process control and remote monitoring.
- Upsizing high service Pumps.
- Additional clear well capacity.

Expected Phase 2 wastewater Improvements:

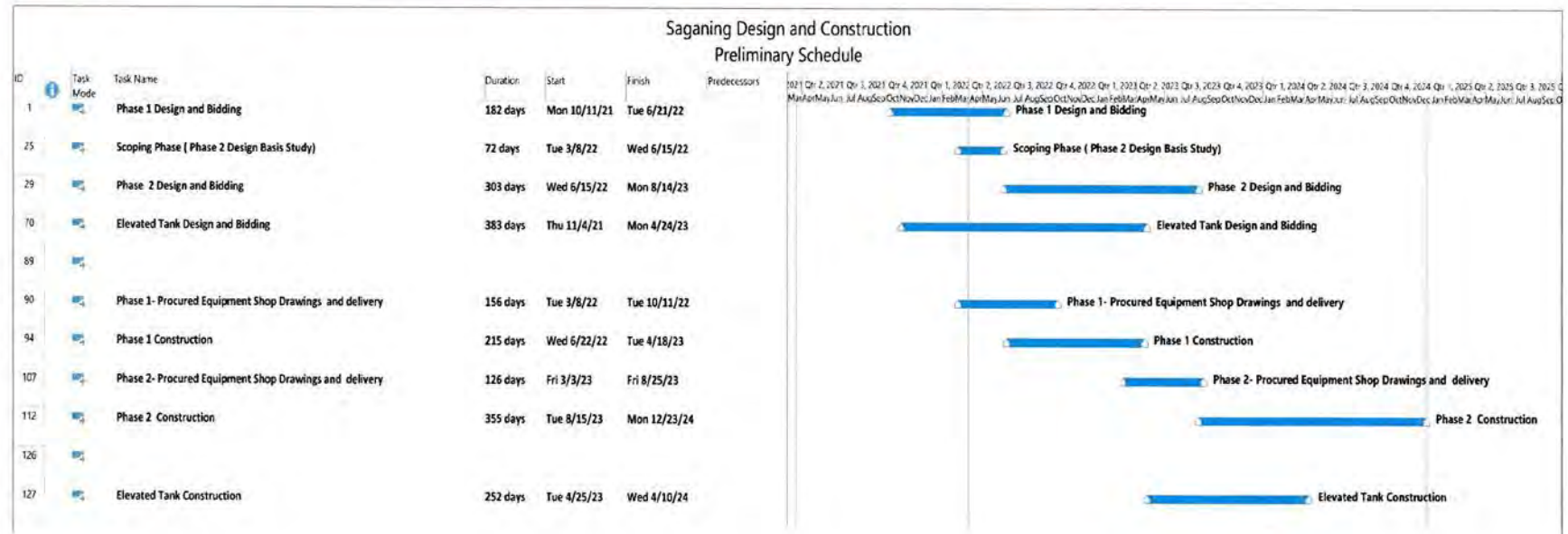
- An equalization tank with aeration and mixing.
- Large solids removal prior to the Raw Wastewater Pumping Station.
- Possible oil and grease removal system.
- Additional Membrane Biological Reactor (MBR) or Moving Bed Biofilm Reactor (MBBR).
- Additional building expansion to contain the treatment units.
- Sludge handling and storage facilities
- Long term agreements for sludge hauling and disposal.
- SCADA system for better process control and remote monitoring.
- Upgrade Chemical Feed Systems.

Water Wastewater System Conclusions, Continued

Elevated Storage Tank

- The completion of the Water System Evaluation allows for the Elevated Tank design to begin.
- A minimum 250,000-gallon tank has been recommended in the Water System Evaluation Study recently completed.

Water Wastewater Project Schedule



Questions?



TNT 830 Nitrogen, Ammonia

DOC312.53.94125

0.015–2.000 mg/L $\text{NH}_3\text{-N}$ Ultra Low Range

TNTplus®

Scope and application: For municipal and industrial wastewaters, environmental waters and watershed protection monitoring.



Test preparation

Reagent storage

Storage temperature: 2–8 °C (35–46 °F)

pH/Temperature

The pH of the water sample must be between pH 4–8.

