2020 ANNUAL WASTEWATER TREATMENT SYSTEM SUMMARY REPORT
Drumbo Wastewater Treatment Plant

1. General Information

Oxford County prepares individual annual reports summarizing each wastewater treatment plant's operation and treated effluent discharge quality for the nine wastewater treatment plants it owns and operates. The reports detail the latest quality testing results and quantity statistics and any non-compliance conditions that may have occurred. They are available for review by the end of March on the internet at www.oxfordcounty.ca/Services-for-You/Water-Wastewater/Wastewater/Annual-reports or by contacting the Public Works Department.

All efforts have been made to ensure the information presented in this report is as accurate as possible.
If you have any questions or comments concerning the report, please contact the County of Oxford at the address and phone number listed below or by email at publicworks@oxfordcounty.ca.

Wastewater Treatment Plant:	Drumbo Wastewater Treatment Plant
Wastewater Treatment Plant Number:	120002479
Environmental Compliance Approval (ECA)	#8752-9Q4H96 (February 9, 2015)
Wastewater Treatment Plant Owner & Contact Information:	Oxford County Public Works Department P.O. Box 1614, 21 Reeve Street Woodstock, ON N4S 7Y3 Telephone: 519-539-9800 | Toll Free: 866-537-7778
Reporting Period:	January 1, 2020 – December 31, 2020

1.1. System Description

The Drumbo Sequencing Batch Reactor (SBR) is a Class II rated treatment facility, servicing the village of Drumbo. The nominally separated wastewater collection system includes 3 sewage pumping station, 6.6 kilometers of sanitary gravity sewers, and 2 kilometers of sanitary forcemain sewers.

The SBR plant consists of two alternating reactors, pressure filters and ultra-violet light for disinfection, with an outfall pipe to a wetland area which discharges to the Cowan Drain. Oxford County operates the plant, utilizing the staff located at the Woodstock WWTP. Biosolids are temporarily stored at the Drumbo WWTP and routinely transported to the Woodstock WWTP for digestion.

A standby generator is available to run the onsite water facility and the SBR in the event of a power failure. The system is maintained by licensed wastewater treatment system operators and licensed mechanics that operate, monitor, and maintain the treatment equipment, in accordance to the regulations, and collect samples as required by the ECA. Alarms automatically notify operators in the event of failure of critical operational requirements.

The facility provided effective wastewater treatment in 2020, as demonstrated by the table below.

Facility	Drumbo Wastewater Treatment Plant
Design Capacity	300 m^3/d
2020 Average Daily Flow	266 m^3/d
2020 Maximum Daily Flow	677 m^3/d
2020 Total Volume of Wastewater	97,291 m^3/year

2. Summary and Interpretation of Monitoring Data

2.1. Effluent Quality Assurance and Control Measures

Sampling Procedure

Influent samples are taken using a 24-hour composite sampler on a monthly basis from the transfer tank. This tank receives flow from the trash tank, which holds most of the daily flow.

Effluent samples are taken weekly using a 24-hour composite sampler installed so as to sample during periods of flow from either of the two reactors. Samples are taken on site and tested for pH, dissolved oxygen, and temperature.

Laboratory and Field Testing

Laboratory analysis is performed by SGS Lakefield Research Ltd. on all samples that are reported for compliance except for pH, DO, chlorine residual, and temperature which are analyzed in the field.

2.2. Plant Performance & Effluent Quality

The Drumbo WWTP provided effective treatment in 2020 with 694 samples out of 707 meeting compliance, or 98.2 % compliance to its regulatory limits for all effluent discharged from the facility.

The Drumbo WWTP was compliant with all regulatory limits with the exception of the September effluent monthly average concentration for Total Ammonia Nitrogen. The effluent monthly average concentration for Total Ammonia Nitrogen was 4.0 mg/L, with an E.C.A. concentration limit of 2.7 mg/L. This was caused by an unknown substance contained in the influent that was very high in nutrients and organic concentrations. This material turned the influent very dark, and caused several tanks within the plant to become dark as well, while the plant effluent remained clear. In reaction, the Sewer Use By-Law staff began sampling the collection system in search of the source. Tanks at the Treatment Plant were cleaned out and additional loads of microorganisms were brought in from the Woodstock Wastewater Treatment Plant to reseed the aeration tanks. Operators were onsite each day, including weekends, to monitor conditions and make process changes. The forcemain into the Plant was also swabbed in the fall, as a preventative measure. The non-compliance was reported to the M.E.C.P. at the time.

On a weekly basis, the Operator measures pH of both the influent and effluent streams. There was no single pH result for the effluent outside the discharge limit of 6 - 9.5 in 2020. Analyses results are summarized below.

Graphs of discharge parameters versus effluent discharge limits are included in this report in Appendix A.

Influent wastewater characteristics and effluent discharge values are presented in the tables below.

Influent Wastewater Characteristics		
Parameter	**Concentration mg/L**	**Loading kg/d**
BOD_5	115	31
Total Suspended Solids	80	21
Total Phosphorus	4	1
Total Kjeldahl Nitrogen	34	9

Effluent Parameter	Sample Frequency	ECA Effluent Limit (Monthly Average) (milligram per liter unless otherwise indicated)	Monthly Average Result Min-Max (milligram per liter unless otherwise indicated)	Percentage Removal
$CBOD_5$	weekly	9.3	2.0 – 2.8	97.1 – 97.9
Total Suspended Solids	weekly	9.3	2.3 – 4.9	93.9 – 97.1
Total Phosphorus	weekly	0.46	0.1 – 0.23	94.3 – 97.5
Total Ammonia Nitrogen (May 1 to October 31)	weekly	2.7	1.1 – 4.0	--
Total Ammonia Nitrogen (Nov. 1 to April 30)	weekly	4.5	0.8 – 4.2	--
E. coli	weekly	200 organisms/100 mL (monthly Geometric Mean Density)	2.0 – 15.5 organisms/100 mL (monthly Geometric Mean Density)	--
DO	weekly	5.0 or higher	6.6 – 8.9	--
pH any single sample	weekly	6.0 - 9.5	6.8 – 7.9	--

2.3. Effluent Objectives

Objectives are non-enforceable effluent quality values which the owner is obligated to use best efforts to strive towards achieving on an ongoing basis. These objectives (summarized below) are to be used as a mechanism to trigger corrective action proactively, and voluntarily before environmental impairment occurs and before the compliance limits are exceeded.

The following table presents the range of effluent discharge values vs. ECA Objectives.

Effluent Parameter	Sample Frequency	Monthly Average Objective Concentration (milligram per liter unless otherwise indicated)	Monthly Average Result Min-Max (milligram per liter unless otherwise indicated)
$CBOD_5$	weekly	4.7	2.0 – 2.8
Total Suspended Solids	weekly	4.7	2.3 – 4.9
Total Phosphorus	weekly	0.27	0.1 – 0.23
Total Ammonia Nitrogen (May 1 to October 31)	weekly	1.8	1.1 – 4.0
Total Ammonia Nitrogen (Nov. 1 to April 30)	weekly	3.6	0.8 – 4.2
E. coli	weekly	150 organisms/100 mL (monthly Geometric Mean Density)	2.0 – 15.5 organisms/100 mL (monthly Geometric Mean Density)
DO	weekly	6 or higher	6.6 – 8.9
pH any single sample	weekly	6.5 - 8.5	6.8 – 7.9

The plant has had difficulty meeting its objectives, as the facility is at the limit of its treatment capacity. A Schedule C Class Environmental Assessment was completed in 2019, which recommended increasing the plant's capacity from 300 m^3/day to 450 m^3/day (there is potential to increase to 600 m^3/day by adding two additional cassettes) by upgrading the existing Sequential Batch Reactor plant (SBR) to a Membrane Bioreactor plant (MBR). Design work is almost complete to upgrade the facility by retrofitting the MBR system within the existing treatment tankage.

Exceedances of the Monthly Average Objectives are included the following table.

Month	Parameter	Objective (mg/L)	Monthly Average Result (mg/L)
January	INF. FLOW	300 m^3/d	391 m^3/d
March	INF. FLOW	300 m^3/d	377 m^3/d
August	TAN	1.8	2.6
September	TAN	1.8	4.0
November	TAN	3.6	4.2
December	TSS	4.7	4.9

3. Overflows, Bypassing, Upsets, Spills, and Abnormal Condition

There were no overflows, bypassing, upsets, spills and abnormal conditions in 2020.

In February, there was a complaint from a resident, regarding the water quality in the marshland located off Oxford County road 3. Plant Operations staff investigated and could not find any evidence of dark coloured effluent leaving the plant. It was explained to the resident that darker coloured water is common in many marshes/bogs, and that it was not being generated by the Treatment Plant.

The Drumbo SBR is nearing its rated capacity and as such achieving the treatment objectives is challenging. Oxford County is currently undertaking design work to expand the treatment facility to address the constraints.

The Limited Operational Flexibility for modifications to the wastewater plant was not used in 2020.

4. Maintenance of Works

The operating and maintenance staff conducts regularly scheduled maintenance of the plant equipment. The Plant utilizes a database system known as Cartegraph to issue work orders and maintain records for regular maintenance and repair at the wastewater treatment facility.

5. Monitoring Equipment Maintenance and Calibration

Calibration of flow meters is conducted yearly by Indus-Controls Inc. in accordance with the requirements of the ECA. The records are kept on-site at the Plant.

All other operational monitoring equipment is calibrated by staff and records are kept on-site at the Plant.

6. Biosolids 2020

Co-thickened primary sludge is transported to Woodstock WWTP for further treatment.

Biosolids are anaerobically digested and dewatered at the Woodstock WWTP using two Alfa-Laval Centrifuges. The biosolids are then stored at the Oxford County Biosolids Centralized Storage Facility (BCSF) prior to land application. The sampling results and land application details are summarized in a separate Biosolids Annual report, available at: www.oxfordcounty.ca/Services-for-You/Water-Wastewater/Wastewater/Annual-reports.

7. Inspection, Pilots, and Trials

The Ministry of Environment, Conservation and Parks (MECP) conducted a facility inspection of the Drumbo Wastewater Treatment Plant on March 6, 2020. The inspection covered the period of January 1, 2018 to January 31, 2019.

The result of the inspection stated a few non-compliance issues, with no regulatory requirements or actions required:

1. The sewage works effluent sample results did not demonstrate compliance with total suspended solids limits prescribed by the Environmental Compliance Approval.
The ECA Total Suspended Solids (TSS) Average Concentration limit is 9.3 mg/L and the Average Waste Loading limit is 2.8 kg/day. The limit is based on a Monthly Average Concentration as defined by the ECA.
According to the data provided for review, all the monthly average concentrations for TSS, except for October 2018, met the regulated limit stipulated in the current ECA during the course of this inspection period. The TSS average concentrations for the month was 21.2 mg/L and limit is 9.3 mg/L and the loading limit was 4.9 kg/day and the loading limit is 2.8 kg/day.
Action(s) Required:
The Owner contacted the MECP verbally and in writing detailing the exceeding total suspended solids values. Corrective actions taken by the Owner included totally cleaning out the entire wastewater treatment plant. No further action is required.

2. The sewage works effluent sample results did not demonstrate compliance with total phosphorous limits prescribed by the Environmental Compliance Approval.
The ECA Total Phosphorus (TP) Average Concentration limit is 0.46 mg/L and the Average Waste Loading limit is 0.14 kg/day. The limit is based on a Monthly Average Concentration as defined by the ECA.
According to the data provided for review, all the monthly average concentrations for TP, except for October 2018, met the regulated limit stipulated in the current ECA during the course of this inspection period. The TP average concentrations for the month was 0.47 mg/L and limit is 0.46 mg/L.
Action(s) Required:
The Owner contacted the MECP verbally and in writing detailing the exceeding total phosphorus value. Corrective actions taken by the Owner included totally cleaning out the entire wastewater treatment plant. No further action is required.

3. The sewage works effluent sample results did not demonstrate compliance with total ammonia/total ammonia nitrogen/unionized ammonia limits prescribed by the Environmental Compliance Approval.
The ECA Total Ammonia Nitrogen (TAN) Average Concentration limit is 2.7 mg/L (May 01 to October 31) and 4.5 mg/L (November 01 to April 30) and the Average Waste Loading limit is 0.8 kg/day (May 01 to October 31) and 1.36 kg/day (November 01 to April 30). The limit is based on a Monthly Average Concentration as defined by the ECA. According to the data provided for review, all the monthly average concentrations for TAN, except for February 2018, March 2018, September 2018 and October 2018, met the regulated limit stipulated in the current ECA during the course of this inspection period. The TAN average concentrations for the month of February 2018 was 5.9 mg/L and the limit is 4.5 mg/L. The TAN average loading for the month of February 2018 was 1.86 kg/day and the loading limit is 1.36 kg/day. The TAN average concentrations for the month of March 2018 was 5.07 mg/L and limit is 4.5 mg/L. The TAN average loading for the month of March 2018 was 1.44 kg/day and the loading limit is 1.36 kg/day. The TAN average concentrations for the month of September 2018 was 3.83 mg/L and limit is 2.7 mg/L. The TAN average loading for the month of September 2018 was 1.7 kg/day and the loading limit is 0.8 kg/day. The TAN average concentrations for the month of October 2018 was 7.37 mg/L and limit is 2.7 mg/L. The TAN average loading for the month of September 2018 was 8.2 kg/day and the loading limit is 0.8 kg/day.
Action(s) Required:
The Owner contacted the MECP verbally and in writing during each monthly exceedance detailing the exceeding TAN values. Corrective actions taken by the Owner included totally cleaning out the entire treatment plant and reseeding the treatment plant. No further action is required.

One recommendation for best practices was reported:

1. The sewage works effluent sample results did not meet the effluent objectives stated in the Environmental Compliance Approval.

The ECA requires the Owner to use best efforts to design, construct and operate the Works with the objective that the concentrations of the materials named in the ECA as effluent parameters are not exceeded in the effluent from the Works. Over the course of this inspection period, there were exceedances of the effluent objectives. The following is a summary of the objective exceedances:

Objective exceedances for 2018:

- CBOD5 - exceeded 5 months during of the year
- TSS - exceeded 7 months during the year
- TAN - exceeded 5 months during the year
- TP - exceeded 2 months during the year

Objective exceedances for 2019:

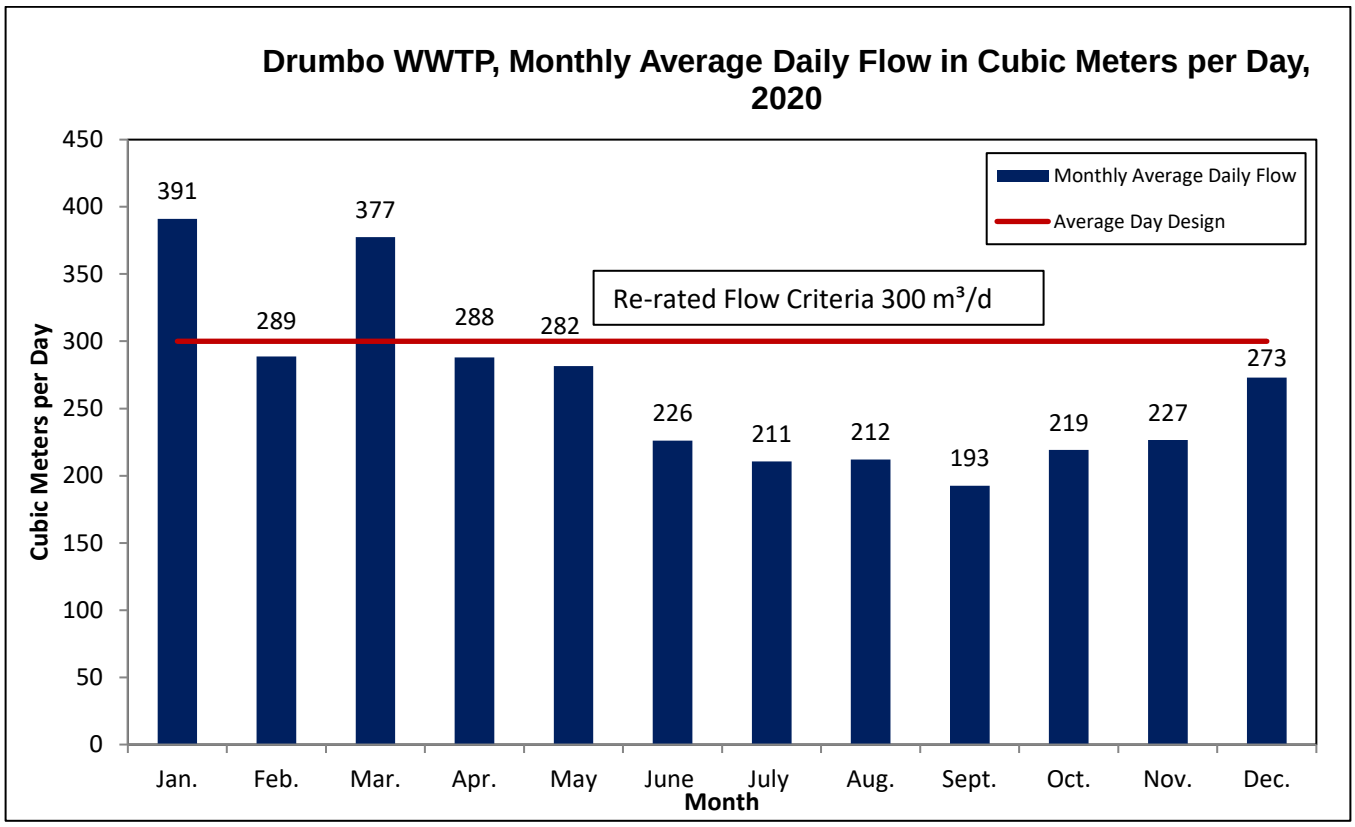
- TSS - exceeded 3 months during the year

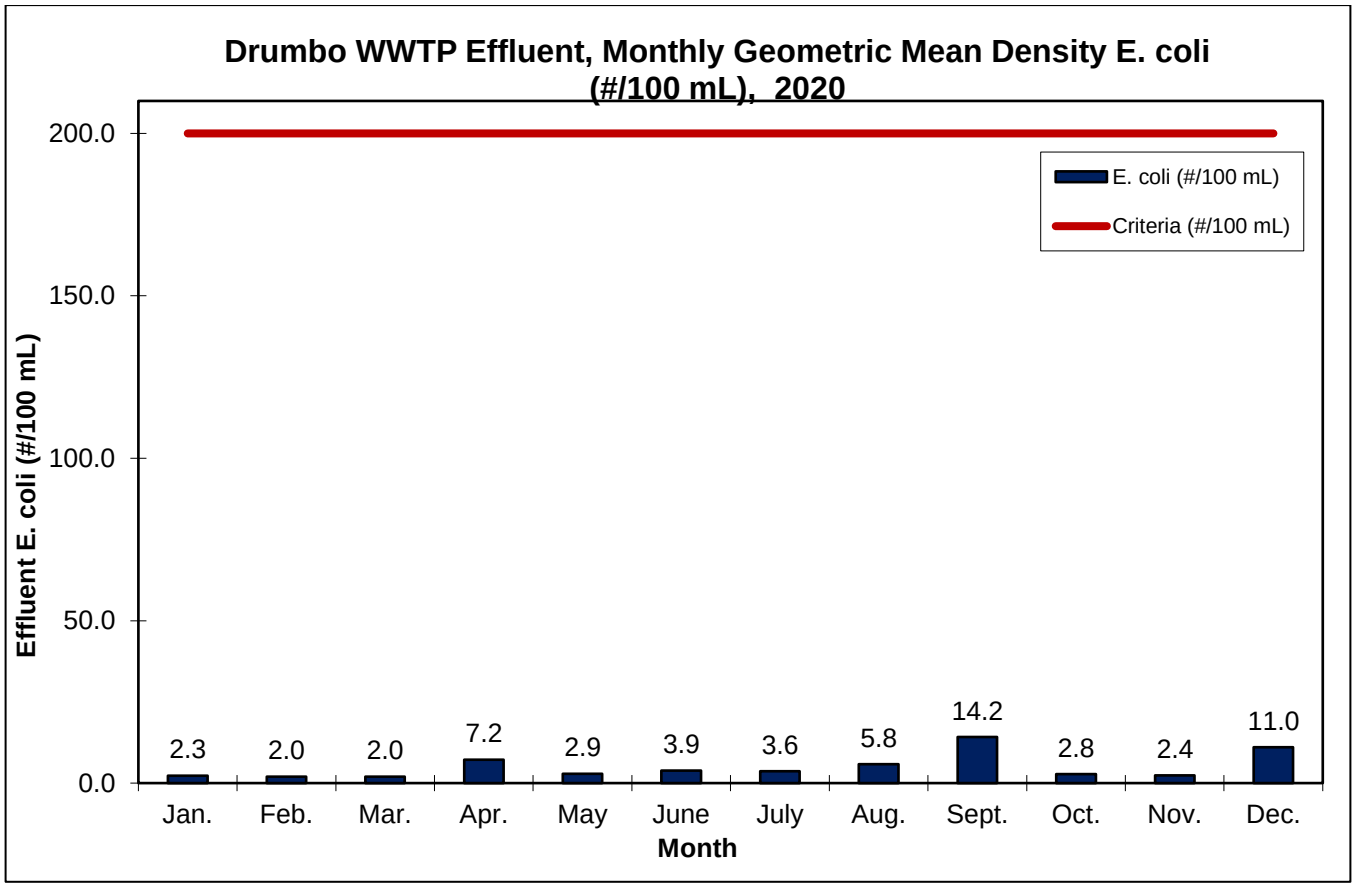
The Drumbo WWTP is nearing its rated capacity and as such achieving the treatment objectives is challenging. Oxford County is currently undertaking to expand the wastewater treatment facility to address the constraints.

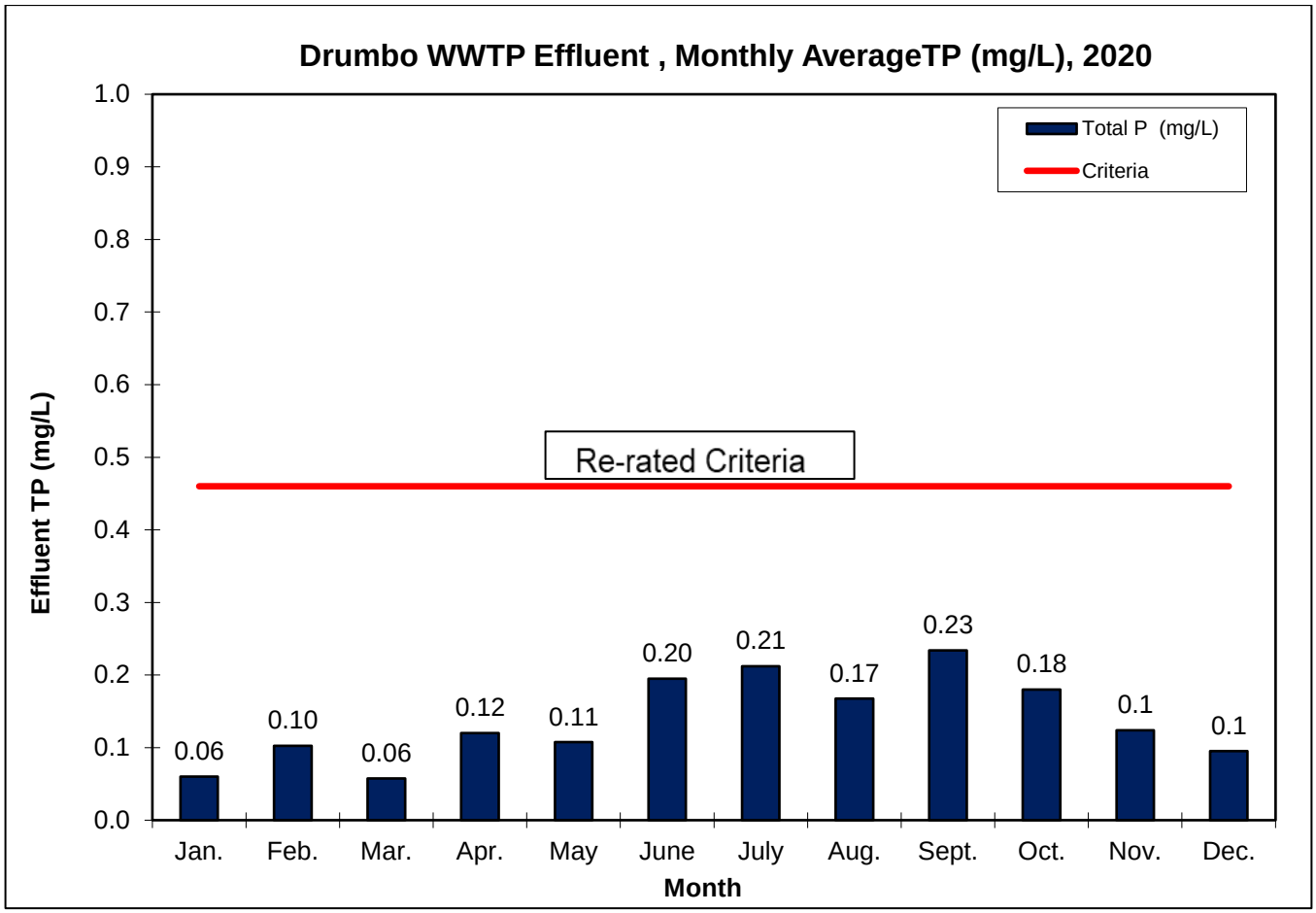
Recommendation:

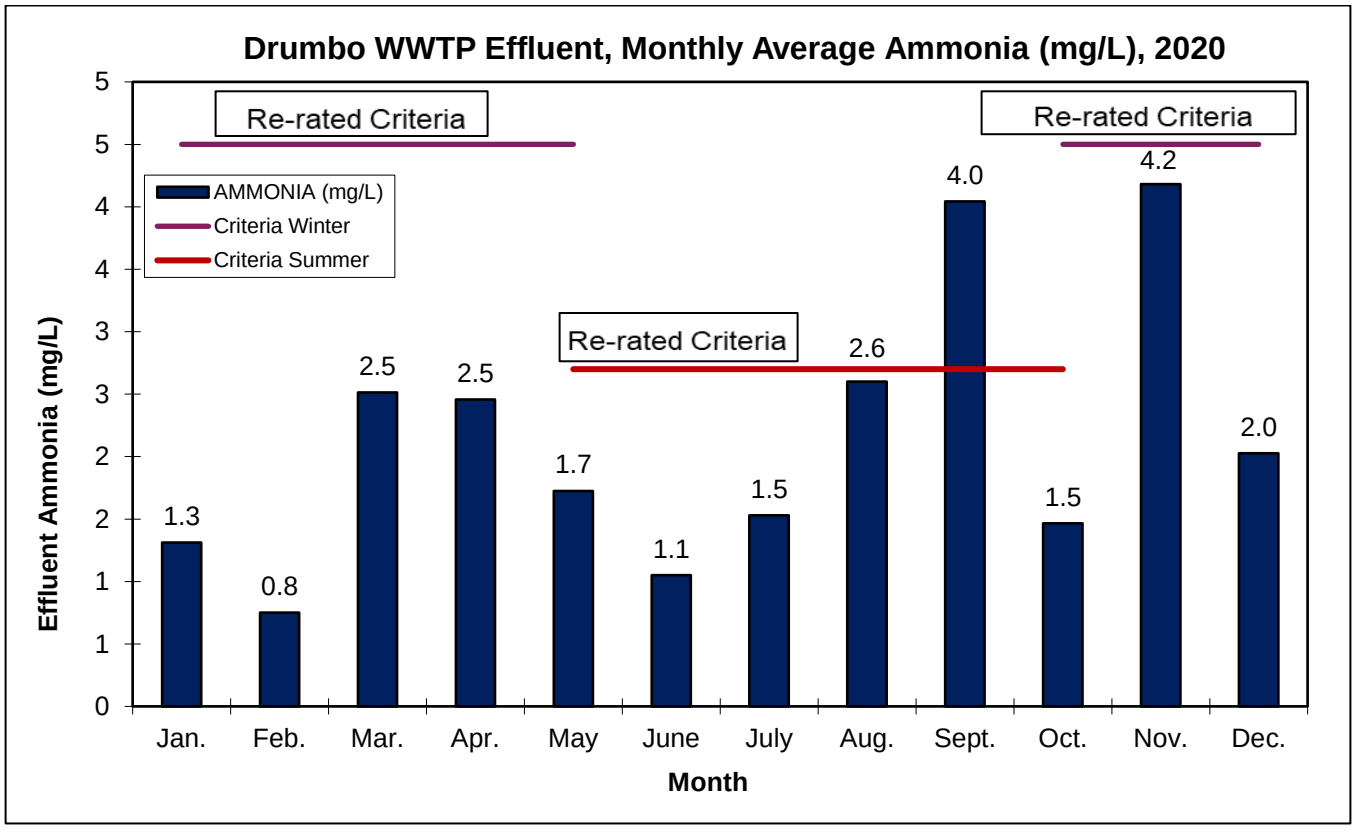
It is recommended that the Owner continue efforts to meet the objectives for CBOD5, TSS, TAN and TP in the final effluent. Also, it is recommended that the Owner proceed with the upgrade to the facility to increase its rated capacity.