The temperature of the water sample and reagents must be between 20–23 °C (68–73.4 °F).

Before starting

In case of not working at the correct recommended temperature an incorrect result may be obtained.

Analyze the samples as soon as possible for best results.

Time dependency:

The final absorbance is reached after a reaction time of **15 minutes** and then remains **constant for a further 15 minutes**.

Review safety information and expiration date on the package.

Review the Safety Data Sheets (MSDS/SDS) for the chemicals that are used. Use the recommended personal protective equipment.

Dispose of reacted solutions according to local, state and federal regulations. Refer to the Safety Data Sheets for disposal information for unused reagents. Refer to the environmental, health and safety staff for your facility and/or local regulatory agencies for further disposal information.

Procedure



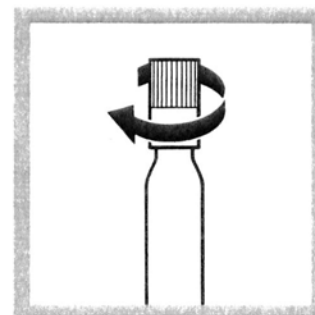
1. Carefully remove the foil from the screwed-on DosiCap Zip.



2. Unscrew the DosiCap Zip.



3. Carefully pipet 5.0 mL of sample.



4. Immediately screw the DosiCap Zip back on; fluting at the top.



5. Shake **vigorously** (2–3 times).



6. After **15 minutes**, thoroughly clean the outside of the vial and evaluate.



7. Insert the vial into the cell holder.
DR 1900: Go to LCK/TNTplus methods. Select the test, push **READ**.

Interferences

The ions listed in the table have been individually checked against the given concentrations and do not cause interference. The cumulative effects and the influence of other ions have not been determined.

Primary amines are also determined and cause high-bias results. A 10,000-fold excess of urea does not interfere. All reducing agents interfere and cause low-bias results.

A large excess of ammonium can cause result displays within the measuring range. It is advisable to carry out a plausibility check by making dilutions.

The measurement results must be subjected to plausibility checks (dilute and/or spike the sample).

Interference level	Interfering substance
1000 mg/L	Cl^- , SO_4^{2-}
500 mg/L	K^+ , Na^+ , Ca^{2+}
50 mg/L	CO_3^{2-} , NO_3^- , Fe^{3+} , Cr^{3+} , Cr^{6+} , Zn^{2+} , Cu^{2+} , Co^{2+} , Ni^{2+} , Hg^{2+}
25 mg/L	Fe^{2+}
10 mg/L	Sn^{2+}
5 mg/L	Pb^{2+}
2 mg/L	Ag^+

Summary of method

Ammonium ions react at pH 12.6 with hypochlorite ions and salicylate ions in the presence of sodium nitroprusside as a catalyst to form indophenol blue.

TNT^{plus}



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TNT 843 Phosphorus, Reactive (Orthophosphate) and Total

DOC312.53.94142

0.05–1.50 mg/L $\text{PO}_4^{3-}\text{-P}$ or
0.15–4.50 mg/L PO_4^{3-} Low Range

TNTplus®—Method 10209/10210

Scope and application: For wastewater, drinking water, boiler water, surface water and process analysis.



Test preparation

Reagent storage

Storage temperature: 15–25 °C (59–77 °F)

pH/Temperature

The pH of the water sample must be between pH 2–10.

The temperature of the water sample and reagents must be between 15–25 °C (59–77 °F).

Before starting

ATTENTION—Important information for the evaluation!

Without hydrolysis, only the (dissolved) orthophosphate is measured. The result of the orthophosphate measurement can be expressed as: mg/L $\text{PO}_4\text{-P}$ (for example, process analysis), mg/L PO_4 (for example, drinking water or boiler water analysis), mg/L P_2O_5 (for example, soil analysis).

With hydrolysis, all of the phosphorus (Total-P, P_{total}) is measured. The result of the total phosphorus measurement can be expressed as: mg/L P_{tot} = Display mg/L $\text{PO}_4\text{-P}$ (for example, for monitoring threshold values in wastewater), mg/L PO_4 (for example, drinking water or boiler water analysis), mg/L P_2O_5 (for example, soil analysis).

Inverting the vial after hydrolysis improves the reliability of the result.