APPENDIX A: GRAPHS OF 2020 DISCHARGE PARAMETERS VS. EFFLUENT DISCHARGE LIMITS






Drumbo WWTP Effluent , Monthly AverageTP (mg/L), 2020
Total P (mg/L)
Criteria
Re-rated Criteria
Effluent TP (mg/L)
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0.06
0.10
0.06
0.12
0.11
0.20
0.21
0.17
0.23
0.18
0.1
0.1
Jan.
Feb.
Mar.
Apr.
May
June
July
Aug.
Sept.
Oct.
Nov.
Dec.
Month


Drumbo WWTP Effluent, Monthly Average Ammonia (mg/L), 2020
Re-rated Criteria
Re-rated Criteria
Re-rated Criteria
AMMONIA (mg/L)
Criteria Winter
Criteria Summer
Effluent Ammonia (mg/L)
5
5
4
4
3
3
2
2
1
1
0
1.3
0.8
2.5
2.5
1.7
1.1
1.5
2.6
4.0
1.5
4.2
2.0
Jan.
Feb.
Mar.
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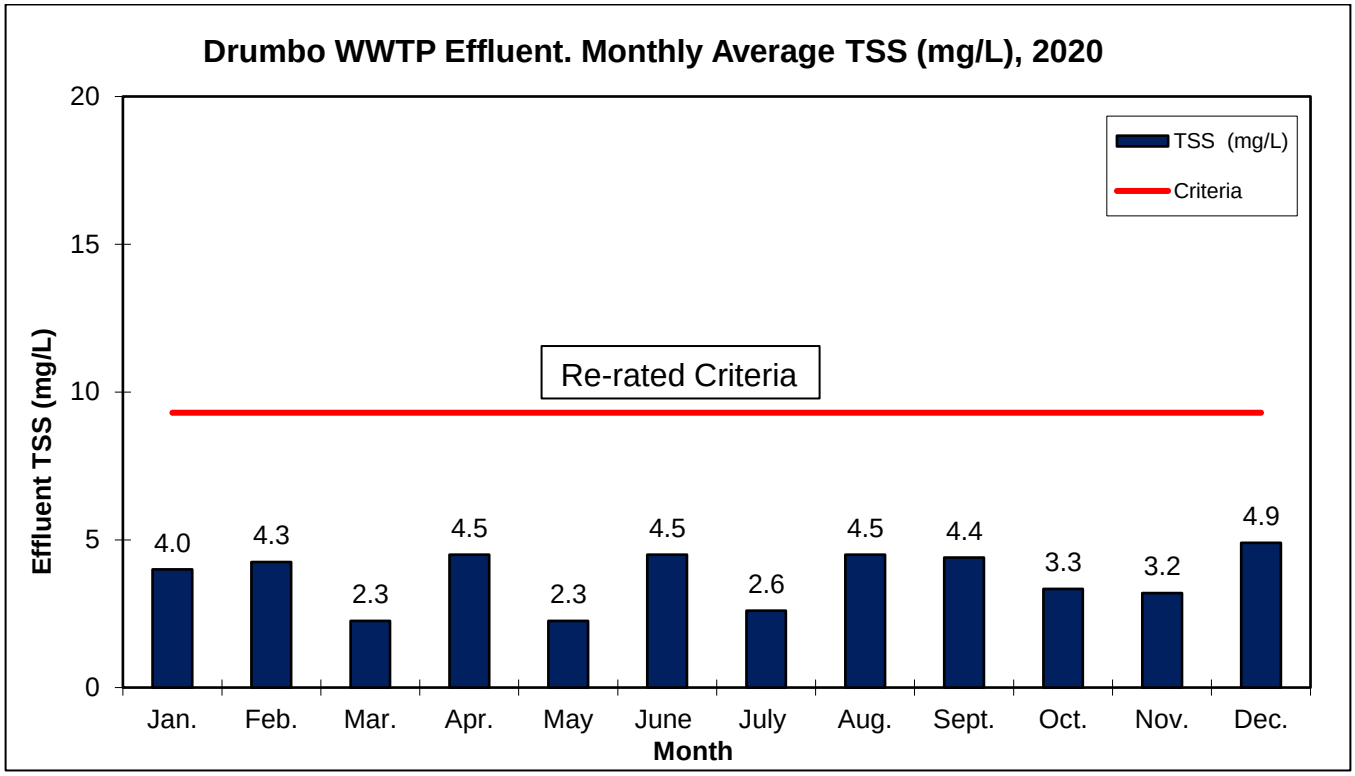
Nov.
Dec.
Month


Drumbo WWTP Effluent. Monthly Average TSS (mg/L), 2020
Effluent TSS (mg/L)
20
15
10
5
0
TSS (mg/L)
Criteria
Re-rated Criteria
4.0
4.3
2.3
4.5
2.3
4.5
2.6
4.5
4.4
3.3
3.2
4.9
Jan.
Feb.
Mar.
Apr.
May
June
July
Aug.
Sept.
Oct.
Nov.
Dec.
Month

2020 ANNUAL WASTEWATER TREATMENT SYSTEM SUMMARY REPORT
Ingersoll Wastewater Treatment Plant

1. General Information

Oxford County prepares individual annual reports summarizing each wastewater treatment plant's operation and treated effluent discharge quality for the nine wastewater treatment plants it owns and operates. The reports detail the latest quality testing results and quantity statistics and any non-compliance conditions that may have occurred. They are available for review by the end of March on the internet at www.oxfordcounty.ca/Services-for-You/Water-Wastewater/Wastewater/Annual-reports or by contacting the Public Works Department.

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Wastewater Treatment Plant:	Ingersoll Wastewater Treatment Plant (WWTP)
Wastewater Treatment Plant Number:	110003969
Environmental Compliance Approval (ECA)	#1614-A28P9L
Wastewater Treatment Plant Owner & Contact Information:	Oxford County Public Works Department P.O. Box 1614, 21 Reeve Street Woodstock ON N4S 7Y3 Telephone: 519-539-9800 | Toll Free: 866-537-7778
Reporting Period:	January 1, 2020 – December 31, 2020

1.1. System Description

The Ingersoll WWTP is a Class III rated treatment facility that provides wastewater treatment for residential, commercial, and industrial users in the Town of Ingersoll. It also provides treatment for septic tank waste, hauled waste, holding tank waste, and landfill leachate from within Oxford County. The nominally separated wastewater collection system includes 5 sewage pumping stations, 81.4 kilometers of sanitary gravity sewers, 14.3 kilometers of sanitary forcemain sewers and 0.8 kilometers of sanitary low pressure sewers.

Since the completion of the upgrade in 2018, two treatment trains have been operational and have provided a treatment capacity of 12,945 cubic meters per day. Both trains are conventional activated sludge plants consisting of primary and secondary treatment sharing an ultraviolet light disinfection system and a single discharge point into the Thames River. The plant utilizes anaerobic digestion followed by dewatering to produce stabilized biosolids. The biosolids are then transported to dedicated offsite storage prior to beneficial reuse on agricultural land.

A standby generator is available to run the onsite Ingersoll Main Lift Station in the event of a power failure. The system is maintained by licensed wastewater system operators and licensed mechanics that operate, monitor, and maintain the treatment equipment, in accordance to the regulations, and collect samples as required by the ECA. Alarms automatically notify operators in the event of failure of critical operational requirements.

The wastewater treatment plant is located at 56 McKeand St., Ingersoll, Ontario.

Facility	Ingersoll Wastewater Treatment Plant
Design Capacity	12,945 m^3/d
2020 Average Daily Flow	7,219 m^3/d

2020 Maximum Daily Flow	19,878 m^3/d
2020 Total Volume of Wastewater	2,642,738 m^3/year
2020 Total Received Hauled Waste	19,355 m^3/year (16,038 m^3/year leachate)

2. Summary and Interpretation of Monitoring Data

2.1. Effluent Quality Assurance and Control Measures

Sampling Procedure

Influent samples are collected monthly and effluent samples are collected weekly using a composite sampler over a 24-hour period. Raw sewage samples are collected at the main lift station located on-site; the sample is drawn after the lift station pumps and prior to the primary tanks of either plant. Effluent is sampled directly from the combined flow after it leaves the UV disinfection system prior to final discharge and comprises the final treated effluent sample for the entire facility.

Laboratory and Field Testing

Laboratory analysis is performed by SGS Lakefield Research Ltd. on all samples that are reported for compliance except for pH, DO, and temperature which are field collected. All other in-house testing is done for process control, the results of which are not included in this report.

2.2. Plant Performance & Effluent Quality

The Ingersoll WWTP was compliant with all its regulatory limits in 2020. For 2020, 628 samples out of a total of 633 samples met compliance, or 99.4 % compliance to its regulatory limits for all effluent discharged from the Ingersoll Wastewater Treatment Plant.

Approximately four times a week, the operator measures pH of both the influent and effluent streams. There was no single pH result for the effluent outside the discharge limit of 6.0 – 9.5 in 2020.

Graphs of discharge parameters versus effluent discharge limits are included in this report in Appendix A. Influent wastewater characteristics and effluent discharge values are presented in the tables below.

Influent Wastewater Characteristics		
Parameter	Concentration mg/L	Loading kg/d
BOD_5	162	1,170
Total Suspended Solids	196	1,415
Total Phosphorus	2.8	20
Total Kjeldahl Nitrogen	21	152

Effluent Parameter	**Sample Frequency**	**ECA Effluent Limit (Monthly Average)** (milligram per liter unless otherwise indicated)	**Monthly Average Result Min-Max** (milligram per liter unless otherwise indicated)	**Percentage Removal**
$CBOD_5$	weekly	15	2.3 – 7.0	95.7 – 98.6

Total Suspended Solids	weekly	15	5.5 – 12.0	93.9 – 97.2
Total Phosphorus	weekly	0.6	0.20 – 0.36	87.1 – 92.9
Total Ammonia Nitrogen (May 1 to November 30)	weekly	2.0	0.1 – 0.6	N/A
Total Ammonia Nitrogen (Dec. 1 to April 30)	weekly	6.0	0.2 – 4.5	N/A
pH any single sample	weekly	6.0 - 9.5	6.56 – 7.89	N/A
E. coli	weekly	200 organisms/100 mL (Monthly Geometric Mean Density)	2.0 – 28.2 organisms/100 mL (Monthly Geometric Mean Density)	N/A

2.3. Effluent Objectives

Objectives are non-enforceable effluent quality values which the owner is obligated to use best efforts to strive towards achieving on an ongoing basis. These objectives are to be used as a mechanism to trigger corrective action proactively, and voluntarily before environmental impairment occurs and before the compliance limits are exceeded.

There were sixteen single sample objective failures related to total suspended solids, three single sample objective failures related to total phosphorus, two single sample objective failures related to ammonia, and two single sample objective failures related to E. coli during 2020.

There were three monthly average objective failures in 2020. The monthly average concentration objective of 10 mg/L for total suspended solids was exceeded during the month of January (result of 12 mg/L) and June (result of 10.8 mg/L). The monthly average concentration objective of 4 mg/L for ammonia, was exceeded during the month of February (result of 4.5 mg/L).

In reaction to the objective exceedances, baffle plates were installed in the 2018 secondary clarifiers early in the year, which slowed down the aeration effluent flow to improve solids settling and resulted in decreased total suspended solid concentrations within the plant effluent. In addition, the aeration tank diffusers were changed to membrane diffusers, which increased the efficiency of the oxygen transfer, to aide in nitrification. The UV system was cleaned to provide effective disinfection.

The following table presents the range of effluent discharge values vs. ECA Objectives.

Effluent Parameter	**Sample Frequency**	**Monthly Average Objective Concentration** (milligram per liter unless otherwise indicated)	**Monthly Average Result Min-Max** (milligram per liter unless otherwise indicated)
$CBOD_5$	weekly	10	2.3 – 7.0
Total Suspended Solids	weekly	10	5.5 – 12.0
Total Phosphorus	weekly	0.40	0.20 – 0.36
Total Ammonia Nitrogen (May 1 to November 30)	weekly	1.5	0.1 – 0.6
Total Ammonia Nitrogen (Dec. 1 to April 30)	weekly	4.0	0.2 – 4.5
pH any single sample	weekly	6.5 - 9.0	6.56 – 7.89

E. coli	weekly	100 organisms/100 mL (Monthly Geometric Mean Density)	2.0 – 28.2 organisms/100 mL (Monthly Geometric Mean Density)

Single sample results that failed to meet effluent objectives are provided in the following table.

Month	Parameter	Objective mg/L	Result mg/L
Jan. 2 2020	TSS	10	18
Jan. 2 2020	Total Phosphorus	0.4	0.51
Jan. 7 2020	TSS	10	12
Jan. 22 2020	TSS	10	11
Jan. 28 2020	TSS	10	14
Feb. 6 2020	Ammonia	4.0	5.2
Feb. 6 2020	E. coli	100 #/100 mL	400 #/100 mL
Feb. 13 2020	TSS	10	14
Feb. 13 2020	Ammonia	4.0	6.7
Mar. 17 2020	TSS	10	13
Apr. 2 2020	TSS	10	12
Apr. 8 2020	TSS	10	11
Apr. 8 2020	Total Phosphorus	0.4	0.42
Apr. 16 2020	TSS	10	12
May 12 2020	TSS	10	13
May 12 2020	E. coli	100 #/100 mL	1520 #/100 mL
May 26 2020	TSS	10	11
June 9 2020	TSS	10	11
June 25 2020	TSS	10	12
June 25 2020	Total Phosphorus	0.4	0.42
June 29 2020	TSS	10	11
July 28 2020	TSS	10	12
Dec. 22 2020	TSS	10	12

Monthly average effluent concentrations that failed to meet monthly average objective limits are provided in the following table.

Month	Parameter	Objective mg/L	Result mg/L
Jan. 2020	TSS	10	12
Feb. 2020	Ammonia	4	4.5
June 2020	TSS	10	10.8

3. Overflows, Bypassing, Upsets, Spills, and Abnormal Conditions

There were no overflows, bypassing, upsets, spills, or abnormal conditions at the Ingersoll WWTP in 2020.

The Limited Operational Flexibility for modification to the wastewater treatment plant was not used in 2020.

4. Maintenance of Works

The operating and maintenance staff at the Ingersoll WWTP conducts regularly scheduled maintenance of the plant equipment. The Plant utilizes a database known as Cartegraph to issue work orders and maintain records for regular maintenance and repair at the treatment facility.

5. Monitoring Equipment Maintenance and Calibration

Calibration of flow meters is conducted yearly by Indus-Controls Inc. in accordance with the requirements of the ECA. The records are kept on-site at the Plant.

All other operational monitoring equipment is calibrated by staff and records are kept on-site at the Plant.

6. 2020 Biosolids Program

Biosolids are anaerobically digested and dewatered at the Ingersoll WWTP using an Alfa-Laval Centrifuge. The biosolids are then stored at the Oxford County Biosolids Centralized Storage Facility (BCSF) prior to land application. The sampling results and land application details are summarized in a separate Biosolids Annual report, available at: www.oxfordcounty.ca/Services-for-You/Water-Wastewater/Wastewater/Annual-reports.

7. Audits, Pilots, and Trials

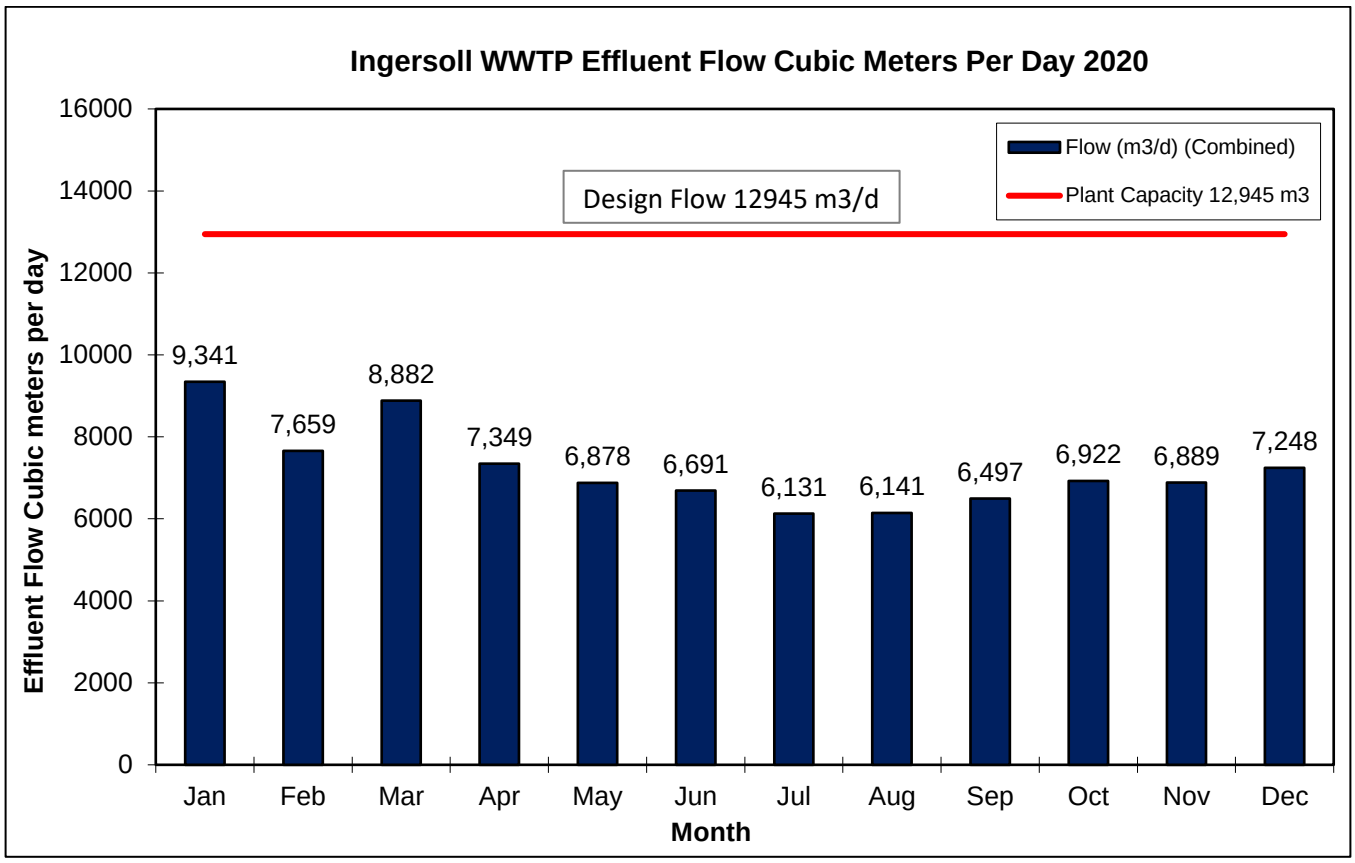
There was no MECP audit in 2020.

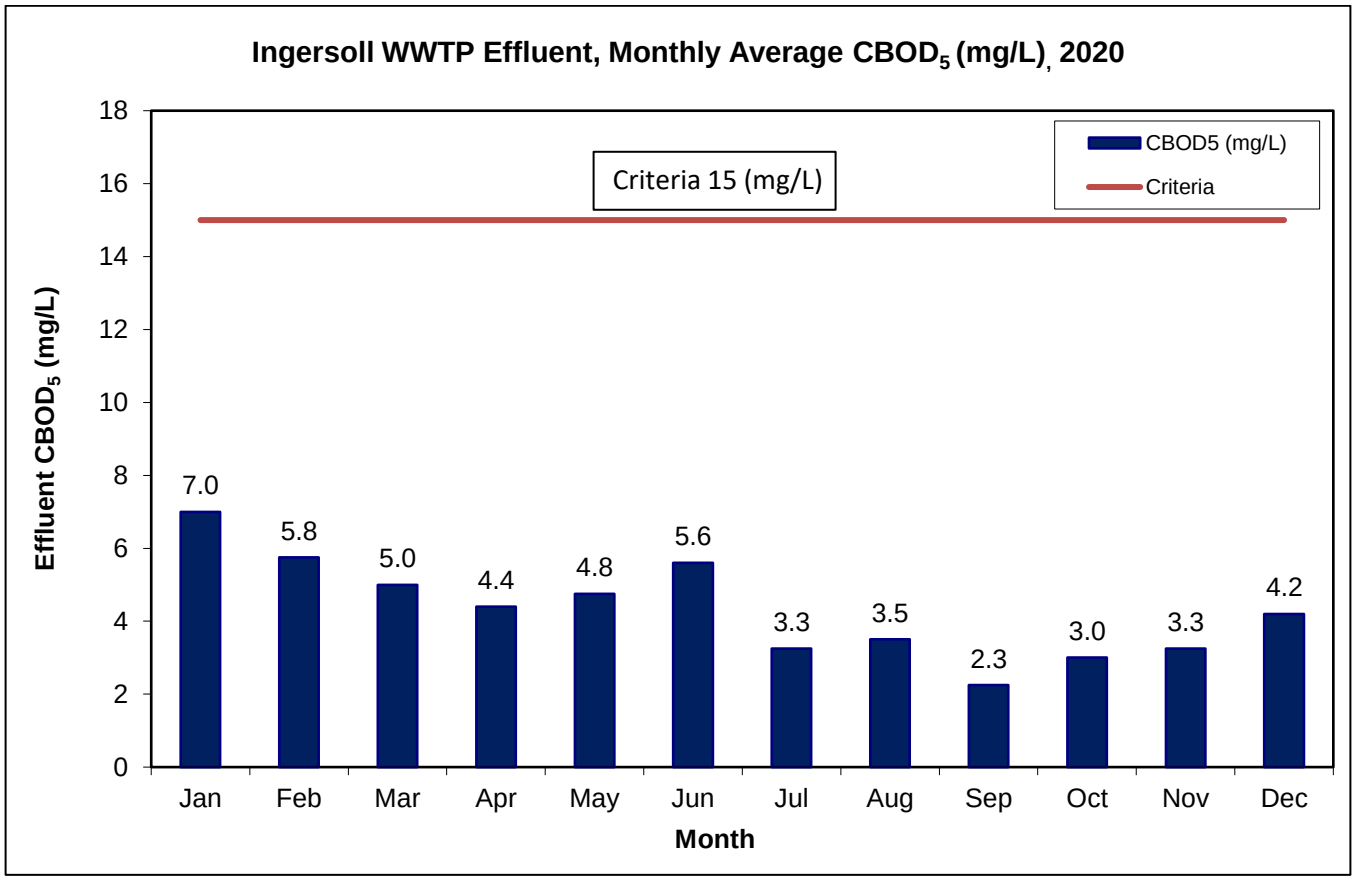
Energy Optimization

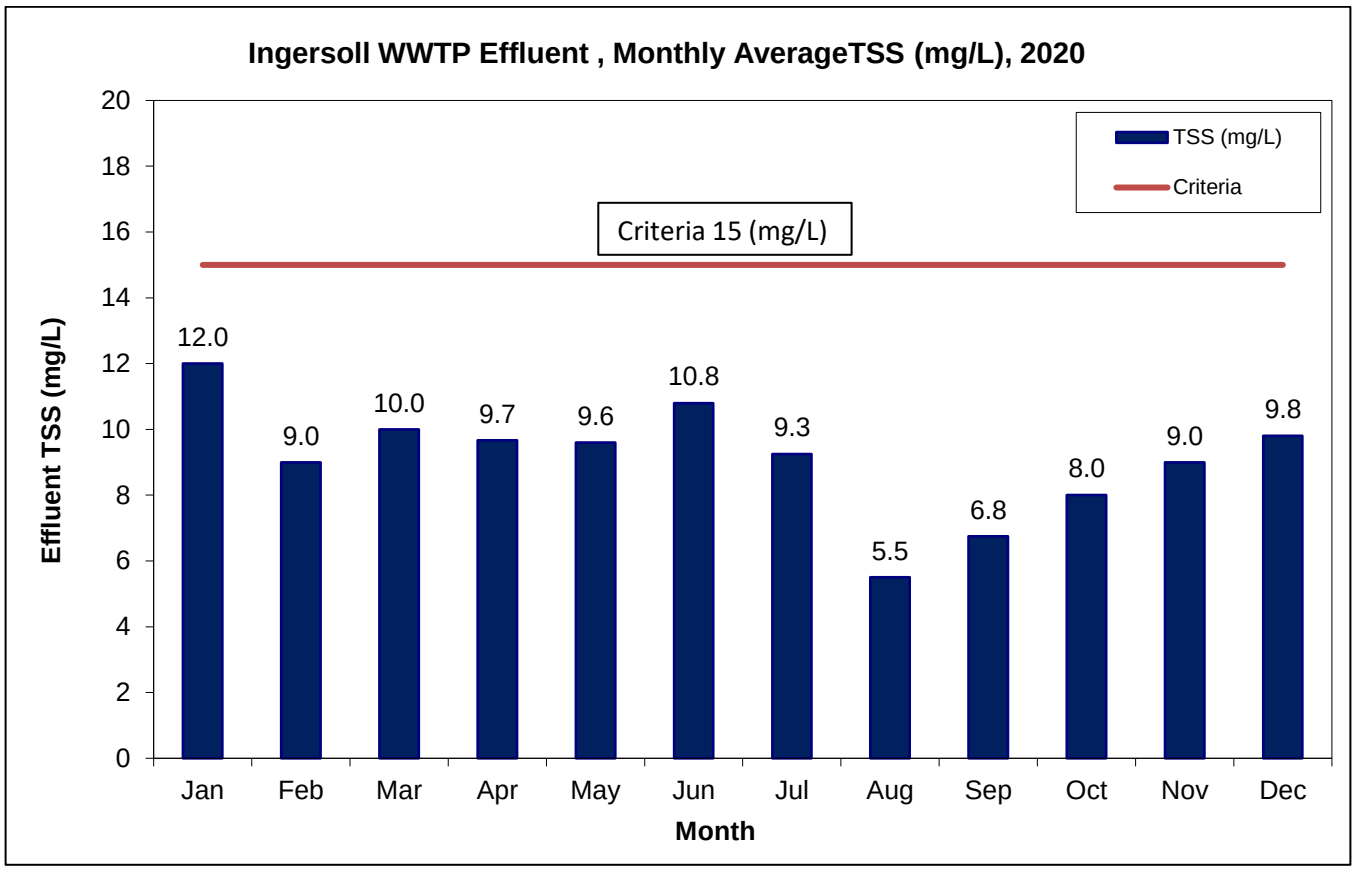
The optimization of the aeration system continued in 2020, through flow adjustments and installation of membrane diffusers into the remaining 2018 aeration tank. This resulted in a reduction in energy demand which translated into significant energy and cost savings. Since 2019, the Ingersoll WWTP achieved actual electricity savings of approximately 92,803 kWh (equivalent greenhouse gas emission reduction of approximately 3.99 Tonne CO_2e).