Determination of orthophosphate: filtrate the sample before the analysis.

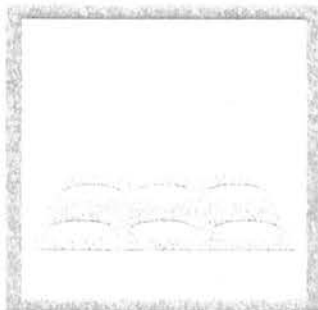
In case of not working at the correct recommended temperature an incorrect result may be obtained.

Review safety information and expiration date on the package.

Review the Safety Data Sheets (MSDS/SDS) for the chemicals that are used. Use the recommended personal protective equipment.

Dispose of reacted solutions according to local, state and federal regulations. Refer to the Safety Data Sheets for disposal information for unused reagents. Refer to the environmental, health and safety staff for your facility and/or local regulatory agencies for further disposal information.

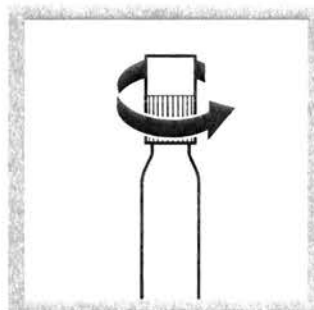
Procedure—Phosphorus Total



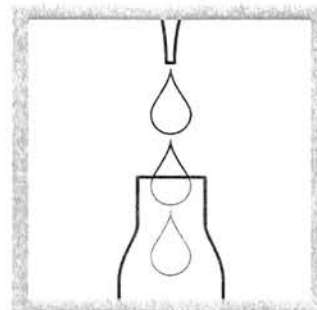
1. Preheat the reactor to 100 °C (212 °F).



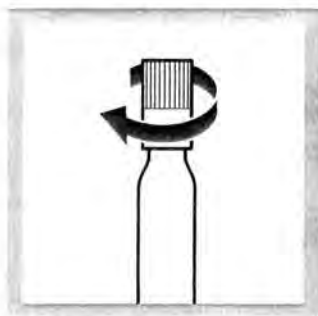
2. Carefully remove the foil from the screwed-on DosiCap Zip.



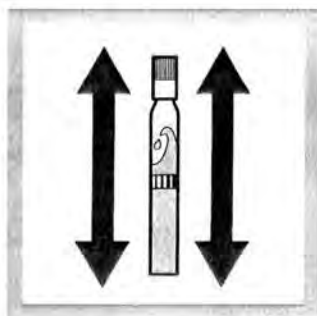
3. Unscrew the DosiCap Zip.



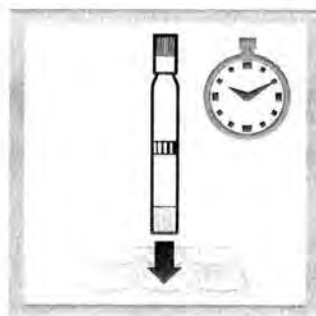
4. Carefully pipet 2.0 mL of sample.



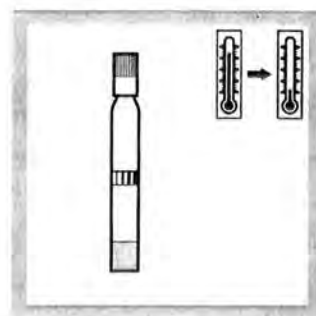
5. **Immediately** screw the DosiCap Zip back on; **fluting at the top**.



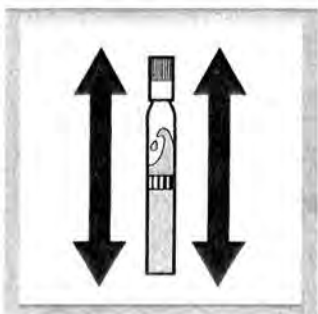
6. Shake **vigorously**.



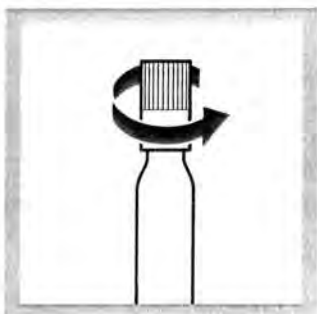
7. Heat in the reactor for **1 hour** at **100 °C (212 °F)**.