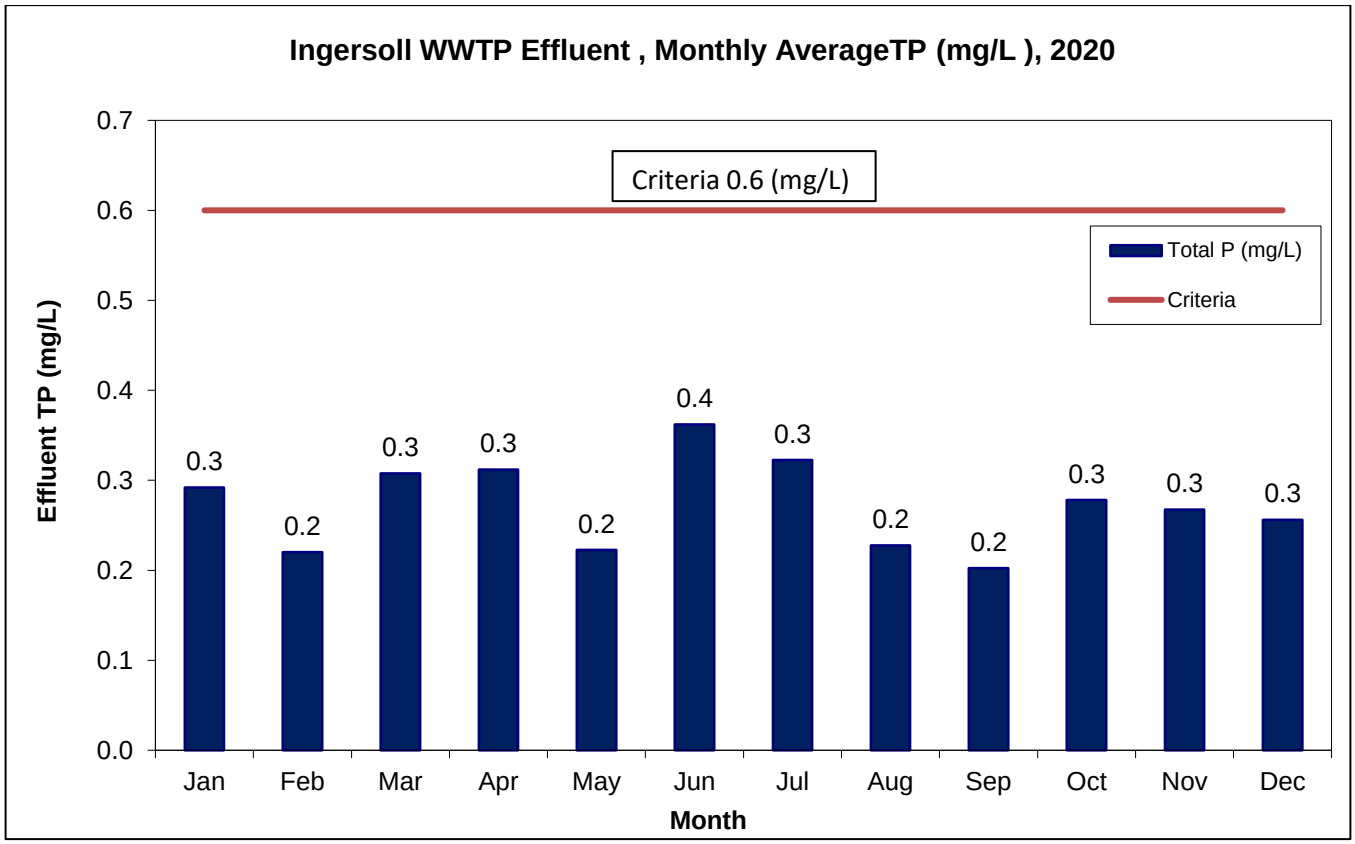
When the flow per electrical consumption is normalized with the 2018 data, the Ingersoll WWTP's electricity avoidance over 2019 and 2020 totals 489,400 kWh kWh (equivalent greenhouse gas emission reduction of approximately 21 Tonne CO_2e). Specifically, in 2020, the WWTP processed wastewater at a reduced energy cost of 1.71 m^3/kWh (versus 1.49 m^3/kWh in 2018). Prior to optimization, the WWTP plant would have consumed 1,773,650 kWh (projected) as opposed to 1,544,364 kWh (actual) annually.

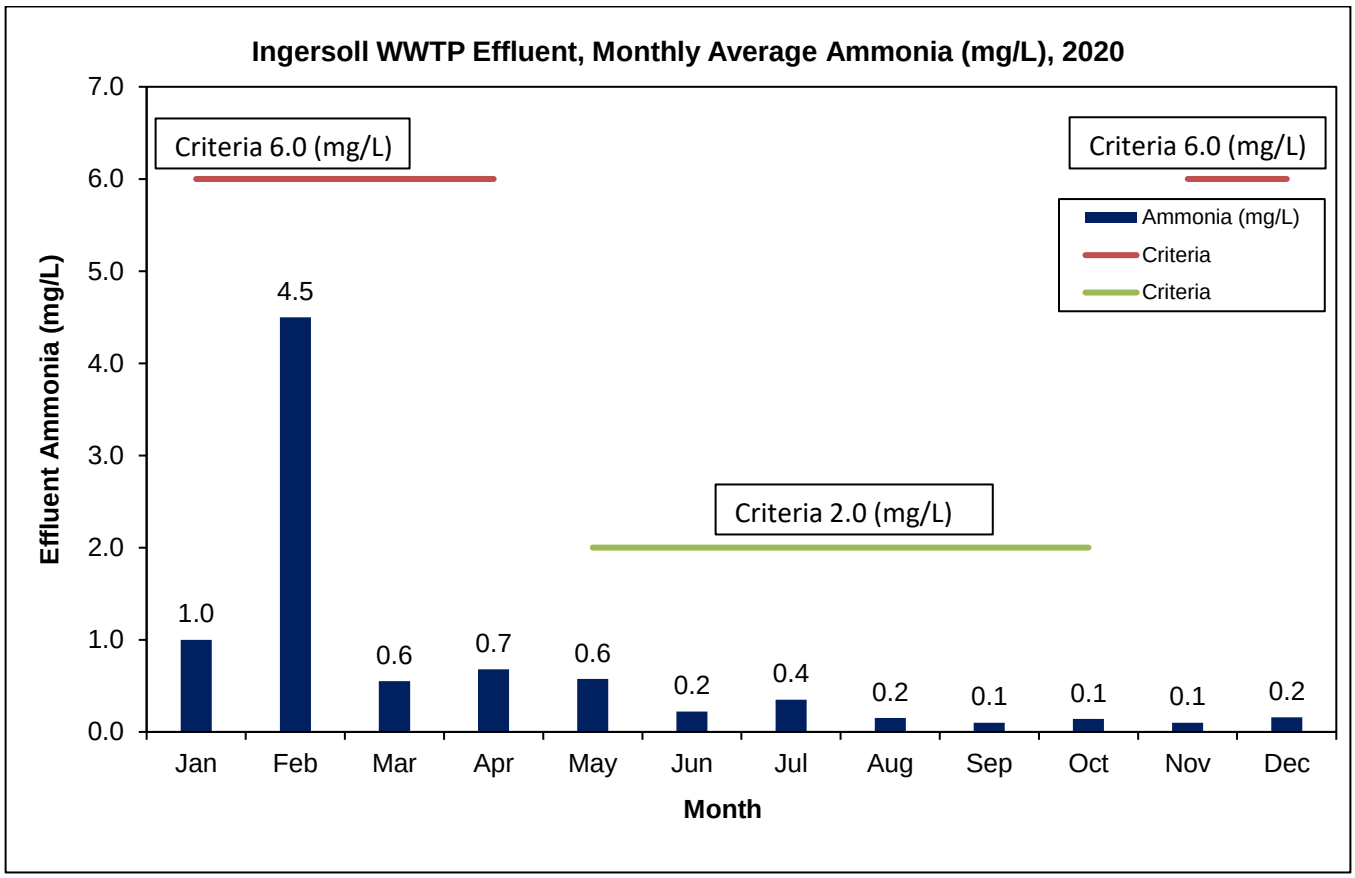
APPENDIX A: GRAPHS OF 2020 DISCHARGE PARAMETERS VS. EFFLUENT DISCHARGE LIMITS

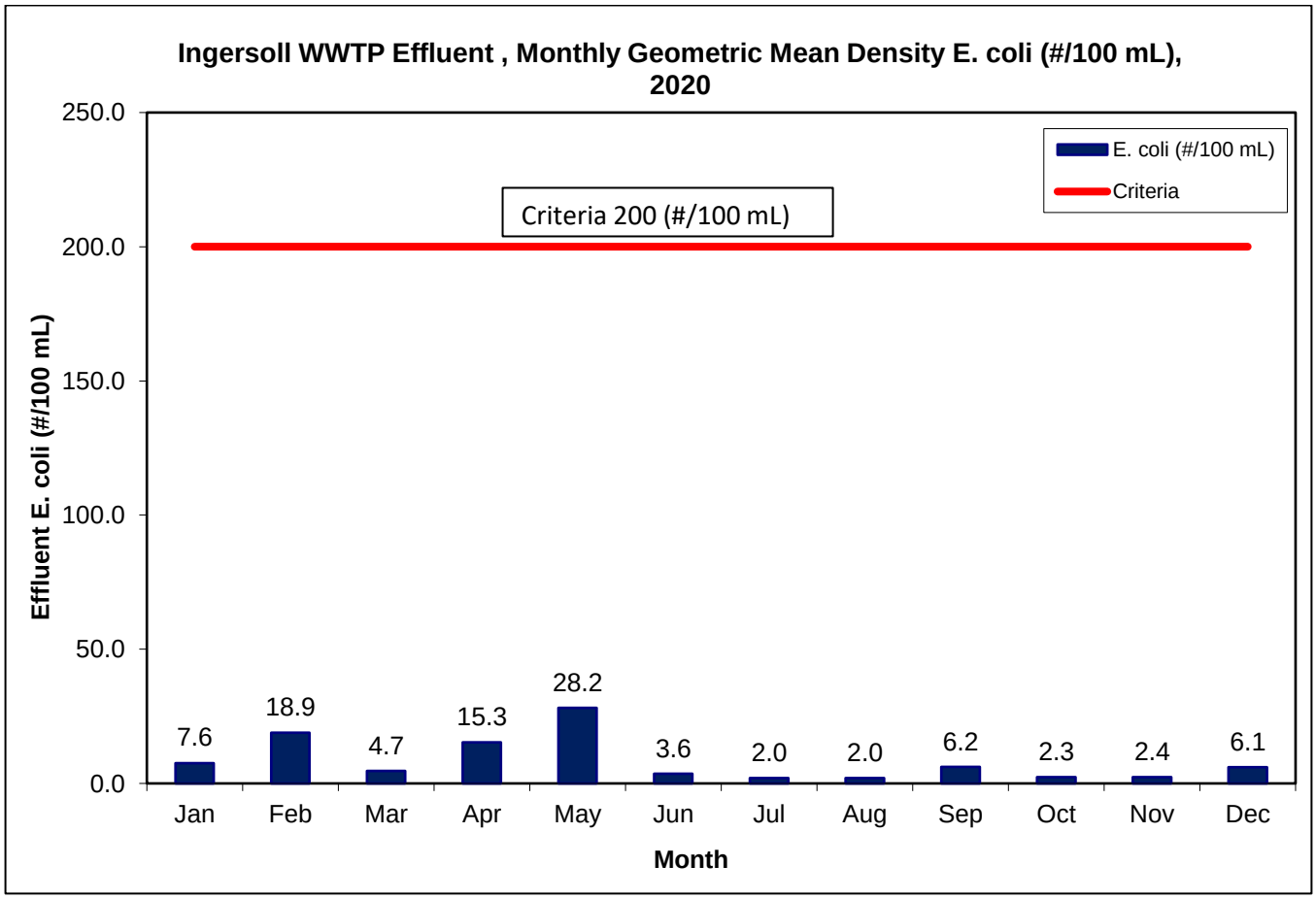





Ingersoll WWTP Effluent , Monthly AverageTSS (mg/L), 2020
Effluent TSS (mg/L)
Month
TSS (mg/L)
Criteria
Criteria 15 (mg/L)
0
2
4
6
8
10
12
14
16
18
20
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
12.0
9.0
10.0
9.7
9.6
10.8
9.3
5.5
6.8
8.0
9.0
9.8


Ingersoll WWTP Effluent , Monthly AverageTP (mg/L), 2020
Effluent TP (mg/L)
Month
Total P (mg/L)
Criteria
Criteria 0.6 (mg/L)
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
0.3
0.2
0.3
0.3
0.2
0.4
0.3
0.2
0.2
0.3
0.3
0.3


Ingersoll WWTP Effluent, Monthly Average Ammonia (mg/L), 2020
Effluent Ammonia (mg/L)
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
Criteria 6.0 (mg/L)
Criteria 6.0 (mg/L)
Criteria 2.0 (mg/L)
Ammonia (mg/L)
Criteria
Criteria
1.0
4.5
0.6
0.7
0.6
0.2
0.4
0.2
0.1
0.1
0.1
0.2
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month


Ingersoll WWTP Effluent , Monthly Geometric Mean Density E. coli (#/100 mL), 2020
Effluent E. coli (#/100 mL)
250.0
200.0
150.0
100.0
50.0
0.0
E. coli (#/100 mL)
Criteria
Criteria 200 (#/100 mL)
7.6
18.9
4.7
15.3
28.2
3.6
2.0
2.0
6.2
2.3
2.4
6.1
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month

2020 ANNUAL WASTEWATER TREATMENT SYSTEM SUMMARY REPORT
Mount Elgin Wastewater Treatment Plant

1. General Information

Oxford County prepares individual annual reports summarizing each wastewater treatment plant's operation and treated effluent discharge quality for the nine wastewater treatment plants it owns and operates. The reports detail the latest quality testing results and quantity statistics and any non-compliance conditions that may have occurred. They are available for review by the end of March on the internet at www.oxfordcounty.ca/Services-for-You/Water-Wastewater/Wastewater/Annual-reports or by contacting the Public Works Department.

All efforts have been made to ensure the information presented in this report is as accurate as possible. If you have any questions or comments concerning the report, please contact the County of Oxford at the address and phone number listed below or by email at publicworks@oxfordcounty.ca.

Wastewater Treatment Plant:	Mount Elgin Wastewater Treatment Plant
Wastewater Treatment Plant Number:	20002870
Environmental Compliance Approval (ECA)	#0611-6Q3JQL
Wastewater Treatment Plant Owner & Contact Information:	Oxford County Public Works Department P.O. Box 1614, 21 Reeve Street Woodstock, ON N4S 7Y3 Telephone: 519-539-9800 | Toll Free: 866-537-7778
Reporting Period:	January 1, 2020 – December 31, 2020

1.1. System Description

The Mount Elgin Wastewater Treatment Plant (WWTP) consists of a central Recirculating Sand Filter (RSF) and subsurface discharge. The wastewater collection system includes 2 sewage pumping stations, 4.4 kilometers of sanitary gravity sewers and 1.3 kilometers of sanitary low pressure sewers. Within the collection system, individual properties are serviced by septic tanks where sewage is pretreated to remove solids and grease before discharge to a small diameter viable grade sewer. The small diameter collection mains direct the primary treated effluent to a pump station.

The primary treated effluent is pumped to the recirculation tanks. The influent is pumped to the recirculating sand filter and then collected and pumped to a splitter valve that allows 80% of the flow to recirculate and 20% to enter the dosing tank. From the dosing tank, treated effluent is pumped to the shallow buried trench drain field that provides for the subsurface discharge of the treated effluent. Effluent samples are collected from the dosing tank ahead of the drain field.

A standby generator is available to power the plant in case of a power failure.

Facility	Mount Elgin Wastewater Treatment Plant
Design Capacity	190.5 m^3/d
2020 Average Daily Flow	75 m^3/d
2020 Maximum Daily Flow	216 m^3/d
2020 Total Volume of Wastewater	27,570 m^3/year

2. Summary and Interpretation of Monitoring Data

2.1. Effluent Quality Assurance and Control Measures

Sampling Procedure

Grab samples are collected from the influent lift station on a quarterly basis. Samples are tested for Carbonaceous Biochemical Oxygen Demand ($CBOD_5$), Total Suspended Solids (TSS), Total Phosphorus (TP), and Total Kjeldahl Nitrogen (TKN).

Effluent grab samples are analyzed for $CBOD_5$, TSS, TP, ammonia, TKN, nitrite, nitrate, pH, and E. coli at least quarterly.

Groundwater testing for nitrites, nitrates, and pH is completed on a quarterly basis.

Laboratory and Field Testing

Laboratory analysis is performed by SGS Lakefield Research Ltd. on all samples for all parameters except for pH, which is tested in the field during collection. These results are used in this report for determination of compliance. Any information generated in-house is used in process control but is not included in this report.

2.2. Plant Performance & Effluent Quality

The Mount Elgin Wastewater Treatment Plant (WWTP) provided effective wastewater treatment in 2020 and was 100% in compliance.

There are no effluent limits for the system, however, the ECA requires Oxford County to use best efforts to operate the sewage treatment facility with the objective that the concentrations of both $CBOD_5$ and Suspended Solids do not exceed 10 mg/L in the effluent ahead of the subsurface disposal system.

Graphs of discharge parameters versus effluent discharge limit are included in this report in Appendix A.

Influent wastewater characteristics and groundwater sampling results are presented in the tables below.

Influent Wastewater Characteristics		
Parameter	Concentration mg/L	Loading kg/d
$CBOD_5$	132	9.9
Total Suspended Solids	57	4.3
Total Phosphorus	7.5	0.6
Total Kjeldahl Nitrogen	69	5.2

Ground Water Results:

	2020						
	Well 1	**Well 2**	**Well 3**		**Well 1**	**Well 2**	**Well 3**
Parameter	**March 25/20**	**March 25/20**	**March 25/20**		**June 11/20**	**June 11/20**	**June 11/20**
Well Level (meters)	0.46	0.27	0.02		0.82	0.85	0.53
Nitrite (mg/L N)	0.03	0.03	0.08		0.03	0.04	0.08
Nitrate (mg/L N)	0.06	24.3	2.58		0.06	19.8	7.89
Nitrate+Nitrite (mg/L N)	0.06	24.3	2.66		0.06	19.8	7.97

pH	7.39	7.70	7.48		7.29	7.31	7.46
	Well 1	**Well 2**	**Well 3**		**Well 1**	**Well 2**	**Well 3**
Parameter	**Sept 10/20**	**Sept 10/20**	**Sept 10/20**		**Nov 12/20**	**Nov 12/20**	**Nov 12/20**
Well Level (meters)	NA	0.87	0.77		0.78	0.89	0.83
Nitrite (mg/L N)	NA	0.03	0.12		0.03	0.03	0.11
Nitrate (mg/L N)	NA	20.9	11.3		0.06	13.4	10.5
Nitrate+Nitrite (mg/L N)	NA	20.9	11.4		0.06	13.4	10.6
pH	NA	7.12	7.28		7.49	7.39	7.52
Well depths	3.66m	3.96m	3.96m				

Well 1 was unable to be sampled on September 10, due to the well becoming blocked with sand. This was reported to the MECP on October 2. The sand point was flushed in November to remove debris, and was able to be sampled for the November sampling date.

2.3. Effluent Objectives

Objectives are non-enforceable effluent quality values which the owner is obligated to use best efforts to strive towards achieving on an ongoing basis. These objectives are to be used as a mechanism to trigger corrective action proactively, and voluntarily before environmental impairment occurs and before the compliance limits are exceeded.

All effluent discharge objectives listed in the Plant's ECA were met at the Mount Elgin WWTP in 2020.

The following table presents the range of effluent discharge values vs. ECA Objectives ahead of the subsurface disposal system.

Effluent Parameter	Sample Frequency	Annual Average Objective Concentration mg/L	Quarterly Results Min-Max mg/L
$CBOD_5$	quarterly	10	2.0 – 5.5
Suspended Solids	quarterly	10	2.0 – 7.5

3. Overflows, Bypassing, Upsets, Spills, and Abnormal Conditions

There were no overflows, bypassing, upsets, spills, or abnormal Conditions for 2020.

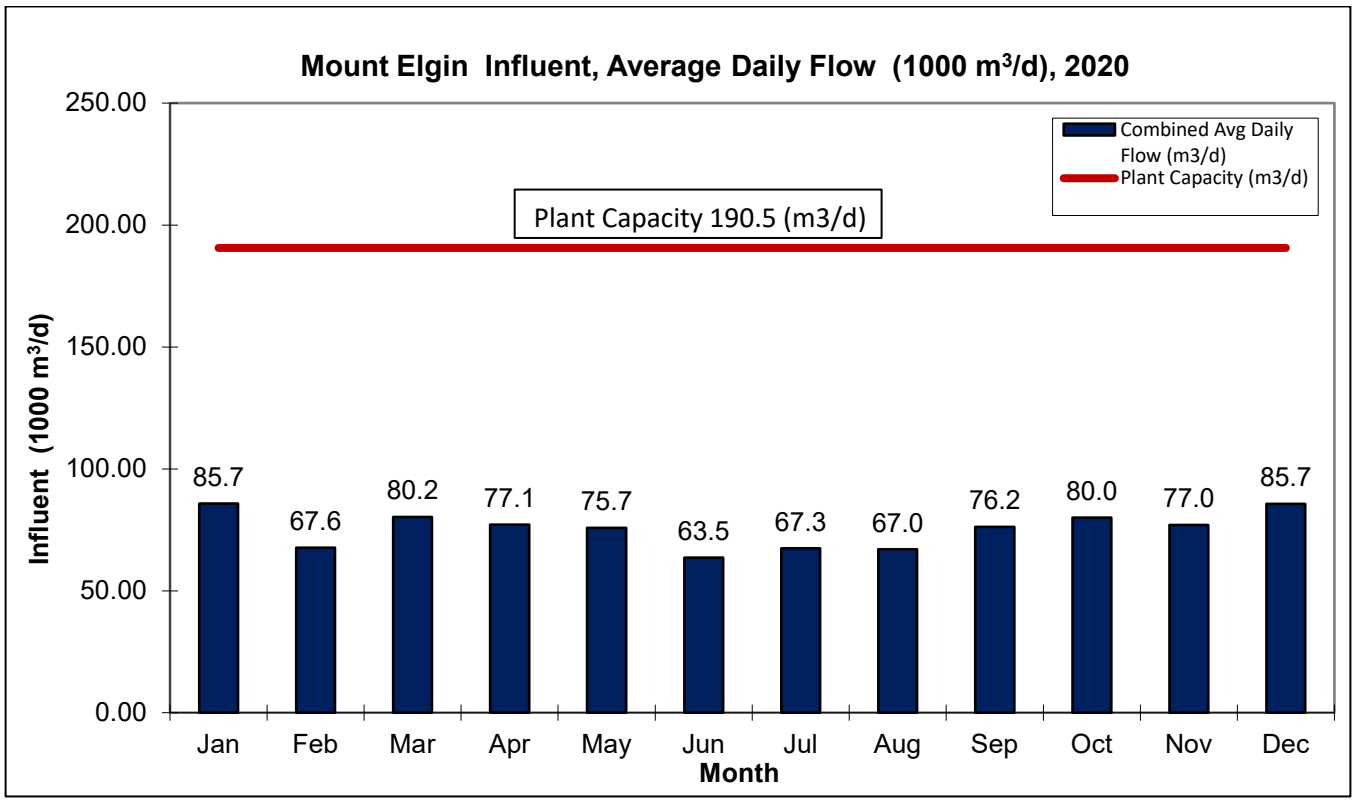
4. Maintenance of Works

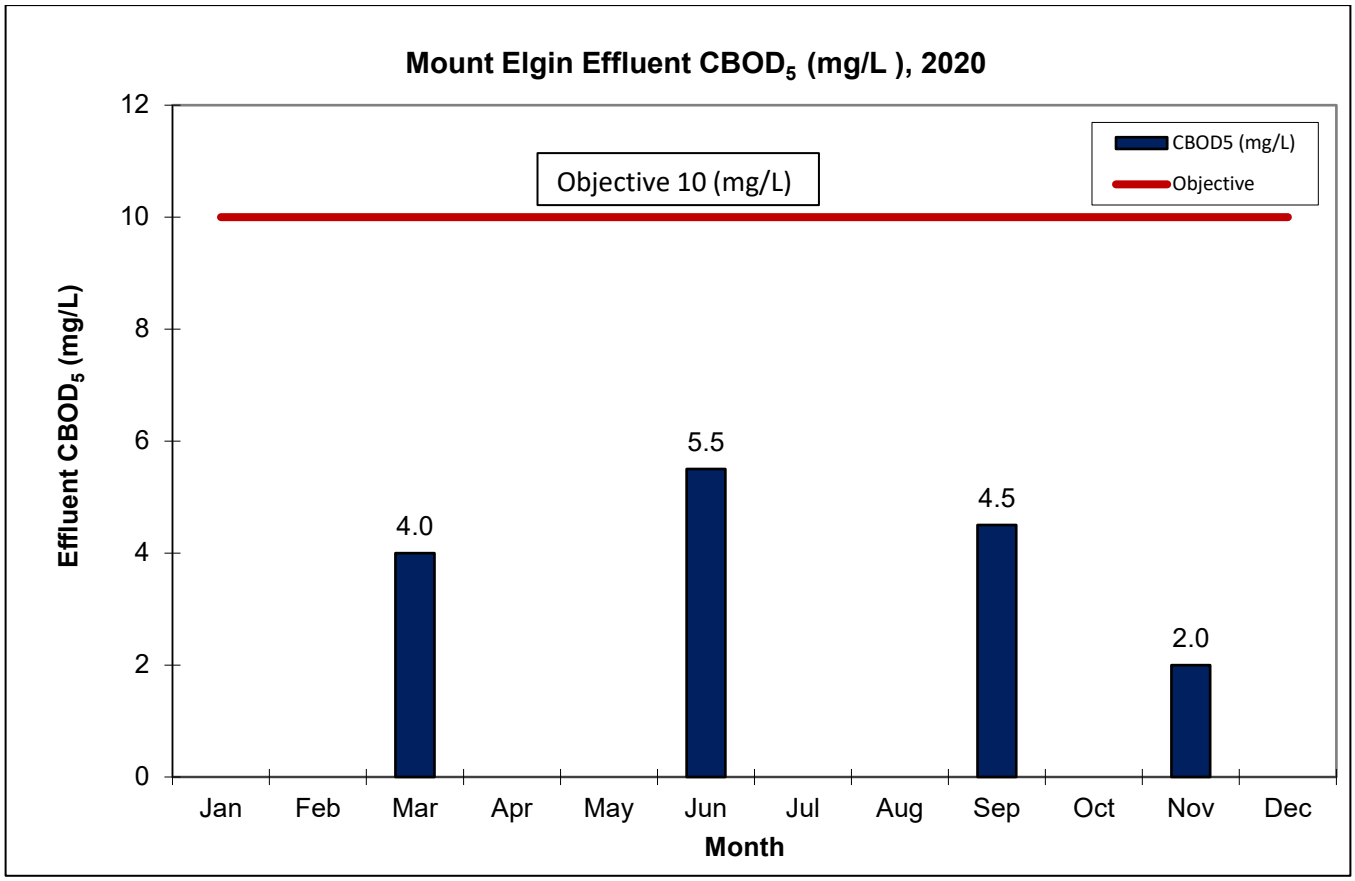
The operating and maintenance staff at the Ingersoll WWTP conducts regularly scheduled maintenance of the plant equipment. The Plant utilizes a database system known as Cartegraph to issue work orders and maintain records for regular maintenance and repair at the treatment facility.

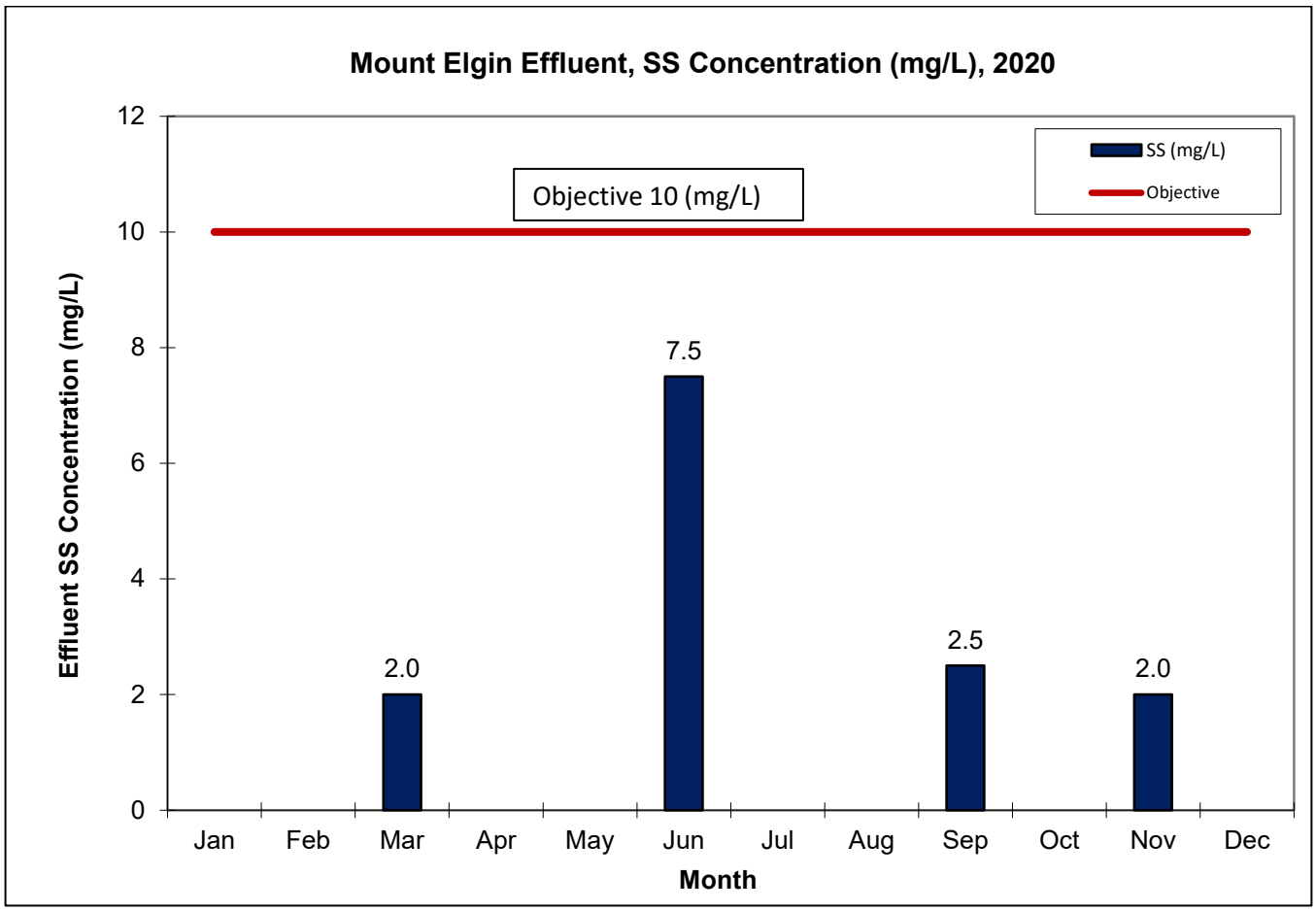
5. Monitoring Equipment Maintenance and Calibration

Calibration of flow meters is conducted by Indus-Controls Inc. in accordance with the requirements of the ECA. The records are kept on-site at the Plant.
All other operational monitoring equipment is calibrated by staff and records are kept on-site at the Plant.

APPENDIX A: GRAPHS OF 2020 DISCHARGE PARAMETERS VS. EFFLUENT DISCHARGE LIMITS






Mount Elgin Effluent, SS Concentration (mg/L), 2020
Effluent SS Concentration (mg/L)
12
10
8
6
4
2
0
Objective 10 (mg/L)
SS (mg/L)
Objective
2.0
7.5
2.5
2.0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month

2020 ANNUAL WASTEWATER TREATMENT SYSTEM SUMMARY REPORT
Norwich Wastewater Treatment Plant

1. General Information

Oxford County prepares individual annual reports summarizing each wastewater treatment plant's operation and treated effluent discharge quality for the nine wastewater treatment plants it owns and operates. The reports detail the latest quality testing results and quantity statistics and any non-compliance conditions that may have occurred. They are available for review by the end of March on the internet at www.oxfordcounty.ca/Services-for-You/Water-Wastewater/Wastewater/Annual-reports or by contacting the Public Works Department.

All efforts have been made to ensure the information presented in this report is as accurate as possible.
If you have any questions or comments concerning the report, please contact the County of Oxford at the address and phone number listed below or by email at publicworks@oxfordcounty.ca.

Wastewater Treatment Plant:	Norwich Wastewater Treatment Plant
Wastewater Treatment Plant Number:	110001480
Environmental Compliance Approval (ECA)	#1680-6F6QR5
Wastewater Treatment Plant Owner & Contact Information:	Oxford County Public Works Department P.O. Box 1614, 21 Reeve Street Woodstock, ON N4S 7Y3 Telephone: 519-539-9800 | Toll Free: 866-537-7778
Reporting Period:	January 1, 2020 – December 31, 2020

1.1. System Description

The Norwich WWTP is a Class I facility that provided effective wastewater treatment in 2020. The Norwich WWTP is a lagoon wastewater treatment system serving the community of Norwich. The nominally separated wastewater collection system includes 3 sewage pumping stations, 25.5 kilometers of sanitary gravity sewers, 4.3 kilometers of sanitary forcemain sewers and 0.6 kilometers of sanitary low pressure sewers. The wastewater is pumped from the collection system to a splitter box; then to either of two lagoon cells as determined by the operator. Typically the wastewater is directed to the North Cell which is operated in series with the South Cell, followed by filtering of the effluent through the sand filter beds performed for a period each day, as required. The lagoons may discharge year-round; however, the freezing period prevents discharge through the filter beds (normally December to April).

The system is maintained by licensed wastewater system operators and licensed mechanics that operate, monitor, and maintain the treatment equipment, in accordance to the regulations, and collect samples as required by the ECA. Alarms automatically notify operators in the event of failure of critical operational requirements.

The wastewater treatment plant is located at Lot 7, Conc. 5, Norwich Township. The Facility description is provided below.

Facility	Norwich Wastewater Treatment Plant
Design Capacity	1,530 m^3/d
2020 Average Daily Flow	1,139 m^3/d
2020 Maximum Daily Flow	6,922 m^3/d

2020 Total Volume of Wastewater	417,444 m^3/year

2. Summary and Interpretation of Monitoring Data

2.1. Effluent Quality Assurance and Control Measures

Sampling Procedure

Influent samples are taken from the Lagoon influent splitter box. The sampling frequency is once per week and samples are tested for Biochemical Oxygen Demand (BOD_5), Total Suspended Solids (TSS) monthly, Total Phosphorus (TP), and Total Kjeldahl Nitrogen (TKN) weekly.

Effluent samples are taken using a 24-hour composite sampler set to take a sample every 15 minutes for the duration of the discharge period. BOD_5 and TSS are sampled at least monthly. TP, ammonia, TKN, pH, and temperature samples are taken three times per week; E. coli and dissolved oxygen are tested at least weekly.

Laboratory and Field Testing

Laboratory analysis is performed by SGS Lakefield Research Ltd. on all samples for all parameters except for pH, temperature, and dissolved oxygen which are tested in the field during collection. These results are used for determination of compliance. Any information generated in-house is used in process control but is not included in this report.

2.2. Plant Performance & Effluent Quality

The Norwich Lagoon provided effective treatment in 2020 with 333 samples out of 343 meeting compliance or 97.1 % compliance to its regulatory limits for all effluent.

In January the daily influent flow limit of 5160 m^3/day was exceeded on two occasions with a daily influent flow of 5260 m^3/day on January 11 and 6922 m^3/day on January 12. The high flows were a direct result of a significant rainfall which occurred in the region at that time. No operational problems were observed at the Norwich Lagoons.

In March, the daily ammonia concentration limit of 8 mg/L (freezing period when the receiving stream temperature was equal to or below 5 degrees Celsius) was exceeded on March 3, with a result of 10.6 mg/L, and again on March 16, with a result of 9.4 mg/L. The daily ammonia concentration limit of 5 mg/L (non-freezing period when the receiving stream temperature was above 5 degrees Celsius) was exceeded on March 17, with a result of 5.1 mg/L. In March, the lagoon levels were quite high, and there was the need to commence the seasonal discharge despite the ice cover and cool atmospheric conditions. In response of the adverse sample results, the south lagoon was recycled to improve quality, flows were adjusted and the number of sand filter beds being used for discharge was increased. The result was that the daily ammonia concentrations declined to compliant levels.

During the month of June, the effluent monthly E. coli concentration (geometric mean density) limit of 200 organisms/100 mL was exceeded with a result of 680 organisms/100 mL. The south lagoon level in June was very low, which most likely caused the increase of E. coli concentrations. The discharge was stopped when the result was received from the external laboratory. The north and south lagoons levels were equalized to increase the depth of the south lagoon, then the south lagoon was recycled to improve effluent quality.

For November, the effluent monthly E. coli concentration (geometric mean density) limit of 200 organisms/100 mL was exceeded with a result of 316 organisms/100 mL. At that time, the north and south lagoons were being equalized in preparation for the winter storage, which may of lead to higher E. coli concentrations. For corrective action, the lagoons were isolated for the remaining fall discharge period. Equalization of the two cells occurred after discharging had ceased. In the spring of 2021 the south lagoon contents will be recycled prior to discharge.

All mentioned ECA exceedances were reported to the MECP at the time of occurrence.

The operator measures pH of both the influent and effluent streams. There was no single pH result for the effluent outside the discharge limit of 6 - 9.5 in 2020.

Chlorine was not used at the Norwich Lagoons in 2020.

There were no single sample un-ionized ammonia effluent results or monthly average un-ionized ammonia effluent results above the ECA limits in 2020.

Graphs of discharge parameters versus effluent discharge limits are included in this report in Appendix A.

Influent wastewater characteristics and effluent discharge values are presented in the tables below.

Parameter	Concentration mg/L	Loading kg/d
BOD_5	153	174
Total Suspended Solids	157	179
Total Phosphorus	3.9	4.4
Total Kjeldahl Nitrogen	37	42

Effluent Parameter	**Sample Frequency** (when discharging)	**ECA Effluent Limit (Monthly Average)** (milligram per liter unless otherwise indicated)	**Monthly Average Result Min-Max** (milligram per liter unless otherwise indicated)	**Percentage Removal**
BOD_5	monthly	10	2.0 – 6.0	96.1 – 98.7
Suspended Solids	monthly	10	2.0 – 5.5	96.5 – 98.7
Total Phosphorus (non-freezing period)*	3/week	0.5	0.13 – 0.33	91.5 – 96.7
Total Phosphorus (freezing Period)*	3/week	1	0.21 – 0.46	88.2 – 94.6
Total Ammonia Nitrogen (non-freezing period)*	3/week	3	0.1 – 0.8	--
Total Ammonia Nitrogen (freezing period)*	3/week	5	0.7 – 4.5	--
E. coli	weekly	200 organisms/100 mL (monthly Geometric Mean Density)	23 – 680 organisms/100 mL (monthly Geometric Mean Density)	--
pH any single sample	3/week	6.0 - 9.5	7.05 – 8.10	--
Total Ammonia Nitrogen any single sample (non-freezing period)*	3/week	5.0	0.1 – 0.46	--
Total Ammonia Nitrogen any single sample (freezing period)*	3/week	8.0	0.1 – 10.6	--
Un-ionized Ammonia any single sample		0.2	0.001 – 0.019	--

* Freezing period means the period of time during which the water temperature of the receiving stream is equal to or below 5 degrees Celsius, normally from December 1, 2020 to April 30, 2020.

2.3. Effluent Objectives

Objectives are non-enforceable effluent quality values which the owner is obligated to use best efforts to strive towards achieving on an ongoing basis. These objectives are to be used as a mechanism to trigger corrective action proactively, and voluntarily before environmental impairment occurs and before the compliance limits are exceeded.

There was one monthly average objective failure related to BOD_5, one monthly average objective failure related to total suspended solids, two monthly average objective failures relating to total phosphorus, one monthly objective failure related to ammonia and two monthly geometric mean density objective failures related to E. coli. There was also one BOD loading objective failure and two total suspended solids loading objective failures during the discharge from the lagoon in 2020. The results are below.

Various operational processes were adjusted to try and meet the effluent objectives. Use of the recirculation pump system to lower TSS and E. coli levels, timing of the discharge to be at maximum daily temperatures to assist in nitrification, increased alum addition to lower effluent phosphorus concentrations, isolating the discharging pond and increasing the number of sand filters in service were all strategies used by staff to try and achieve the objectives.

The following table presents the range of effluent discharge values vs. ECA Objectives.

Effluent Parameter	**Sample Frequency** (when discharging)	**Monthly Average Objective Concentration** (milligram per liter unless otherwise indicated)	**Monthly Average Result Min-Max** (milligram per liter unless otherwise indicated)
BOD_5	monthly	5	2.0 – 6.0
Total Suspended Solids	monthly	5	2.0 – 5.5
Total Phosphorus (non-freezing period) *	3/week	0.3	0.13 – 0.33
Total Phosphorus (freezing period)*	3/week	0.8	0.21 – 0.46
Total Ammonia Nitrogen (non-freezing period) *	3/week	2	0.1 – 0.8
Total Ammonia Nitrogen (freezing period)*	3/week	4	0.7 – 4.5
E. coli	weekly	150 organisms/100 mL (monthly Geometric Mean Density)	23 – 680 organisms/100 mL (monthly Geometric Mean Density)

* Freezing period means the period of time during which the water temperature of the receiving stream is equal to or below 5 degrees Celsius, normally from December 1, 2020 to April 30, 2020.

Norwich effluent monthly average concentration/monthly average loading objective exceedances in 2020 included the following:

Date	**Parameter**	**Objective mg/L**	**Result mg/L**
Mar. 2020	BOD_5	5	6.0
Mar. 2020	TAN	4	4.5
May 2020	TSS	5	5.5
June 2020	E. coli	150 organisms/100 mL (monthly Geometric Mean Density)	680 organisms/100 mL (monthly Geometric Mean Density)
Oct. 2020	TP	0.3	0.32
Nov. 2020	TP	0.30	0.33
Nov. 2020	E. coli	150 organisms/100 mL (monthly Geometric Mean Density)	316 organisms/100 mL (monthly Geometric Mean Density)
Mar. 2020	BOD_5 loading	11.8 kg/d	14.5 kg/d
Apr. 2020	TSS loading	11.8 kg/d	12.6 kg/d

May 2020	TSS loading	11.8 kg/d	12.7 kg/d

3. Overflows, Bypassing, Upsets, Spills, and Abnormal Conditions

There were no overflows, bypasses, or spills in 2020.

There were no complaints received in 2020.

4. Maintenance of Works

The operating and maintenance staff at the Ingersoll WWTP conducts regularly scheduled maintenance of the plant equipment. The Plant utilizes a database, known as Cartegraph to issue work orders and maintain records for regular maintenance and repair at the treatment facility.

5. Monitoring Equipment Maintenance and Calibration

Calibration of flow meters is conducted by Indus-Controls Inc. in accordance with the requirements of the ECA. The records are kept on-site at the Plant.

All other operational monitoring equipment is calibrated by staff and records are kept on-site at the Plant.

6. Biosolids 2020

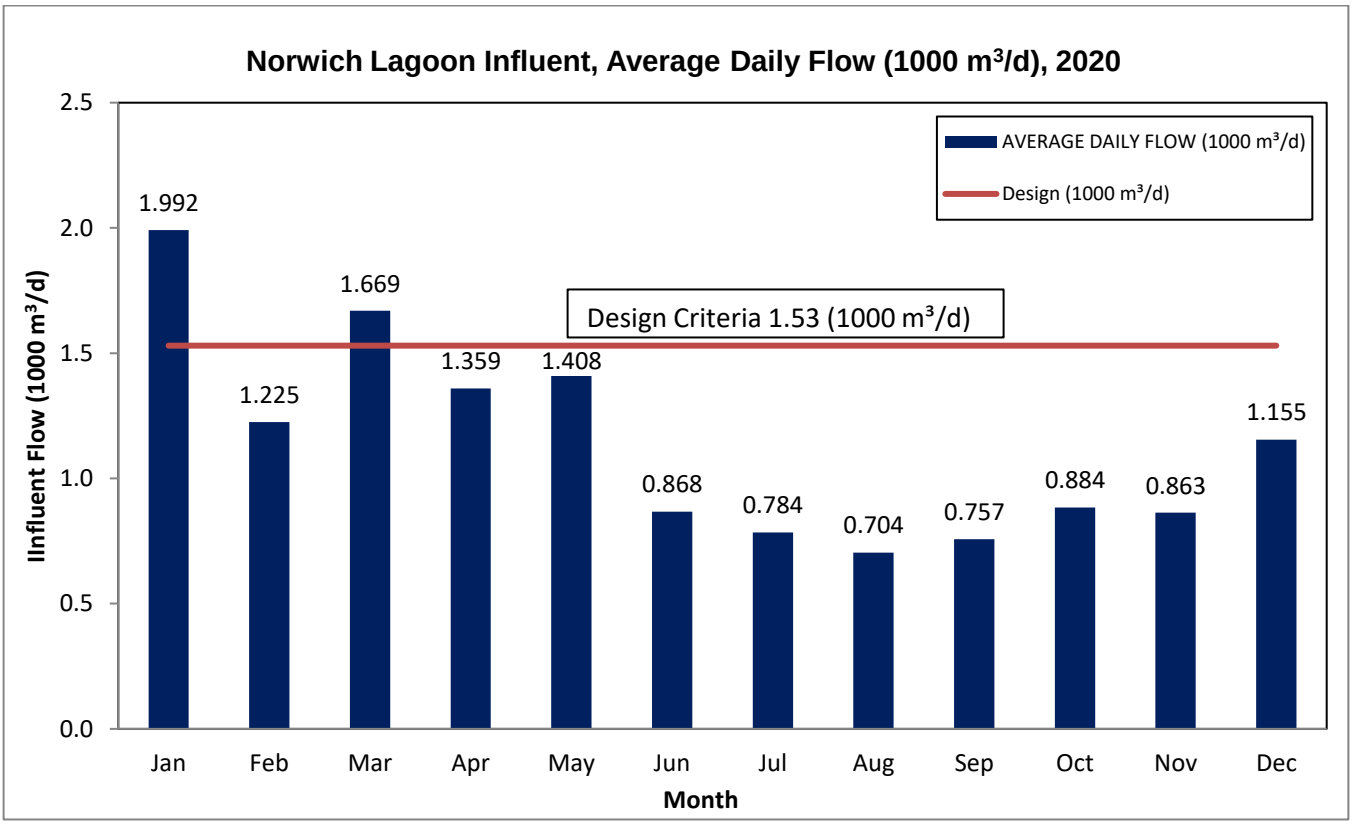
The remaining 2019 Norwich biosolids that were in storage at the BCSF facility were mixed and approximately 2,500 wet tonnes of this mixed material was land applied for beneficial reuse on agricultural land.