8. Allow to **cool** to room temperature.



9. Shake **vigorously**.



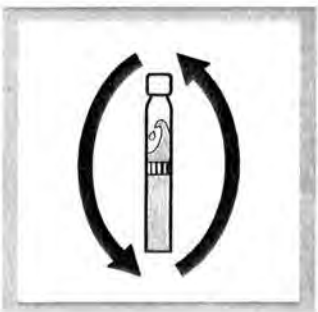
10. Unscrew the DosiCap Zip.



11. Pipet into the cooled vial: **0.2 mL reagent B**. Close **reagent B** immediately after use.



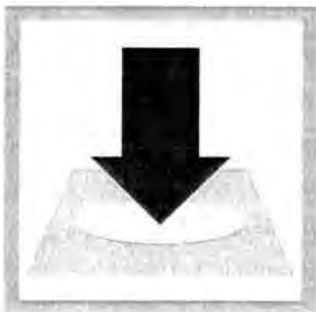
12. Screw a **grey** colored DosiCap C on the vial.



13. Invert a few times until the freeze-dried contents are **completely dissolved**.

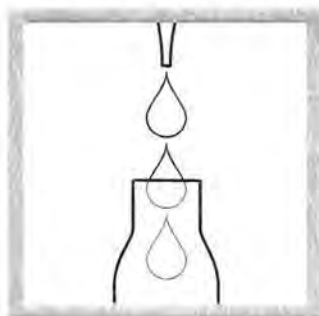


14. After **10 minutes**, invert a few more times, thoroughly clean the outside of the vial and evaluate.



15. Insert the vial into the cell holder.
DR 1900: Go to LCK/TNTplus methods. Select the test, push **READ**.

Procedure—Phosphorus Reactive (Orthophosphate)



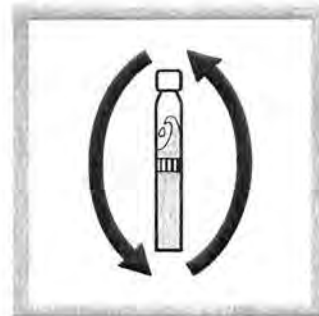
1. Carefully pipet 2.0 mL of sample.



2. Pipet 0.2 mL reagent B. Close reagent B immediately after use.



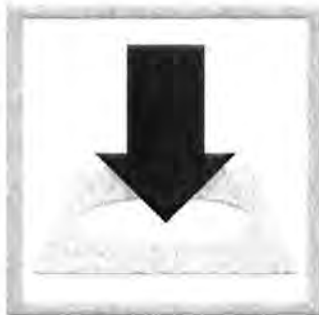
3. Screw a grey colored DosiCap C on the vial.



4. Invert a few times until the freeze-dried contents are completely dissolved.



5. After 10 minutes, invert a few more times, thoroughly clean the outside of the vial and evaluate.



6. Insert the vial into the cell holder.
DR 1900: Go to LCK/TNTplus methods. Select the test, push READ.

Interferences

The ions listed in the table have been individually checked against the given concentrations and do not cause interference. The cumulative effects and the influence of other ions have not been determined.

The measurement results must be subjected to plausibility checks (dilute and/or spike the sample).

Interference level	Interfering substance
5000 mg/L	SO_4^{2-}
2000 mg/L	Cl^-
1000 mg/L	K^+ , Na^+
500 mg/L	NO_3^-
250 mg/L	Ca^{2+}
100 mg/L	Mg^{2+}
50 mg/L	Co^{2+} , Fe^{2+} , Fe^{3+} , Zn^{2+} , Cu^{2+} , Ni^{2+} , I^- , NO_2^- , Cd^{2+} , NH_4^+ , Mn^{2+} , Al^{3+} , CO_3^{2-} , SiO_2
5 mg/L	Sn^{4+} , Hg^{2+}
2.5 mg/L	Ag^+ , Pb^{2+}
1 mg/L	Cr^{3+}
0.5 mg/L	Cr^{6+}

Summary of method

Phosphate ions react with molybdate and antimony ions in an acidic solution to form an antimonyl phosphormolybdate complex, which is reduced by ascorbic acid to phosphormolybdenum blue.

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