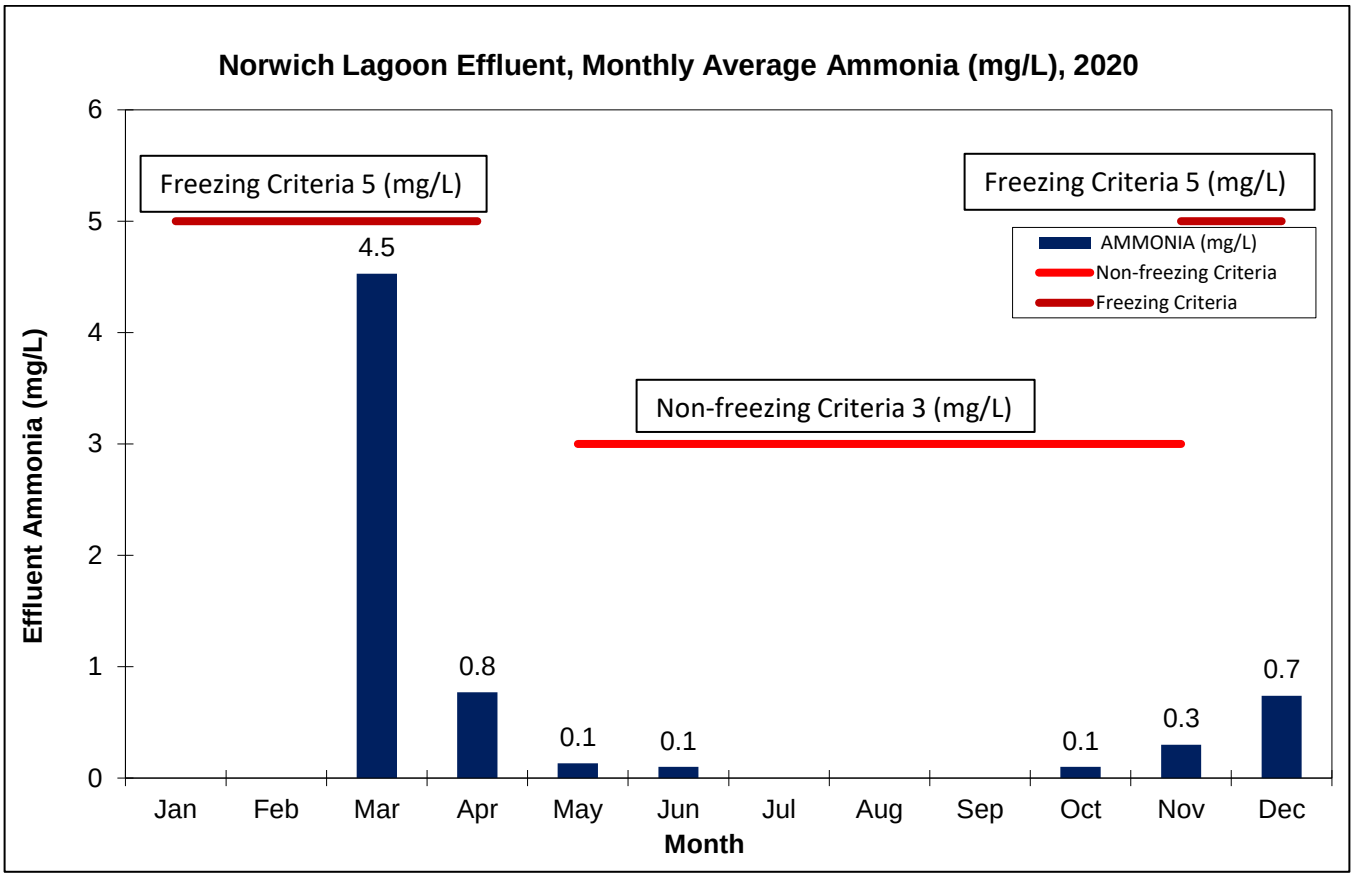
7. Audits, Pilots, and Trials

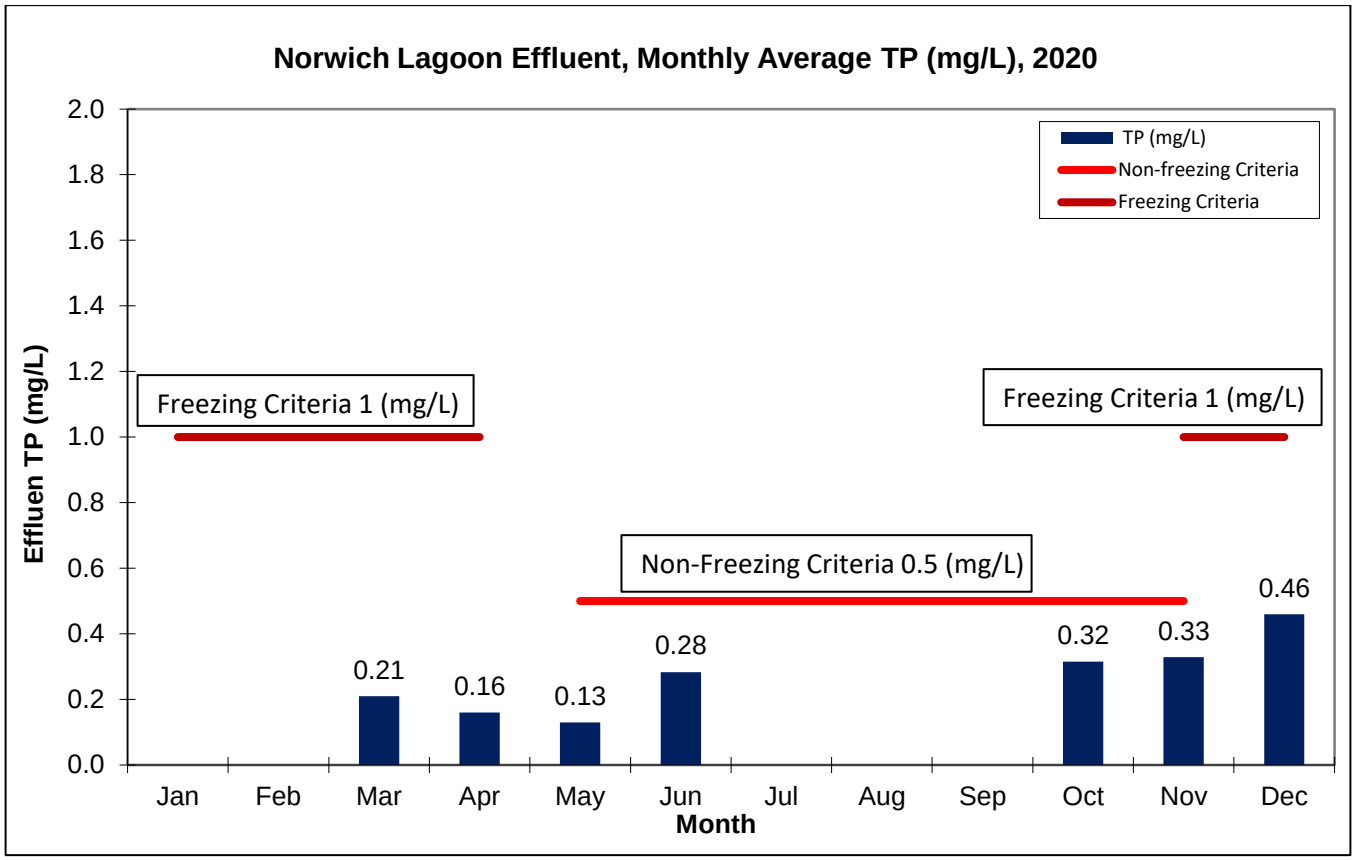
There was no MECP audit at the Norwich Lagoons in 2020.

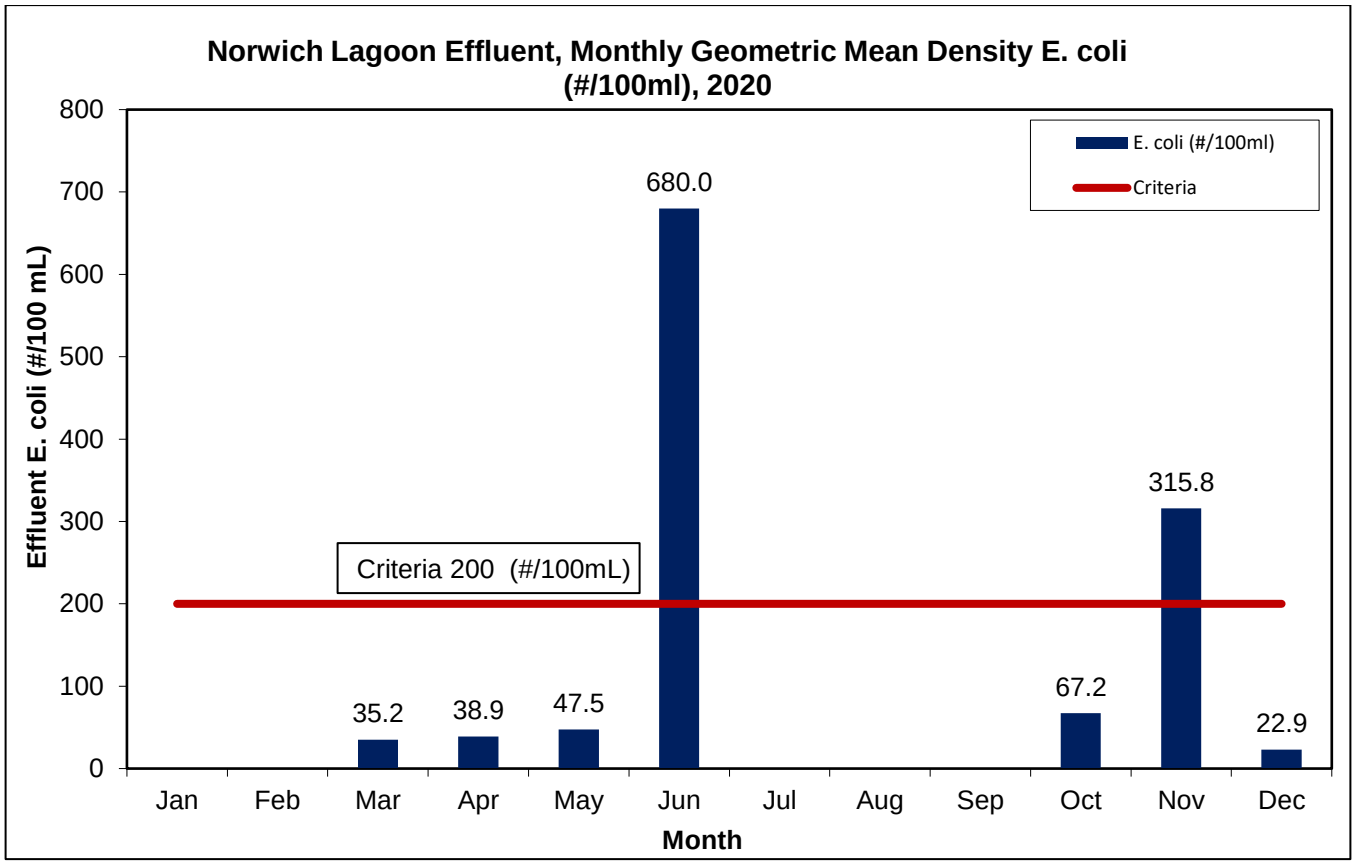
A feasibility study looking into the high bacterial levels and ways to address this through optimization of operations and to look at technology that may assist with the operations issues and future additional capacity was completed in 2020. This study will be used to restart the EA process for plant expansion in 2021.

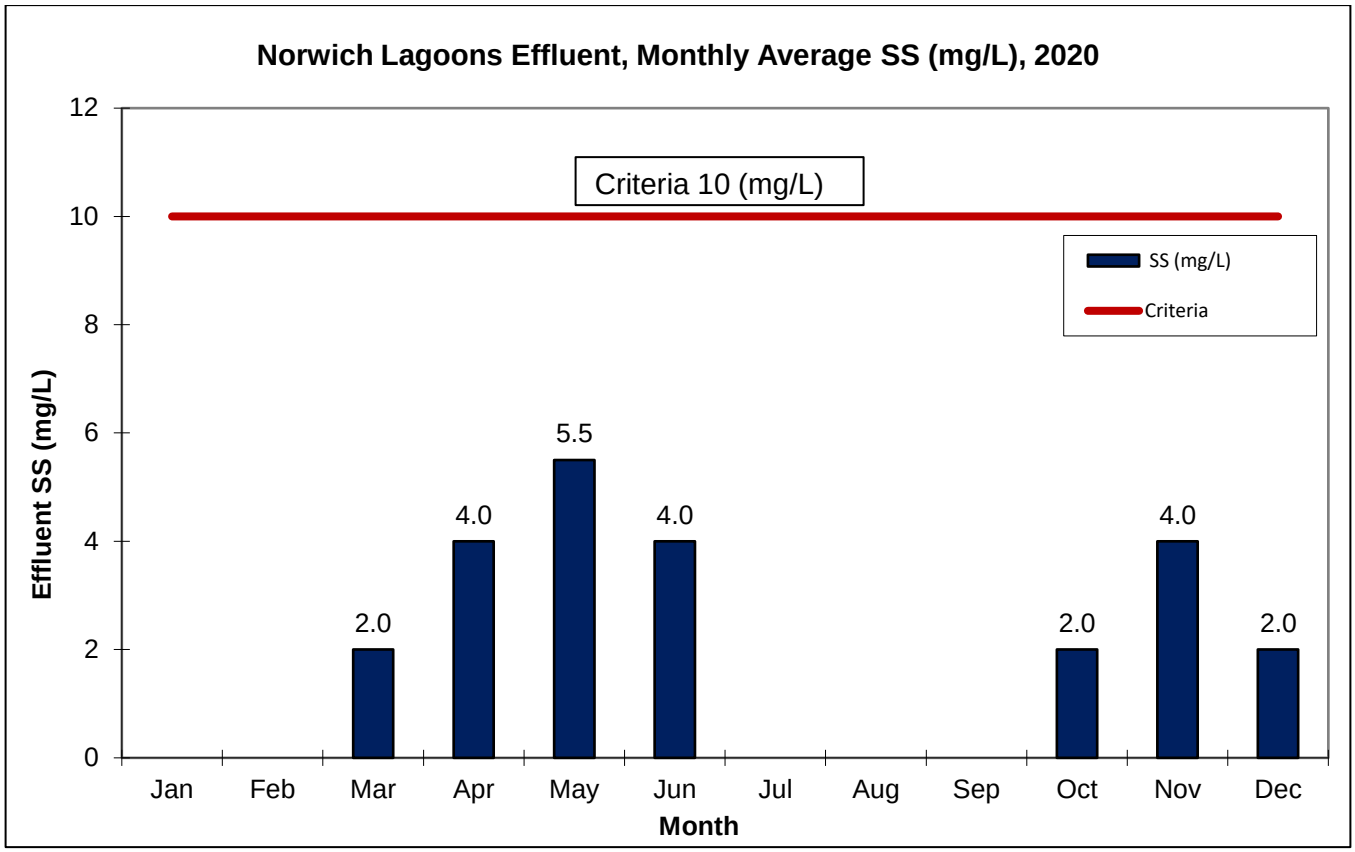
APPENDIX A: GRAPHS OF 2020 DISCHARGE PARAMETERS VS. EFFLUENT DISCHARGE LIMITS

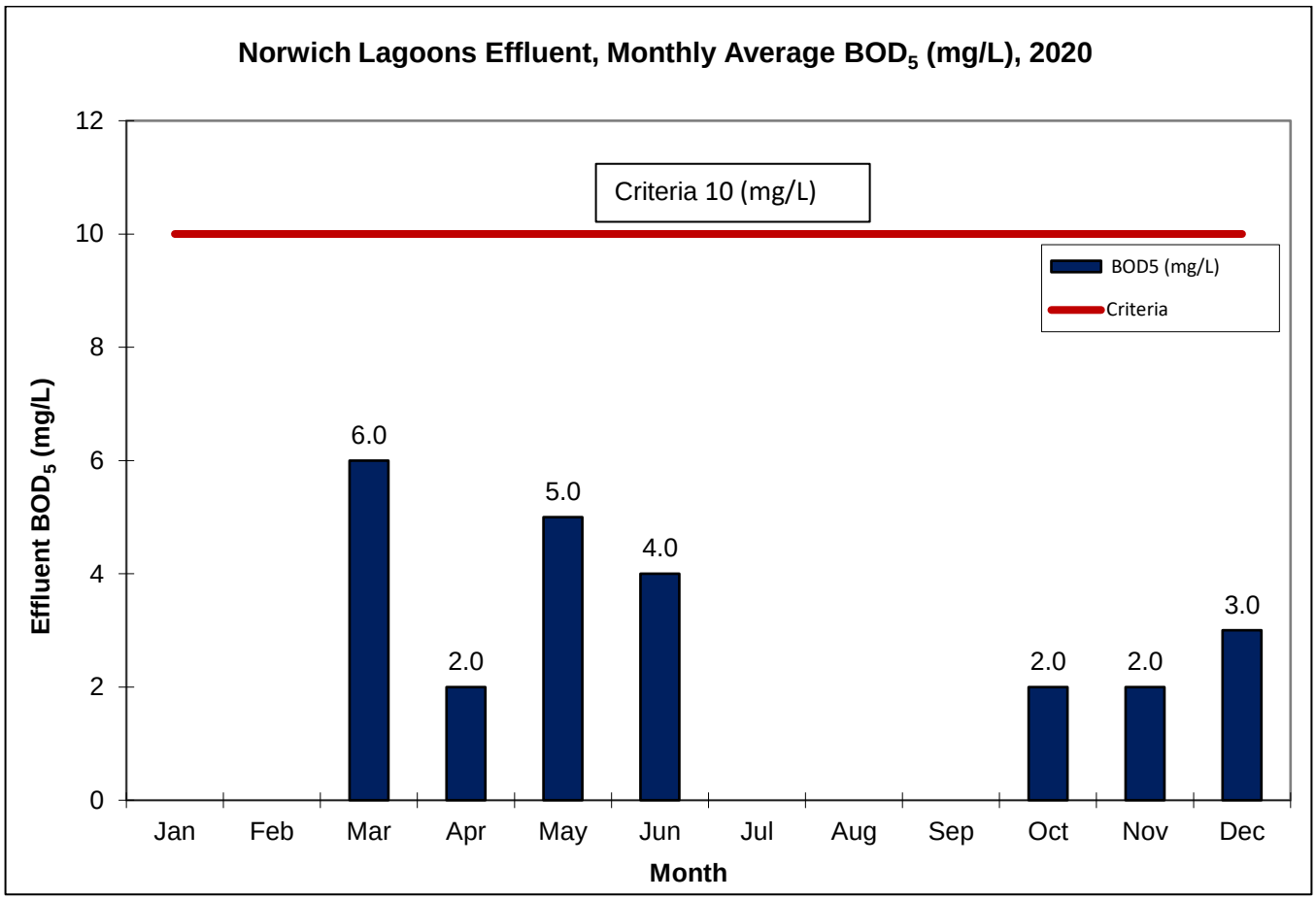





Norwich Lagoon Effluent, Monthly Average TP (mg/L), 2020
Effluen TP (mg/L)
2.0
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
TP (mg/L)
Non-freezing Criteria
Freezing Criteria
Freezing Criteria 1 (mg/L)
Freezing Criteria 1 (mg/L)
Non-Freezing Criteria 0.5 (mg/L)
0.21
0.16
0.13
0.28
0.32
0.33
0.46
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month


Norwich Lagoon Effluent, Monthly Geometric Mean Density E. coli (#/100ml), 2020
Effluent E. coli (#/100 mL)
800
700
600
500
400
300
200
100
0
E. coli (#/100ml)
Criteria
Criteria 200 (#/100mL)
680.0
315.8
35.2
38.9
47.5
67.2
22.9
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month


Norwich Lagoons Effluent, Monthly Average SS (mg/L), 2020
Criteria 10 (mg/L)
SS (mg/L)
Criteria
Effluent SS (mg/L)
12
10
8
6
4
2
0
2.0
4.0
5.5
4.0
2.0
4.0
2.0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month


Norwich Lagoons Effluent, Monthly Average BOD5 (mg/L), 2020
Criteria 10 (mg/L)
BOD5 (mg/L)
Criteria
Effluent BOD5 (mg/L)
12
10
8
6
4
2
0
6.0
2.0
5.0
4.0
2.0
2.0
3.0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month

2020 ANNUAL WASTEWATER TREATMENT SYSTEM SUMMARY REPORT
Plattsville Wastewater Treatment Plant

1. General Information

Oxford County prepares individual annual reports summarizing each wastewater treatment plant's operation and treated effluent discharge quality for the nine wastewater treatment plants it owns and operates. The reports detail the latest quality testing results and quantity statistics and any non-compliance conditions that may have occurred. They are available for review by the end of March on the internet at www.oxfordcounty.ca/Services-for-You/Water-Wastewater/Wastewater/Annual-reports or by contacting the Public Works Department.

All efforts have been made to ensure the information presented in this report is as accurate as possible. If you have any questions or comments concerning the report, please contact the County of Oxford at the address and phone number listed below or by email at publicworks@oxfordcounty.ca.

Wastewater Treatment Plant:	Plattsville Wastewater Treatment Plant
Wastewater Treatment Plant Number:	110003022
Environmental Compliance Approval (ECA)	#3133-7QWH4N
Wastewater Treatment Plant Owner & Contact Information:	Oxford County Public Works Department P.O. Box 1614 21 Reeve Street Woodstock, ON N4S 7Y3 Telephone: 519-539-9800 Toll Free: 866-537-7778
Reporting Period:	January 1, 2020 – December 31, 2020

1.1. System Description

The Plattsville WWTP is a Class I facility that provided effective wastewater treatment in 2020. The Plattsville WWTP is a lagoon wastewater treatment system serving the community of Plattsville. The nominally separated wastewater collection system includes 1 sewage pumping station, 11.8 kilometers of sanitary gravity sewers and 3.1 kilometers of sanitary forcemain sewers. Wastewater is treated at the Plattsville WWTP, which includes two aerated lagoon cells and two conventional wastewater stabilization ponds. Phosphorus removal is accomplished through the flow paced continuous dosing of aluminum sulphate into the splitter box prior to the wastewater entering the stabilization ponds and/or when required by batch dosing via a return pump pond mixing system, which can dose either cell and recirculate the contents. Treated effluent is pumped to an intermittent sand filter designed for ammonia removal prior to discharge to the Nith River.

The wastewater treatment plant is located at Lot 16, Conc. 12, Township of Blandford-Blenheim. The Facility description is provided below.

Facility	Plattsville Wastewater Treatment Plant
Design Capacity	800 m^3/d
2020 Average Daily Flow	483 m^3/d
2020 Maximum Daily Flow	2,049 m^3/d
2020 Total Volume of Wastewater	176,723 m^3/year

2. Summary and Interpretation of Monitoring Data

2.1. Effluent Quality Assurance and Control Measures

Sampling Procedure

Raw influent wastewater is sampled on a monthly basis and is analyzed for BOD_5, TSS, TKN, TP and pH. Effluent discharge samples are collected bi-weekly or monthly and at an interval to meet the percentage of drawdown of the lagoon cell as stipulated in the ECA during discharge periods and analyzed for $CBOD_5$, TSS, Total Ammonia Nitrogen, TP, E. coli, temperature and pH.

Laboratory and Field Testing

Laboratory analyses are performed by SGS Lakefield Research Ltd. on all samples that are reported for compliance except for pH, DO, and temperature which are field collected. All in-house laboratory testing is done for process control and is not included in this report.

Groundwater Testing

The ECA requires that an annual groundwater sample be collected and tested for Total Organic Carbon, Total Phosphorus, Total Kjeldahl Nitrogen, Nitrite and Nitrate.

Four samples were collected in 2020 and are referred to as the shallow well sample and deep well sample:

PLATTSVILLE WWTP GROUNDWATER SAMPLING								
	Apr 16/20	**Apr 16/20**	**Apr 30/20**	**Apr 30/20**	**Nov 12/20**	**Nov 12/20**	**Nov 26/20**	**Nov 26/20**
	Shallow	**Deep**	**Shallow**	**Deep**	**Shallow**	**Deep**	**Shallow**	**Deep**
Parameter								
TOC (mg/L)	<1	1	< 1	< 1	3	1	1	< 1
Total P (mg/L)	< 0.03	0.21	0.03	0.56	<0.03	0.33	< 0.03	0.04
TKN (mg/L N)	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Ammonia/ium (mg/L)	<0.1	< 0.1	< 0.1	<0.1	< 0.1	< 0.1	< 0.1	< 0.1
Nitrite (mg/L)	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Nitrate (mg/L)	0.53	< 0.06	0.57	< 0.06	0.57	< 0.06	0.57	< 0.06
Nitrate + Nitrite (mg/L N)	0.53	< 0.06	0.57	< 0.06	0.57	< 0.06	0.57	< 0.06
Chloride (mg/L)	3	19	3	19	5	20	3	20

2.2. Plant Performance & Effluent Quality

The Plattsville Lagoon provided effective treatment in 2020 meeting all its regulatory limits for all parameters in the effluent discharged to the Nith River.

On a bi-weekly basis (as a minimum) the operator measures pH of the effluent streams during discharge. There was no single pH result for the effluent outside the discharge limit of 6 - 9.5 in 2020.

During discharge, the receiving stream temperature was <12 degrees Celsius from April 2 until May 21. From May 22 to June 5, the receiving stream temperature was >12 degrees Celsius.

Graphs of discharge parameters versus effluent discharge limits are included in this report in Appendix A.

Influent wastewater characteristics and effluent discharge values are presented in the tables below.

Influent Wastewater Characteristics

Parameter	Concentration mg/L	Loading kg/d
BOD_5	314	152
Total Suspended Solids	681	329
Total Phosphorus	6.1	3.0
Total Kjeldahl Nitrogen	53.6	25.9

Effluent Parameter	**Sample Frequency**	**ECA Effluent Limit (Monthly Average)** (milligram per liter unless otherwise indicated)	**Monthly Average Result Min-Max** (milligram per liter unless otherwise indicated)	**Percentage Removal**
$CBOD_5$	weekly	10	2.0 – 2.2	99.3 – 99.4
Total Suspended Solids	weekly	10	2.5 – 4.3	99.4 – 99.6
Total Phosphorus	weekly	0.5	0.03 – 0.05	99.2 - 99.5
Total Ammonia Nitrogen (when receiving stream >12 degrees Celsius)	weekly	2	0.1	99.8
Total Ammonia Nitrogen (when receiving stream < or = to 12 degrees Celsius)	weekly	5	0.13 – 1.1	97.3 – 99.7
E. coli	weekly	200 organisms/100 mL (monthly Geometric Mean Density)	2 – 12 organisms/100 mL (monthly Geometric Mean Density)	--
pH any single sample	weekly	6.0-9.5	6.7 – 7.9	--

2.3. Effluent Objectives

Objectives are non-enforceable effluent quality values which the owner is obligated to use best efforts to strive towards achieving on an ongoing basis. These objectives are to be used as a mechanism to trigger corrective action proactively, and voluntarily before environmental impairment occurs and before the compliance limits are exceeded.
All effluent discharge objectives listed in the Plant's ECA were met in 2020, with the exception of two single samples, summarized in the tables below. Those TSS objective exceedances occurred in the first week of the discharge period, all remaining TSS concentrations met the objective.

The following table presents the range of effluent discharge values vs. ECA Objectives.

Effluent Parameter	**Sample Frequency**	**Monthly Average Objective Concentration** (milligram per liter unless otherwise indicated)	**Monthly Average Result Min-Max** (milligram per liter unless otherwise indicated)
$CBOD_5$	weekly	5	2.0 – 2.2
Total Suspended Solids	weekly	5	2.5 – 4.3
Total Phosphorus	weekly	0.3	0.03 – 0.05
Total Ammonia Nitrogen (when receiving stream >12 degrees Celsius)	weekly	1	0.1
Total Ammonia Nitrogen (when receiving stream < or = to 12 degrees Celsius)	weekly	3	0.13 – 1.1

E. coli	weekly	150 organisms/100 mL (monthly Geometric Mean Density)	2 – 12 organisms/100 mL (monthly Geometric Mean Density)

Plattsville effluent single samples that exceeded the objective in 2020 included the following:

Date	Parameter	Objective mg/L	Result mg/L
Apr 2 2020	TSS	5	12
Apr 6 2020	TSS	5	6

3. Overflows, Bypassing, Upsets, Spills, and Abnormal Conditions

There were no overflows, bypassing, upsets, spills, and abnormal conditions from the Plattsville WWTP in 2020.

There were no complaints in 2020.

4. Maintenance of Works

The operating and maintenance staff at the Plattsville WWTP conducts regularly scheduled maintenance of the plant equipment. The Plant utilizes a database known as Cartegraph to issue work orders and maintain records for regular maintenance and repair at the treatment facility.

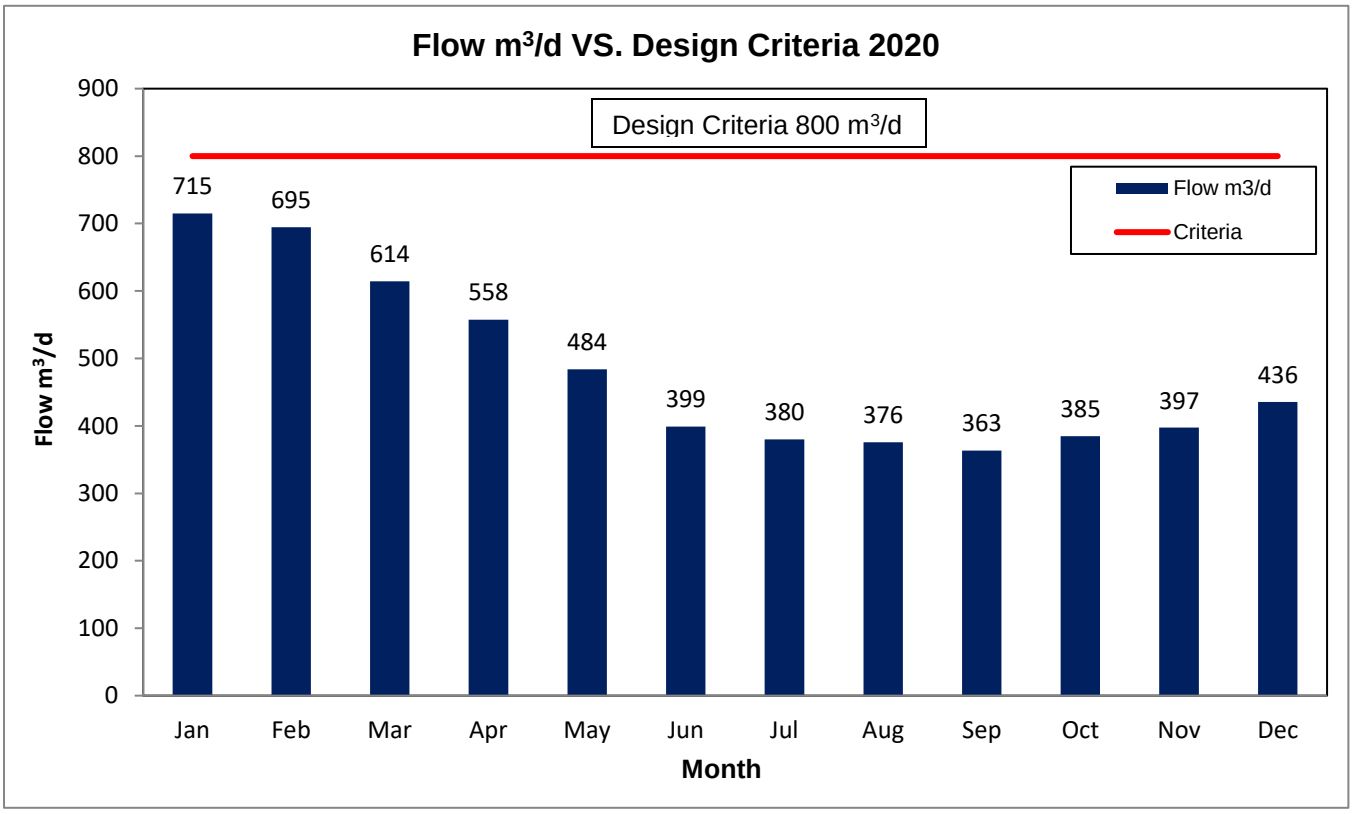
5. Monitoring Equipment Maintenance and Calibration

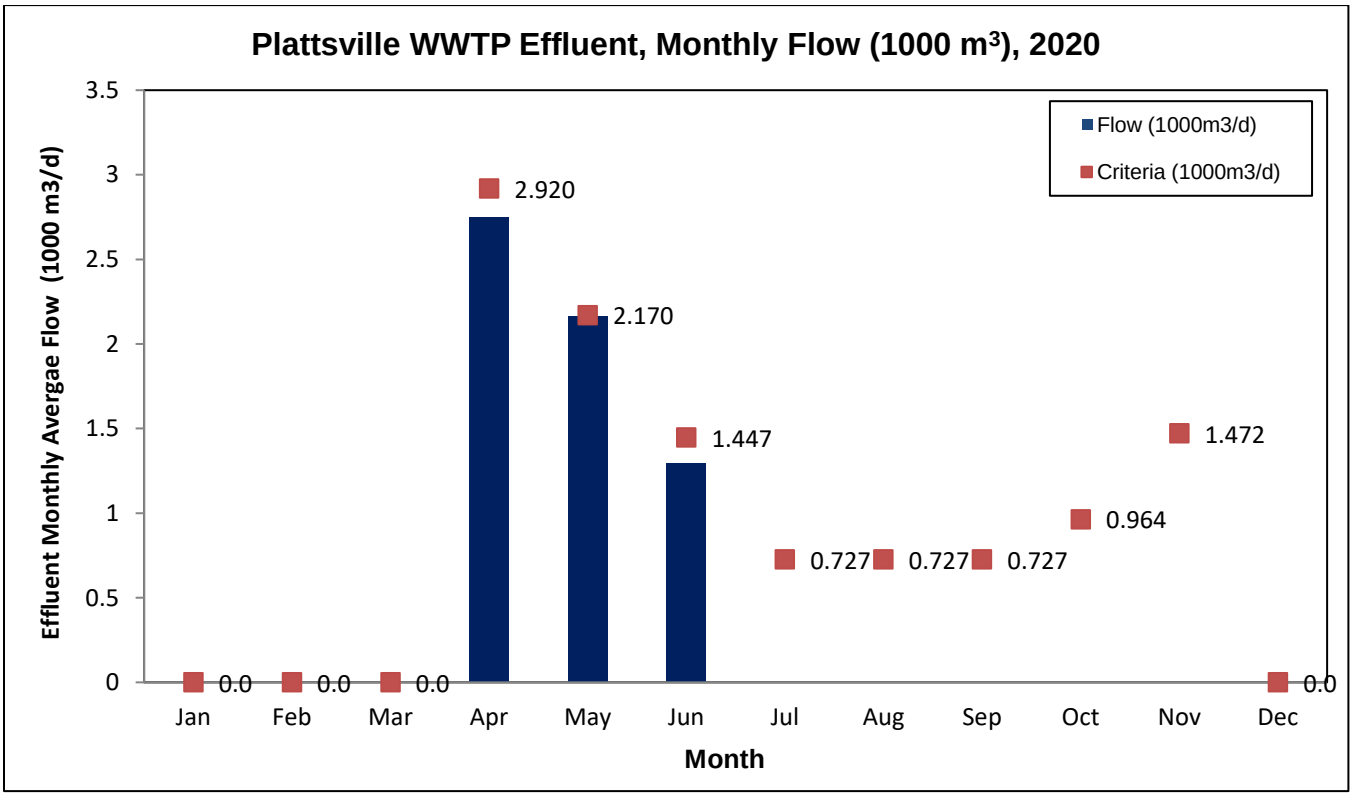
Calibration of flow meters is conducted yearly by Indus-Controls Inc. The operational monitoring equipment calibration records are kept on-site at the Plant.

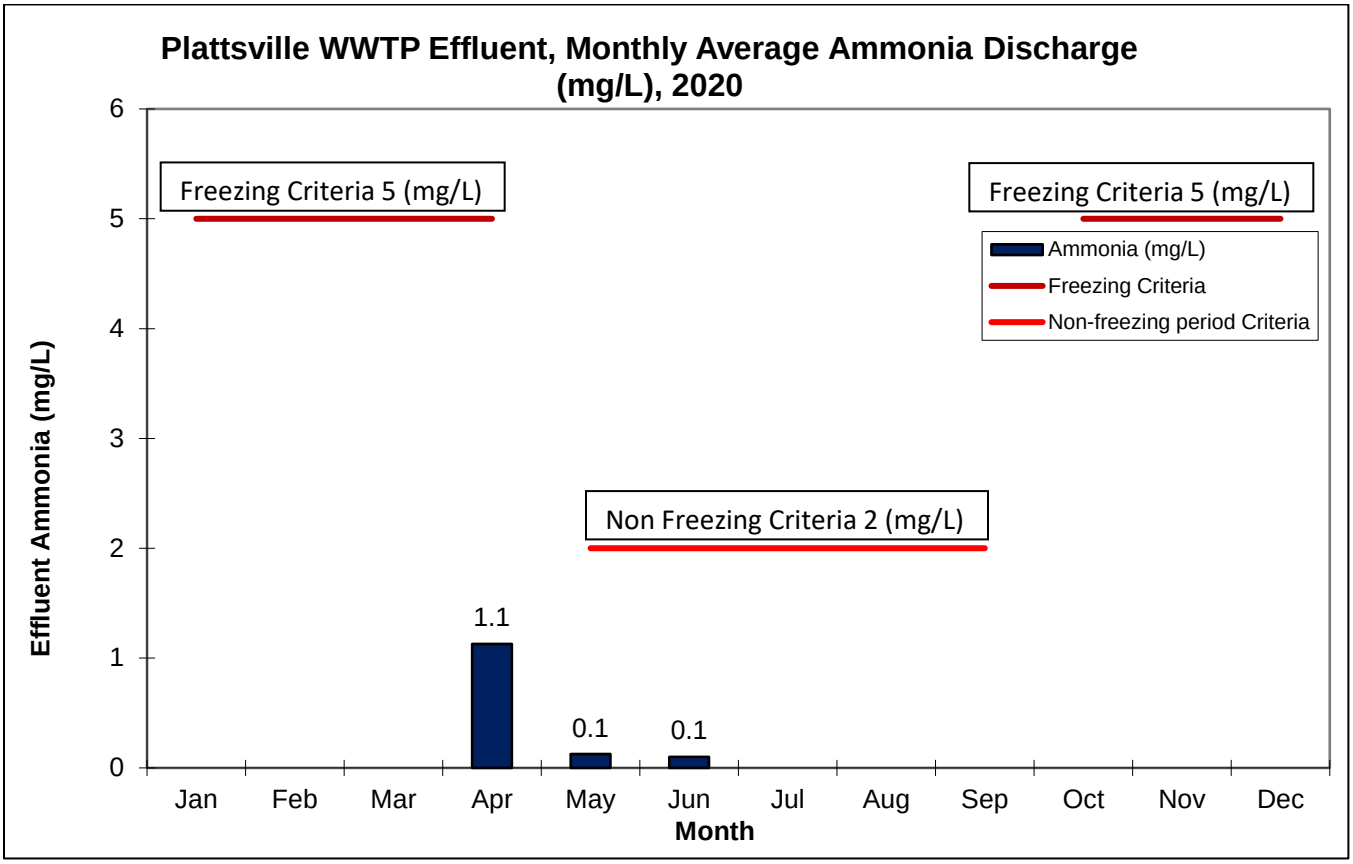
6. Audits, Pilots, and Trials

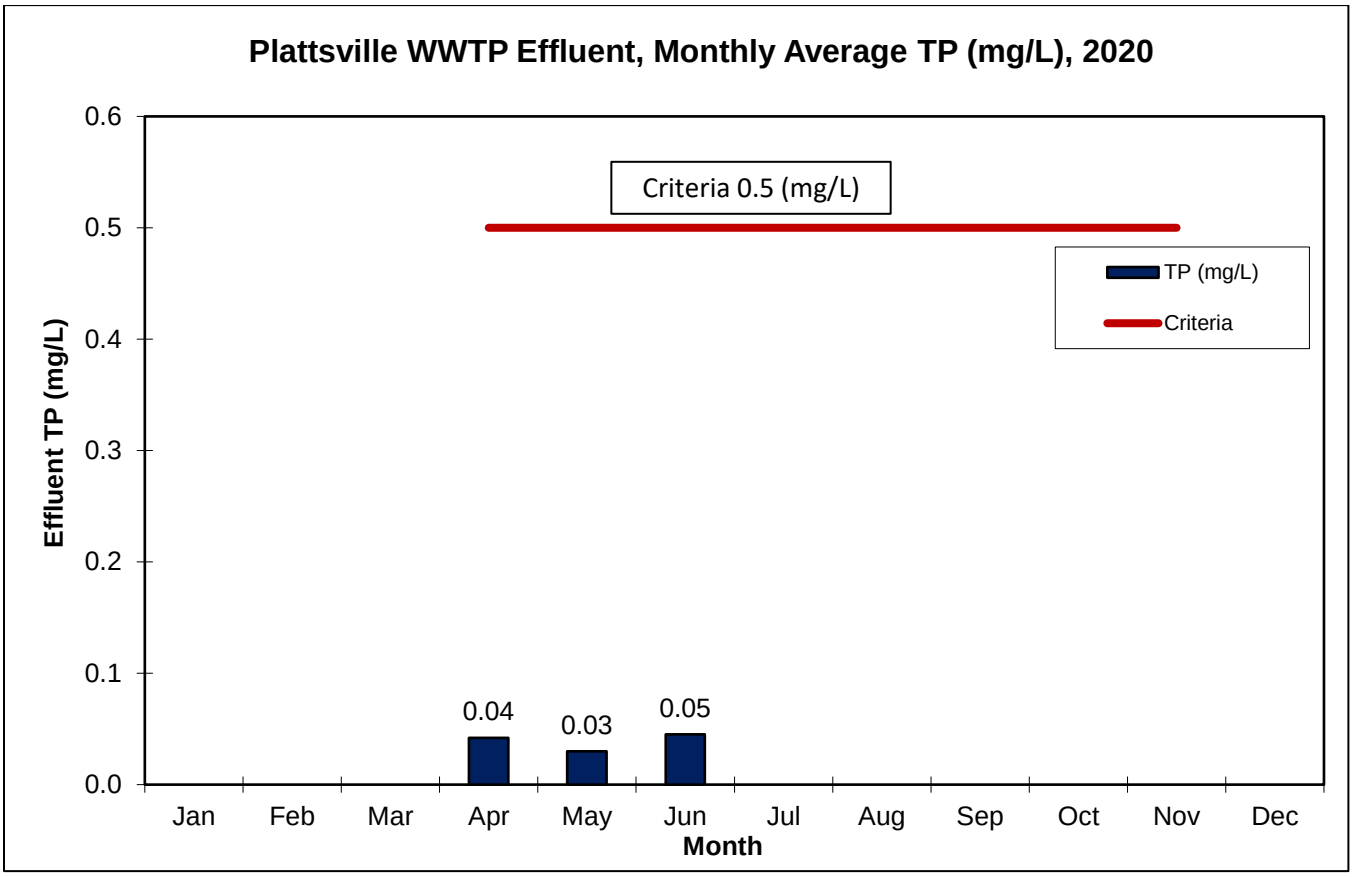
There was no MECP audit in 2020.

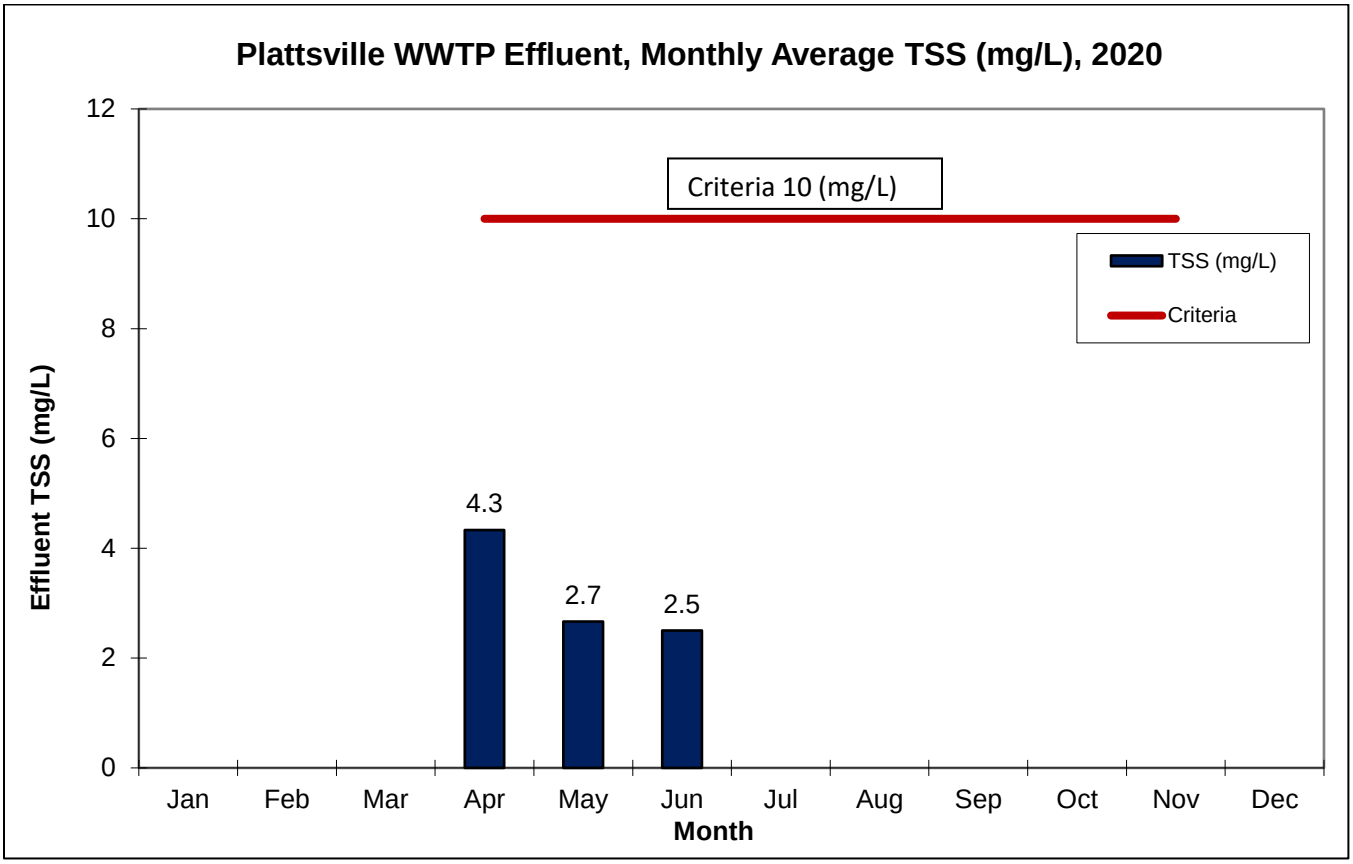
APPENDIX A: GRAPHS OF 2020 DISCHARGE PARAMETERS VS. EFFLUENT DISCHARGE LIMITS

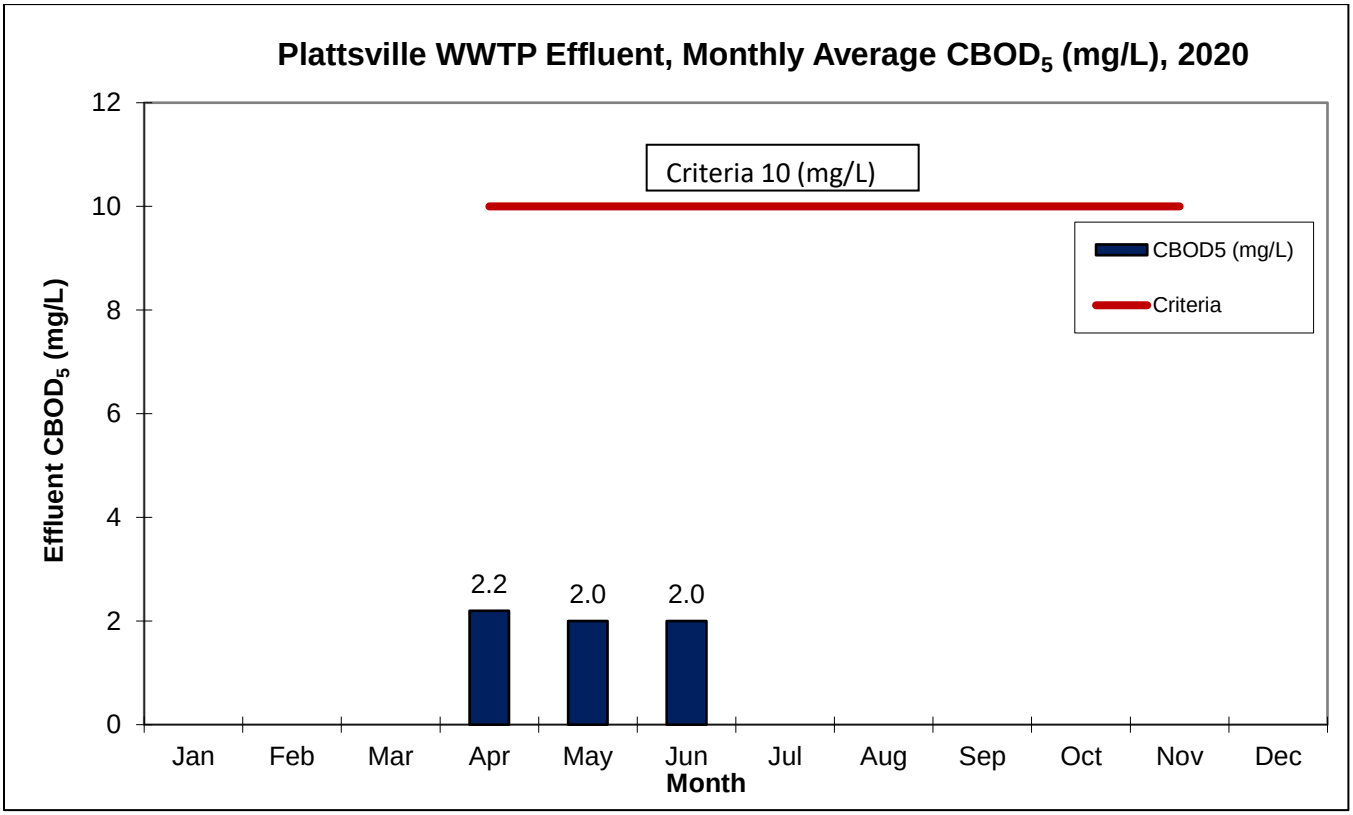





Plattsville WWTP Effluent, Monthly Average Ammonia Discharge (mg/L), 2020
Effluent Ammonia (mg/L)
6
5
4
3
2
1
0
Freezing Criteria 5 (mg/L)
Freezing Criteria 5 (mg/L)
Ammonia (mg/L)
Freezing Criteria
Non-freezing period Criteria
Non Freezing Criteria 2 (mg/L)
1.1
0.1
0.1
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month


Plattsville WWTP Effluent, Monthly Average TP (mg/L), 2020
Effluent TP (mg/L)
0.6
0.5
0.4
0.3
0.2
0.1
0.0
Criteria 0.5 (mg/L)
TP (mg/L)
Criteria
0.04
0.03
0.05
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month


Plattsville WWTP Effluent, Monthly Average TSS (mg/L), 2020
Effluent TSS (mg/L)
12
10
8
6
4
2
0
Criteria 10 (mg/L)
TSS (mg/L)
Criteria
4.3
2.7
2.5
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month


Plattsville WWTP Effluent, Monthly Average CBOD5 (mg/L), 2020
Effluent CBOD5 (mg/L)
12
10
8
6
4
2
0
Criteria 10 (mg/L)
CBOD5 (mg/L)
Criteria
2.2
2.0
2.0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month

2020 ANNUAL WASTEWATER TREATMENT SYSTEM SUMMARY REPORT
Tavistock Wastewater Treatment Plant

1. General Information

Oxford County prepares individual annual reports summarizing each wastewater treatment plant's operation and treated effluent discharge quality for the nine wastewater treatment plants it owns and operates. The reports detail the latest quality testing results and quantity statistics and any non-compliance conditions that may have occurred. They are available for review by the end of March on the internet at www.oxfordcounty.ca/Services-for-You/Water-Wastewater/Wastewater/Annual-reports or by contacting the Public Works Department.

All efforts have been made to ensure the information presented in this report is as accurate as possible.
If you have any questions or comments concerning the report, please contact the County of Oxford at the address and phone number listed below or by email at publicworks@oxfordcounty.ca.

Wastewater Treatment Plant:	Tavistock Wastewater Treatment Plant
Wastewater Treatment Plant Number:	110000720
Environmental Compliance Approval (ECA)	#4450-BF9NE6 (March 5, 2020)
Wastewater Treatment Plant Owner & Contact Information:	Oxford County Public Works Department P.O. Box 1614 21 Reeve Street Woodstock, ON N4S 7Y3 Telephone: 519-539-9800 Toll Free: 866-537-7778
Reporting Period:	January 1, 2020 – December 31, 2020

1.1. System Description

The Tavistock WWTP is a Class I facility that provided effective wastewater treatment in 2020. The Tavistock WWTP is a lagoon wastewater treatment system serving the community of Tavistock. The nominally separated wastewater collection system includes 3 sewage pumping stations, 20.7 kilometers of sanitary gravity sewers, and 1.9 kilometers of sanitary forcemain sewers. The Tavistock WWTP consists of 3 aerated lagoon cells, one polishing pond and an Intermittent Sand Filter (ISF). Cell 1 is equipped with Ares aerators, cell 2 and 3 are equipped with Mat Aerators, and there are an additional six 15 HP aspirating surface aerators in Cell 1 to provide the necessary dissolved oxygen for the lagoons.

There is also the provision for continuous aluminum sulphate addition for phosphorus removal. The wastewater is dosed with aluminum sulphate as it enters Cell 1 and as it enters Cell 2.

Effluent from Cell 1 overflows to Cell 2, then into Cell 3 and/or Cell 4 where it is pumped through the filter beds and/or stored prior to discharge.

The wastewater treatment plant is located at 381 William St., Tavistock, Ontario. The Facility description is provided below.

Facility	Tavistock Wastewater Treatment Plant
Design Capacity	2,525 m^3/d

2020 Average Daily Flow	1,943 m^3/d
2020 Maximum Daily Flow	7,582 m^3/d
2020 Total Volume of Wastewater	712,096 m^3/year

2. Summary and Interpretation of Monitoring Data

2.1. Effluent Quality Assurance and Control Measures

Sampling Procedure

Raw sewage is sampled a minimum of once monthly for $CBOD_5$, suspended solids, TKN, total phosphorous, pH and temperature.

Automatic composite samplers are used to collect raw sewage samples from Chamber 3 as the flow enters Cell 1. Automated composite samples are also taken at the same time from a large food processor in Tavistock. The company can discharge significant loadings to the Tavistock Lagoon system and is subject to a surcharge agreement with Oxford County.

Grab samples of final effluent are taken weekly during effluent discharge and tested for $CBOD_5$, suspended solids, total phosphorous, pH, temperature, dissolved oxygen, nitrate nitrogen, nitrite nitrogen, ammonia nitrogen and un-ionized ammonia.

Laboratory and Field Testing

SGS Lakefield Research Ltd. performs all sample analyses with the exception of pH, temperature, and dissolved oxygen which are measured in the field.

2.2. Plant Performance & Effluent Quality

The Tavistock WWTP provided effective treatment in 2020, meeting all its regulatory limits for all parameters in the effluent discharged to the Hohner Drain (eventually to the Thames River) achieving 100% compliance.

On a weekly basis (minimum), the operator measures pH of the effluent stream when discharging. There was no single pH result for the effluent outside the discharge limit of 6 – 9.5 in 2020.

Graphs of discharge parameters versus effluent discharge limits are included in this report in Appendix A.

Influent wastewater characteristics and effluent discharge values are presented in the tables below.

Influent Wastewater Characteristics		
Parameter	Concentration mg/L	Loading kg/d
$CBOD_5$	510	991
Total Suspended Solids	473	919
Total Phosphorus	14	27
Total Kjeldahl Nitrogen	43	84

Effluent Parameter	Sample Frequency	ECA Effluent Limit (Monthly Average) (milligram per liter unless otherwise indicated)	Monthly Average Result Min-Max (milligram per liter unless otherwise indicated)	Percentage Removal
$CBOD_5$	weekly	15	2.0 – 3.5	99.3 - 99.6
Suspended Solids	weekly	15	2.0 – 3.8	99.2 - 99.6
Total Phosphorus (May-Nov.)	weekly	0.5	0.1 – 0.2	98.6 – 99.3
Total Phosphorus (Dec.-Apr.)	weekly	0.8	0.2	98.6
Total Ammonia Nitrogen (January)	weekly	7.0	1.3	–
Total Ammonia Nitrogen (February)	weekly	10.0	2.4	–
Total Ammonia Nitrogen (March)	weekly	8.5	3.5	–
Total Ammonia Nitrogen (April)	weekly	8.0	1.5	–
Total Ammonia Nitrogen (May-Nov.)	weekly	1.0	0.1	–
pH any single sample	weekly	6.0 - 9.5	6.9 – 8.4	–

2.3. Effluent Objectives

Objectives are non-enforceable effluent quality values which the owner is obligated to use best efforts to strive towards achieving on an ongoing basis. These objectives are to be used as a mechanism to trigger corrective action proactively, and voluntarily before environmental impairment occurs and before the compliance limits are exceeded.

All effluent discharge objectives listed in the Plant's ECA were met at the Tavistock WWTP in 2020.

The following table presents the range of effluent discharge values vs. ECA Objectives.

Effluent Parameter	Sample Frequency	Monthly Average Objective Concentration (milligram per liter unless otherwise indicated)	Monthly Average Result Min-Max (milligram per liter unless otherwise indicated)
$CBOD_5$	weekly	10	2.0 – 3.5
Suspended Solids	weekly	10	2.0 – 3.8
Total Phosphorus (May-Nov.)	weekly	0.3	0.1 – 0.2
Total Phosphorus (Dec.-Apr.)	weekly	0.5	0.2
Total Ammonia Nitrogen (January)	weekly	6.0	1.3
Total Ammonia Nitrogen (February)	weekly	9.0	2.4
Total Ammonia Nitrogen (March)	weekly	7.5	3.5
Total Ammonia Nitrogen (April)	weekly	7.0	1.5
Total Ammonia Nitrogen (May-Nov.)	weekly	0.8	0.1
pH any single sample	weekly	6.5 - 9.0	6.9 – 8.4

3. Overflows, Bypassing, Upsets, Spills, Complaints, and Abnormal Conditions

There were no overflows, bypasses, upsets, or spills from the Tavistock WWTP in 2020.

To allow for the desludging of cell 1 and the upgrades to the aeration system, the MECP temporarily increased the plant effluent discharge flow to a limit of 4800 $m^{3/}d$ for the period of June through November. Effluent was discharged from cell three and four, in order to make room to drain cell one and complete all the repairs.

Many odour complaints were received during the initial period of the plant upgrade in 2020. In response, an odour mitigation strategy was developed and implemented, which included an odour neutralizing air curtain system and several odour minimizing drum mounted aspirators, stationed along the facility perimeter closet to the village. Operations were onsite each day to monitor and adjust to the conditions. Chemical addition into the lagoons increased dissolved oxygen levels to minimize any odours that were created from the exposed biosolids and bacteria within the ponds. The strategy was successful at reducing nuisance odours, and the upgrade was completed in December.

The Limited Operational Flexibility for modification to the wastewater treatment facility was not used in 2020.

4. Maintenance of Works

The operating and maintenance staff at the Woodstock WWTP conducts regularly scheduled maintenance of the plant equipment. The Plant utilizes a database system known as Cartegraph to issue work orders and maintain records for regular maintenance and repair at the treatment facility.

5. Monitoring Equipment Maintenance and Calibration

Calibration of flow meters is conducted yearly by Indus-Controls Inc. The operational monitoring equipment calibration records are kept on-site at the Plant.

6. Inspection, Pilots, and Trials

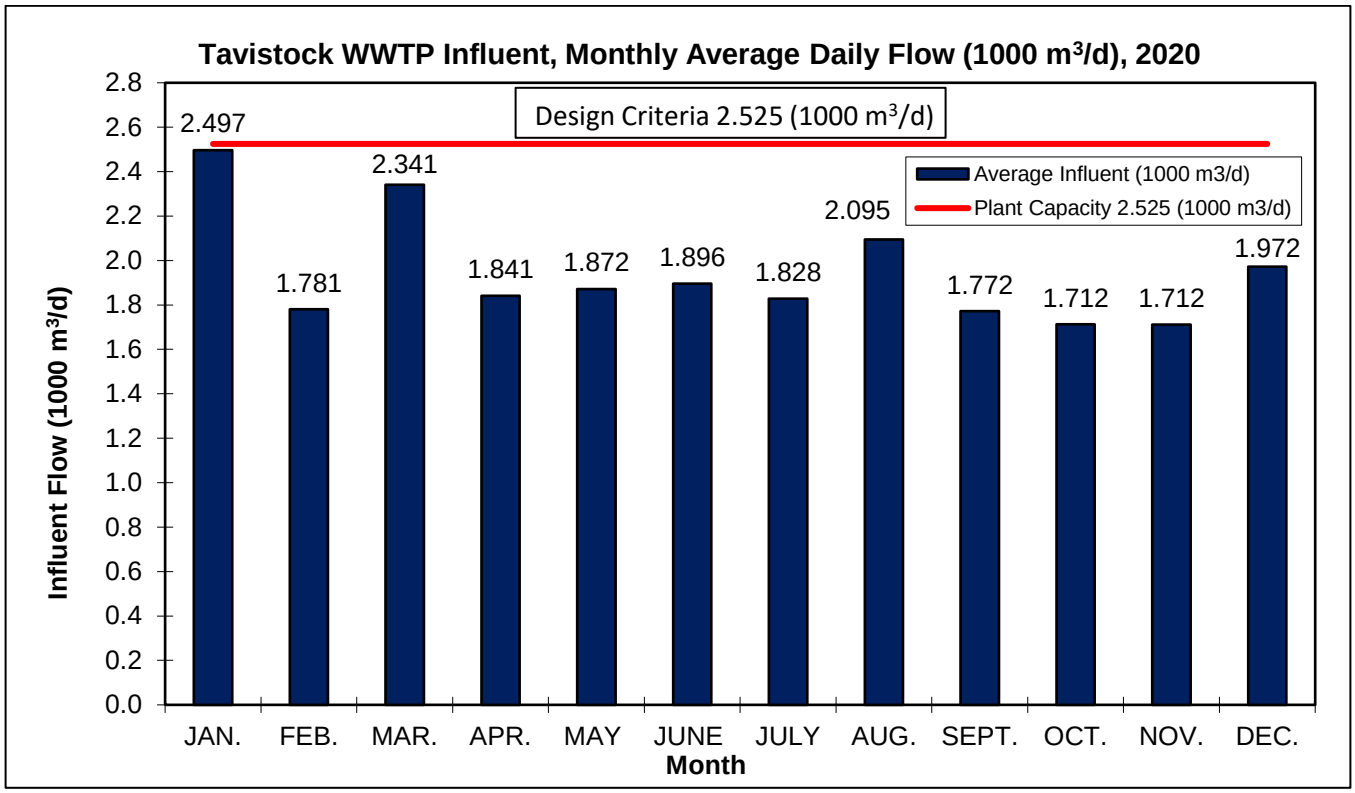
The Ministry of Environment, Conservation and Parks (MECP) did not conduct an inspection of the Tavistock Wastewater Treatment Plant in 2020.

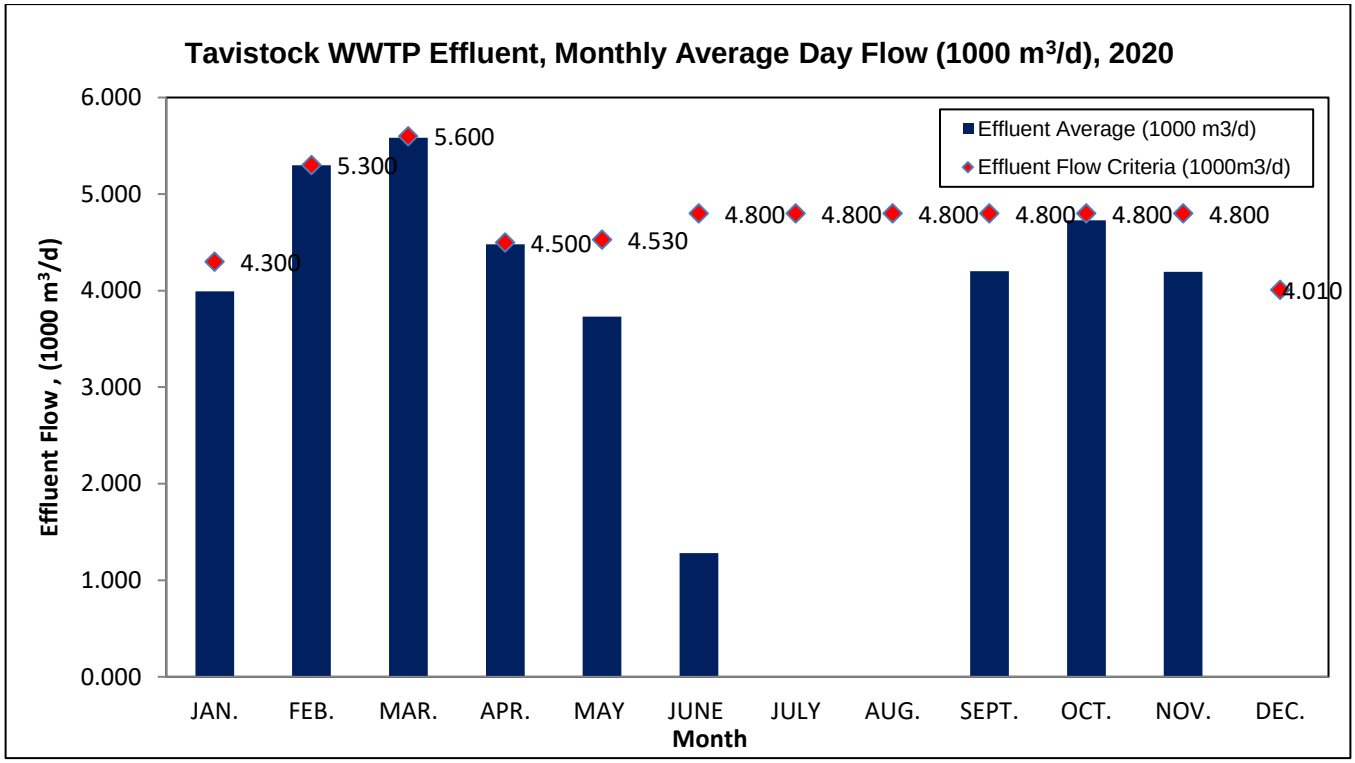
Plant Upgrade, Lagoon Cleanout & Optimization

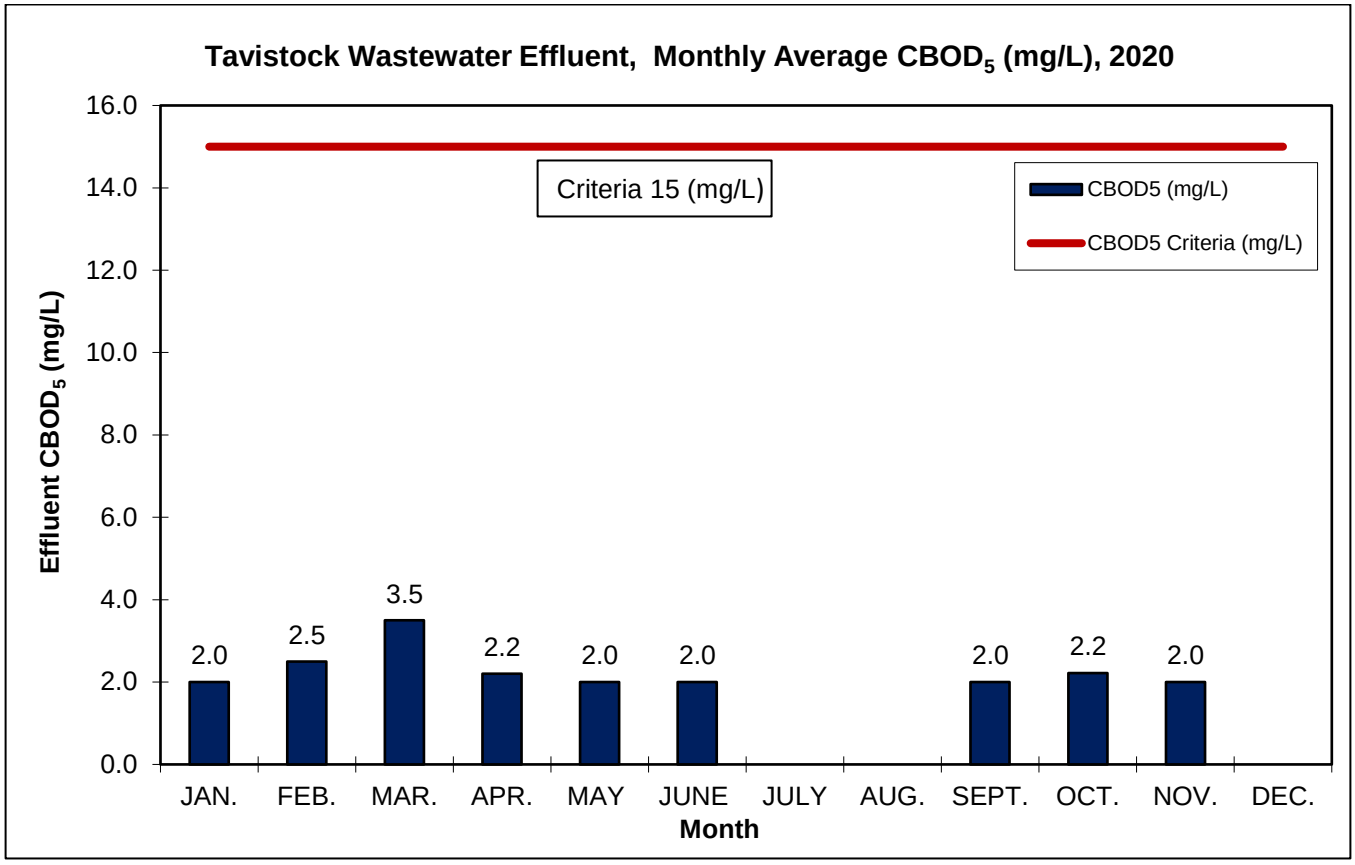
Cell 1 was desludged in 2020, removing 11,253 wet tonnes of biosolids, and restoring back capacity to the lagoon. This aligned with the department's biosolids monitoring plan, which collects data that allows for informed decisions on a number of sludge management actions and best practices including determining the actual lagoon capacity, quantity/quality/distribution of sludge and budget planning for sludge removal. Planned clean outs will be based on the available data, but will typically occur every 15-20 years for a primary cell, and 15-25 years for secondary or tertiary cell.

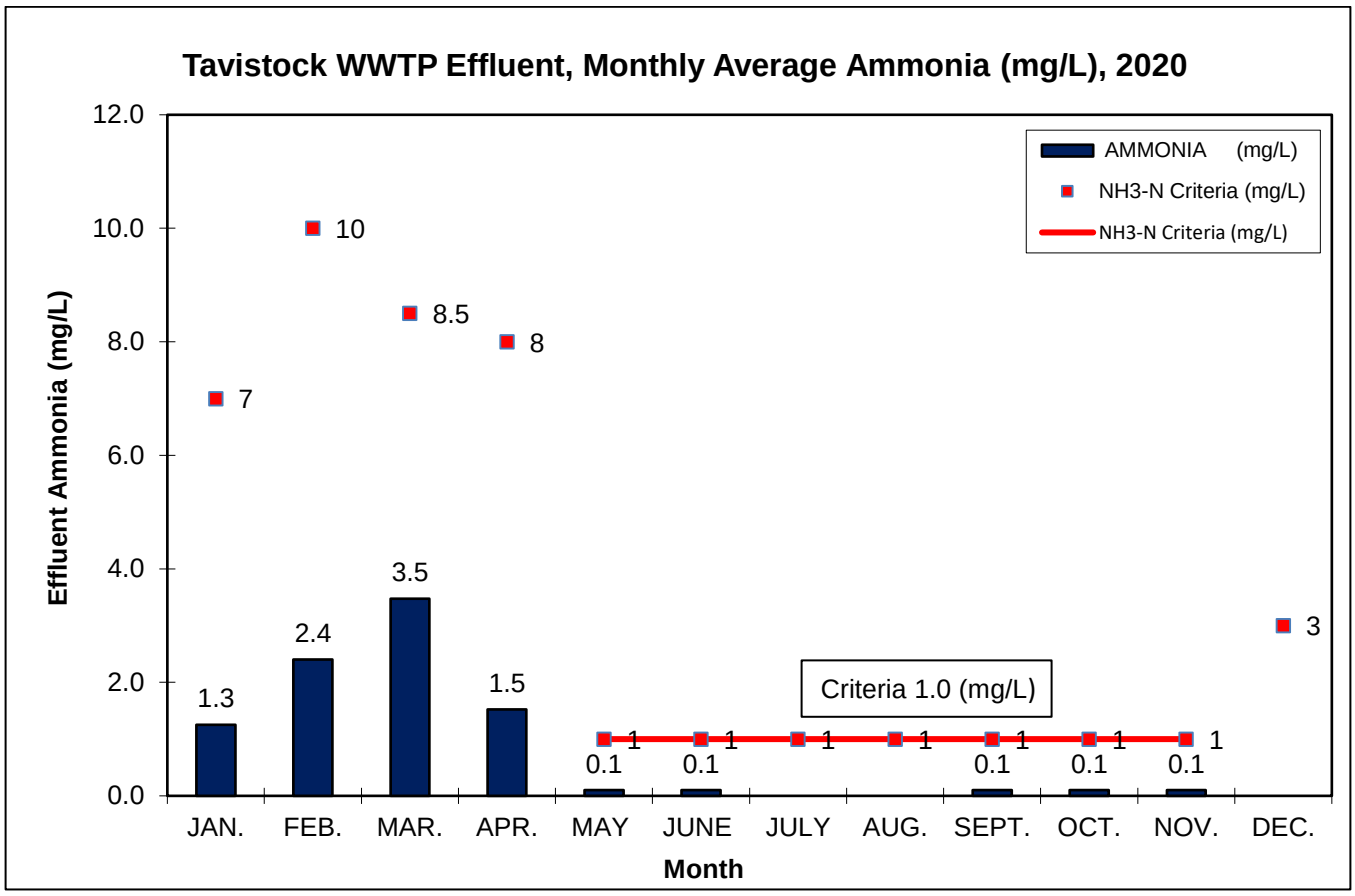
Cell one's aged course bubble aeration system was at the end of its life cycle and at risk of failing. This old aeration system was removed and the plant was upgraded with a new, efficient fine bubble diffuser system to optimize oxygen transfer into the water to stabilize the incoming waste. In addition the berm around cell 1 was stabilized and repaired, as it had been wind eroded over the past few years.

APPENDIX A: GRAPHS OF 2020 DISCHARGE PARAMETERS VS. EFFLUENT DISCHARGE LIMITS






Tavistock Wastewater Effluent, Monthly Average CBOD5 (mg/L), 2020
Effluent CBOD5 (mg/L)
16.0
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
Criteria 15 (mg/L)
CBOD5 (mg/L)
CBOD5 Criteria (mg/L)
2.0
2.5
3.5
2.2
2.0
2.0
2.0
2.2
2.0
JAN.
FEB.
MAR.
APR.
MAY
JUNE
JULY
AUG.
SEPT.
OCT.
NOV.
DEC.
Month


Tavistock WWTP Effluent, Monthly Average Ammonia (mg/L), 2020
Effluent Ammonia (mg/L)
12.0
10.0
8.0
6.0
4.0
2.0
0.0
AMMONIA (mg/L)
NH3-N Criteria (mg/L)
NH3-N Criteria (mg/L)
Criteria 1.0 (mg/L)
7
10
8.5
8
3.5
2.4
1.5
1.3
0.1
0.1
0.1
0.1
0.1
1
1
1
1
1
1
1
JAN.
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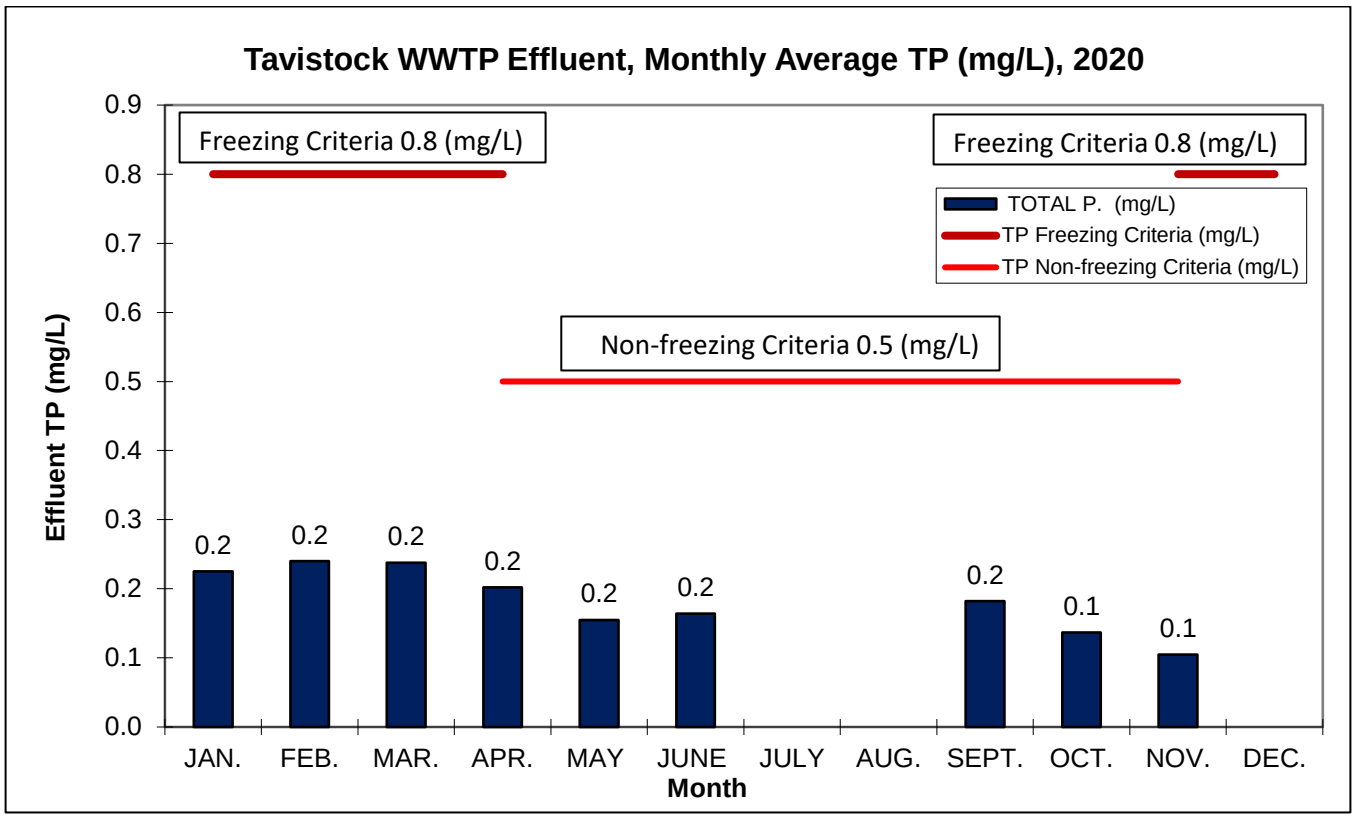
MAY
JUNE
JULY
AUG.
SEPT.
OCT.
NOV.
DEC.
Month


Tavistock WWTP Effluent, Monthly Average TP (mg/L), 2020
Freezing Criteria 0.8 (mg/L)
Freezing Criteria 0.8 (mg/L)
TOTAL P. (mg/L)
TP Freezing Criteria (mg/L)
TP Non-freezing Criteria (mg/L)
Non-freezing Criteria 0.5 (mg/L)
Effluent TP (mg/L)
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0.2
0.2
0.2
0.2
0.2
0.2
0.2
0.1
0.1
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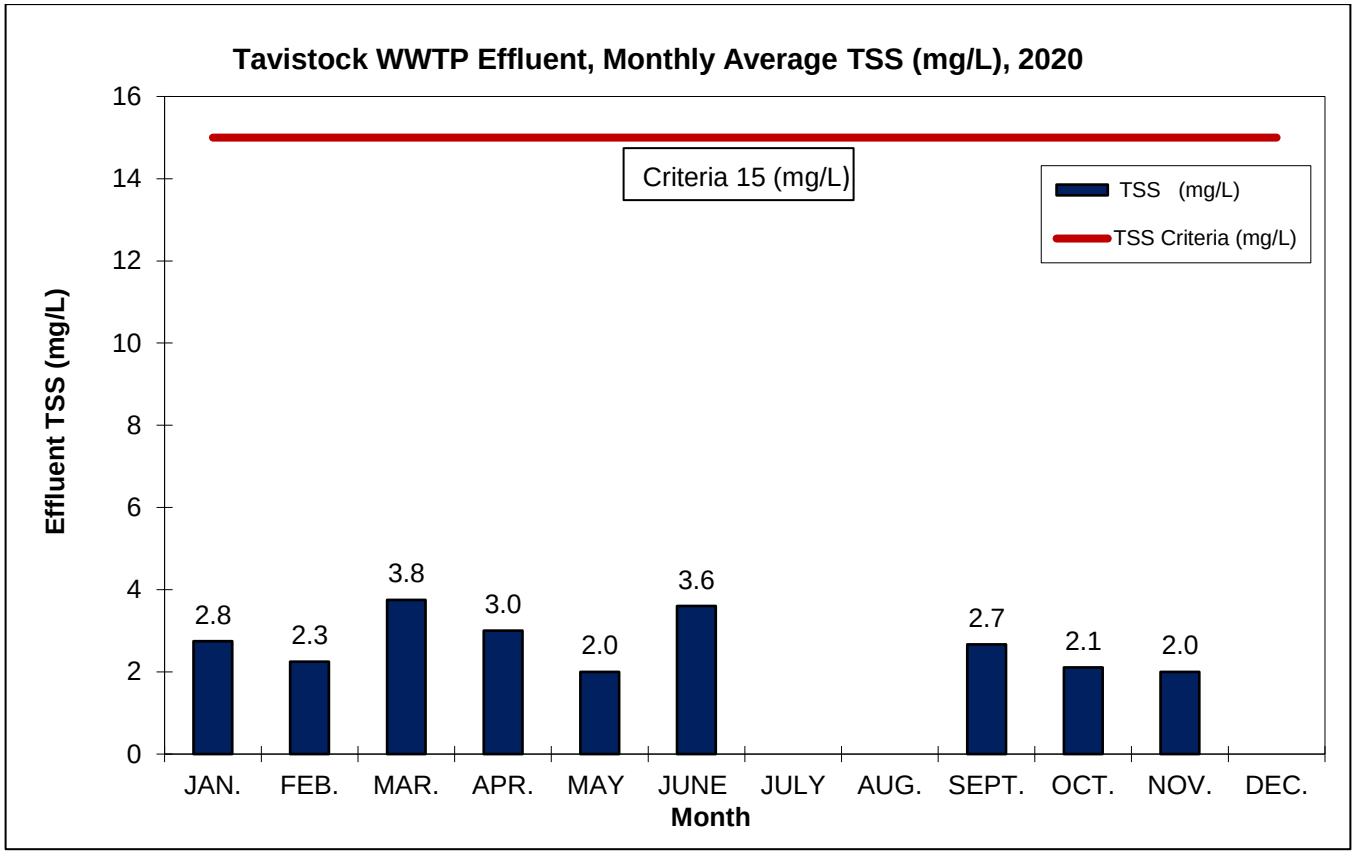
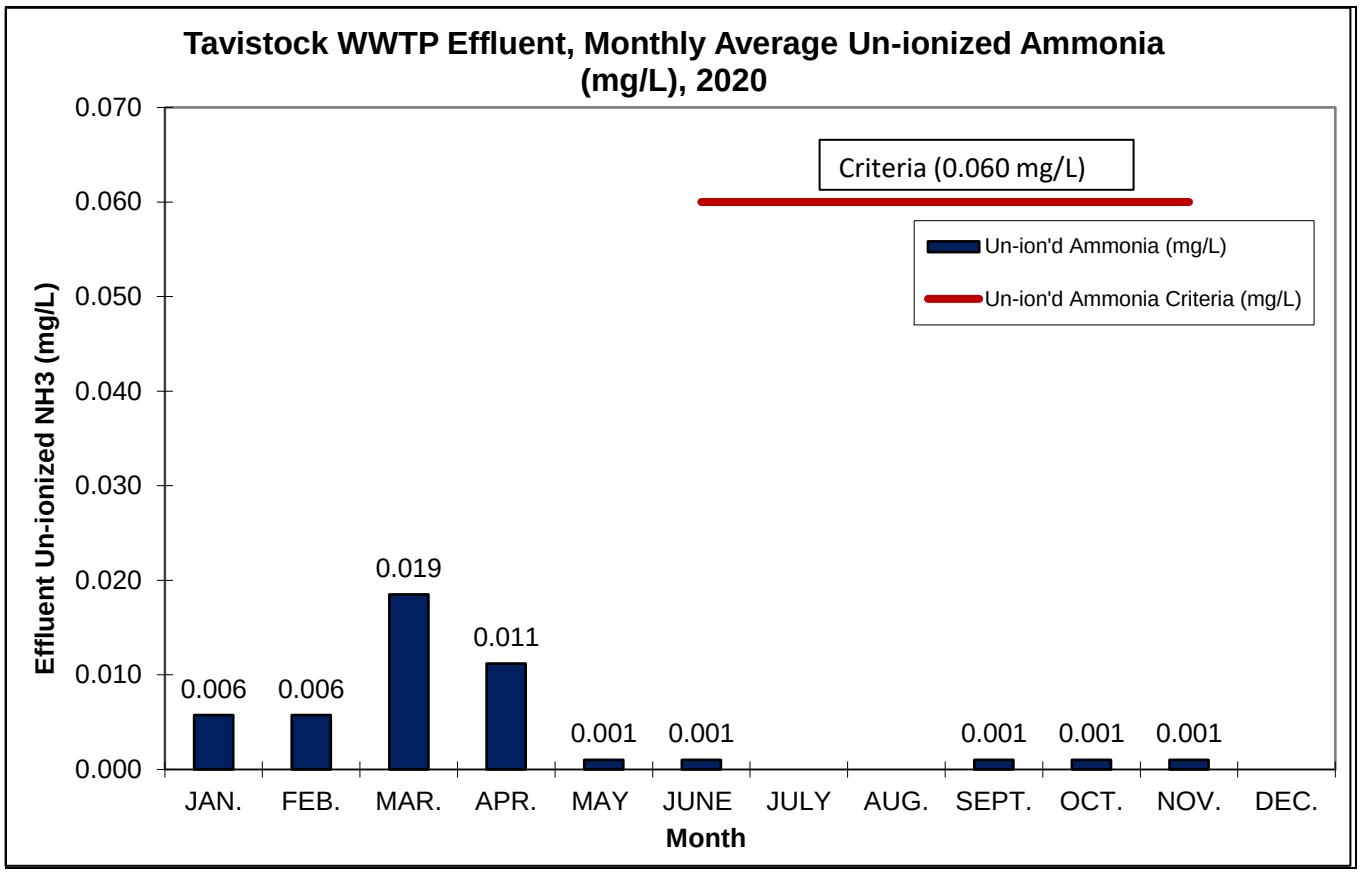
Month


Tavistock WWTP Effluent, Monthly Average TSS (mg/L), 2020
Criteria 15 (mg/L)
TSS (mg/L)
TSS Criteria (mg/L)
Effluent TSS (mg/L)
16
14
12
10
8
6
4
2
0
2.8
2.3
3.8
3.0
2.0
3.6
2.7
2.1
2.0
JAN.
FEB.
MAR.
APR.
MAY
JUNE
JULY
AUG.
SEPT.
OCT.
NOV.
DEC.
Month


Tavistock WWTP Effluent, Monthly Average Un-ionized Ammonia (mg/L), 2020
Effluent Un-ionized NH3 (mg/L)
0.070
0.060
0.050
0.040
0.030
0.020
0.010
0.000
Criteria (0.060 mg/L)
Un-ion'd Ammonia (mg/L)
Un-ion'd Ammonia Criteria (mg/L)
0.006
0.006
0.019
0.011
0.001
0.001
0.001
0.001
0.001
JAN.
FEB.
MAR.
APR.
MAY
JUNE
JULY
AUG.
SEPT.
OCT.
NOV.
DEC.
Month

2020 ANNUAL WASTEWATER TREATMENT SYSTEM SUMMARY REPORT
Thamesford Wastewater Treatment Plant

1. General Information

Oxford County prepares individual annual reports summarizing each wastewater treatment plant's operation and treated effluent discharge quality for the nine wastewater treatment plants it owns and operates. The reports detail the latest quality testing results and quantity statistics and any non-compliance conditions that may have occurred. They are available for review by the end of March on the internet at www.oxfordcounty.ca/Services-for-You/Water-Wastewater/Wastewater/Annual-reports or by contacting the Public Works Department.

All efforts have been made to ensure the information presented in this report is as accurate as possible. If you have any questions or comments concerning the report, please contact the County of Oxford at the address and phone number listed below or by email at publicworks@oxfordcounty.ca.

Wastewater Treatment Plant:	Thamesford Wastewater Treatment Plant
Wastewater Treatment Plant Number:	120002601
Environmental Compliance Approval (ECA)	#6974-6FKKAY & 1897-9YAKKF
Wastewater Treatment Plant Owner & Contact Information:	Oxford County Public Works Department P.O. Box 1614, 21 Reeve Street Woodstock, ON N4S 7Y3 Telephone: 519-539-9800 | Toll Free: 866-537-7778
Reporting Period:	January 1, 2020 – December 31, 2020

1.1. System Description

The Thamesford WWTP is a Class II rated treatment facility that provides wastewater treatment for the village of Thamesford. The Thamesford WWTP is an extended air activated sludge plant equipped with tertiary sand filters. The nominally separated wastewater collection system includes 4 sewage pumping stations, 17 kilometers of sanitary gravity sewers, 1 kilometer of sanitary forcemain sewers and 0.6 kilometers of sanitary low pressure sewers.

The incoming wastewater is screened and then treated in the extended aeration system. From there the flows enters into a secondary clarifier where the settled activated sludge is either returned or wasted and the supernatant flows to a sand filter, prior to disinfection and direct discharge to the Middle Thames River. Wasted biosolids are processed/stabilized in the aerobic digester, and routinely transported to the Ingersoll WWTP for dewatering. In 2020, some remaining biosolids in the plant storage area were applied to agricultural land application sites with appropriate Nutrient Management Plans for Non-Agricultural Source Material (NASM).

For purposes of calculating loading to the River, the treated effluent flow is measured at the Parshall flume located after the stilling well just before discharge to the re-aeration chamber and the Middle Thames River. The flow readings used to apportion the loading to the plant is from two meters: one on each lift station. The influent and all other meters are calibrated annually.

A standby generator is available to run the onsite lift stations and a blower in the event of a power failure. The system is maintained by licensed wastewater system operators and licensed mechanics that operate, monitor, and maintain the treatment equipment, in accordance to the regulations, and collect samples as required by the ECA. Alarms automatically notify operators in the event of failure of critical operational requirements.

The wastewater treatment plant is located at 10 Middleton St., Thamesford, Ontario. The Facility description is provided below

Facility	Thamesford Wastewater Treatment Plant
Design Capacity	2,500 m^3/d
2020 Average Daily Flow	504 m^3/d
2020 Maximum Daily Flow	1,296 m^3/d
2020 Total Volume of Wastewater	184,378 m^3/year

2. Summary and Interpretation of Monitoring Data

2.1. Effluent Quality Assurance and Control Measures

Sampling Procedure

Influent samples were taken from sampling ports located in-line after the influent pumps. A 24-hour composite sampler is taking an influent sample every 15 minutes for a 24-hour period concurrent with effluent sampling.

In 2020, effluent samples were taken using a 24-hour composite sampler set to take a sample every 15 minutes for 24 hours. Samples were drawn from a stilling well prior to the Parshall flume immediately before the discharge. Total residual chlorine (TRC) samples are taken from the stilling well prior to the Parshall flume. The stilling well follows the chlorination and de-chlorination chambers. The pH of the final effluent composite sample is also measured.

Following the Parshall flume, effluent flows through a discharge pipe and drops approximately 0.75 m into a discharge well, where dissolved oxygen (DO) samples are taken. This discharge well aerates the effluent prior to discharge to the River, as reflected in the DO sample results.

Laboratory and Field Testing

Laboratory analysis is performed by SGS Lakefield Research Ltd. on all samples, except for TRC, DO, temperature and pH which are tested in the field. These results are used for determination of compliance. Any information generated in-house is used in process control but is not included in this report.

2.2. Plant Performance & Effluent Quality

The Thamesford WWTP provided effective treatment in 2020, with 929 samples out of 937 samples meeting compliance, or 99.1 % compliance to its regulatory limits for all effluent.

During the month of June, the plant effluent average monthly concentration for total ammonia nitrogen was 2.87 mg/L, which exceeded the effluent total ammonia nitrogen average monthly concentration compliance limit of 2.0 mg/L. The exceedance coincided with the observed presence of filamentous bacteria and poor settling. To rectify the problem, the aeration basin microbe concentration and dissolved oxygen concentration were both increased. Seed aeration sludge from the Woodstock and Ingersoll Wastewater Treatment Plants were transferred to the Thamesford aeration basin, to encourage the growth of beneficial organisms. Operations continued to monitor plant conditions and made necessary process changes to allow for nitrification to be re-established and effluent ammonia concentrations to decrease. The MECP was informed at the time of the non-compliance.

There was no single laboratory pH result for the effluent outside the discharge limit of 6 - 9.5 in 2020.

Staff tests Total Residual Chlorine (TRC) in the treated effluent several times per week; well in excess of the required weekly testing frequency. In 2020, the monthly average results at all times met the Monthly Average TRC limit of 0.02 mg/L or less and, therefore, were in compliance.

The Thamesford WWTP met all its effluent loading limits required within the ECA.

Graphs of discharge parameters versus effluent discharge limits are included in this report in Appendix A.

Influent wastewater characteristics and effluent discharge values are presented in the tables below.

Influent Wastewater Characteristics		
Parameter	Concentration mg/L	Loading kg/d
BOD_5	242	122
Total Suspended Solids	261	132
Total Phosphorus	5.2	2.6
Total Kjeldahl Nitrogen	55.1	28
Oil and Grease	42	21

Effluent Parameter	**Sample Frequency**	**ECA Effluent Limit (Monthly Average)** (milligram per liter unless otherwise indicated)	**Monthly Average Result Min-Max** (milligram per liter unless otherwise indicated)	**Percentage Removal**
$CBOD_5$ (May 01 to November 30)	weekly	10	2.0 – 3.8	98.4 – 99.2
$CBOD_5$ (December 01 to April 30)	weekly	15	2.0 – 3.2	98.7 – 99.2
Total Suspended Solids (May 01 to November 30)	weekly	10	2.3 – 9.2	96.5 – 99.1
Total Suspended Solids (December 01 to April 30)	weekly	15	2.0 – 6.4	97.6 – 99.2
Total Phosphorus (May 01 to November 30)	weekly	0.20	0.03 – 0.14	97.3 – 99.4
Total Phosphorus (December 01 to April 30)	weekly	0.50	0.03 – 0.05	99.0 – 99.4
Total Ammonia Nitrogen (May 1 to November 30)	weekly	2.0	0.1 – 2.9	--
Total Ammonia Nitrogen (Dec. 1 to April 30)	weekly	5.0	0.1 – 0.3	--
Total Chlorine Residual	weekly	0.02	0.00	--
E. coli	weekly	200 organisms/100 mL (monthly Geometric Mean Density)	2 – 50 organisms/100 mL (monthly Geometric Mean Density)	--
pH any single sample	weekly	6.0 - 9.5	6.55 – 7.34	--
Dissolved Oxygen	weekly	5 and above	6.6 – 8.9	--

2.3. Effluent Objectives

Objectives are non-enforceable effluent quality values which the owner is obligated to use best efforts to strive towards achieving on an ongoing basis. These objectives are to be used as a mechanism to trigger corrective action proactively, and voluntarily before environmental impairment occurs and before the compliance limits are exceeded.

All effluent discharge objectives listed in the Plant's ECA were met with the exception of fourteen single sample results for total suspended solids, two single sample results for CBOD, five single sample results for total phosphorus and four single sample result for ammonia. In addition the effluent average monthly objective concentration for total suspended solids were exceeded during the months of January, May and June. During the month of June both the effluent average monthly objective concentration for total phosphorus and the effluent average monthly objective concentration for ammonia were exceeded.

In January, plant solids concentration levels increased due to decreased biosolids haulage over the December holiday break. It took several weeks of additional biosolids haulage to decrease the solids concentration, which had an impact on meeting effluent objectives for total suspended solids.

In June, an outbreak of filamentous bacteria, caused increased total suspended solids, total phosphorus and ammonia concentrations. Operations made process changes and brought in seed sludge from surrounding wastewater treatment plants to re-establish nitrification.

The results are summarized below.

The following table presents the range of effluent discharge values vs. ECA Objectives.

Effluent Parameter	**Sample Frequency**	**Monthly Average Objective Concentration** (milligram per liter unless otherwise indicated)	**Monthly Average Result Min-Max** (milligram per liter unless otherwise indicated)
$CBOD_5$	weekly	5	2.0 – 3.8
Total Suspended Solids	weekly	5	2.0 – 9.2
Total Phosphorus	weekly	0.10	0.03 – 0.14
Total Ammonia Nitrogen (May 1 to November 30)	weekly	1.2	0.1 – 2.9
Total Ammonia Nitrogen (Dec. 1 to April 30)	weekly	4.0	0.1 – 0.3
Total Chlorine Residual	weekly	non-detect	0.00
E. coli (May 1 – October 31)	weekly	200 organisms/100 mL (monthly Geometric Mean Density)	2 – 50 organisms/100 mL (monthly Geometric Mean Density)
pH any single sample	weekly	6.5 – 8.5	6.55 – 7.34

Thamesford single samples that did not meet effluent objective concentrations in 2020 included the following:

Month	Parameter	**Objective mg/L**	**Result mg/L**
Jan. 2 2020	TSS	5	8
Jan. 7 2020	TSS	5	6
Jan. 14 2020	TSS	5	7
Jan. 20 2020	TSS	5	7
Jan. 21 2020	TSS	5	7
Jan. 29 2020	TSS	5	6
Mar. 3 2020	CBOD	5	7
Apr. 28 2020	TSS	5	6
May 26 2020	TSS	5	10
May 26 2020	TP	0.1	0.14
June 2 2020	CBOD	5	6
June 2 2020	TSS	5	9
June 2 2020	TP	0.1	0.15
June 2 2020	Ammonia	1.2	4.8
June 9 2020	TSS	5	9
June 9 2020	TP	0.1	0.16
June 9 2020	Ammonia	1.2	17.5
June 16 2020	TSS	5	10
June 16 2020	TP	0.1	0.21
June 16 2020	Ammonia	1.2	5.2
June 19 2020	Ammonia	1.2	2.5
June 23 2020	TSS	5	9
June 29 2020	TSS	5	9
June 29 2020	TP	0.1	0.11
Dec. 29 2020	TSS	5	7

Thamesford effluent monthly average concentrations that did not meet effluent monthly average objective concentrations in 2020 are listed in the following table:

Month	Parameter	**Objective mg/L**	**Result mg/L**
Jan. 2020	TSS	5	6.4
May 2020	TSS	5	6.0
June 2020	TSS	5	9.2
June 2020	TP	0.1	0.14
June 2020	Ammonia	1.2	2.9

3. Overflows, Bypassing, Upsets, Spills, and Abnormal Conditions

There were no overflows, bypassing, upsets, spills, or abnormal conditions at the Thamesford WWTP in 2020.

The Limited Operational Flexibility for modifications to the wastewater plant was not used in 2020.

There were no complaints received in 2020.

4. Maintenance of Works

The operating and maintenance staff at the Thamesford WWTP conducts regularly scheduled maintenance of the plant equipment. The Plant utilizes a database known as Cartegraph, to issue work orders and maintain records for regular maintenance and repair at the treatment facility.

5. Monitoring Equipment Maintenance and Calibration

Calibration of flow meters is conducted Indus-Controls Inc. in accordance with the requirements of the ECA. The records are kept on-site at the Plant.

All other operational monitoring equipment is calibrated by staff and records are kept on-site at the Plant.

6. 2020 Biosolids Program

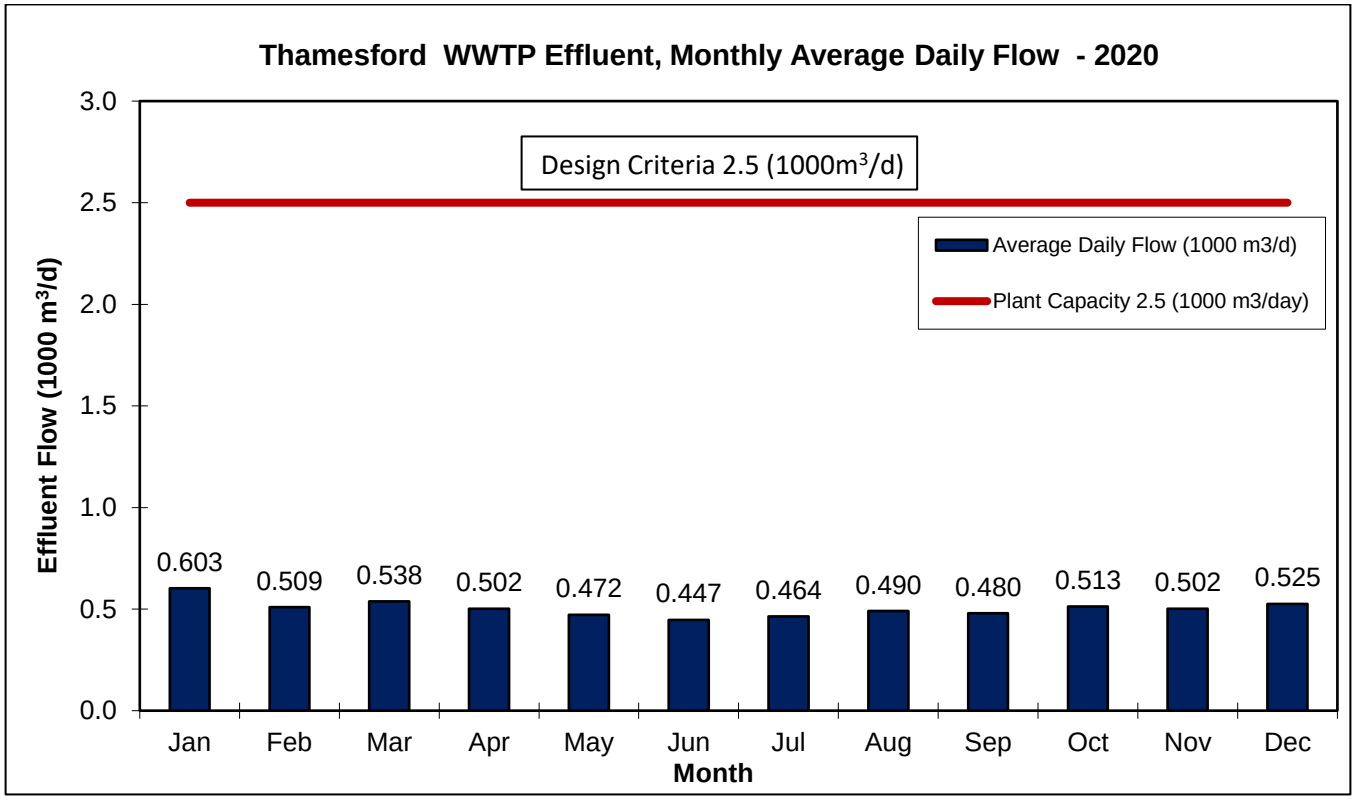
Thickened and partially aerobically digested secondary sludge is transported to Ingersoll WWTP for further treatment.

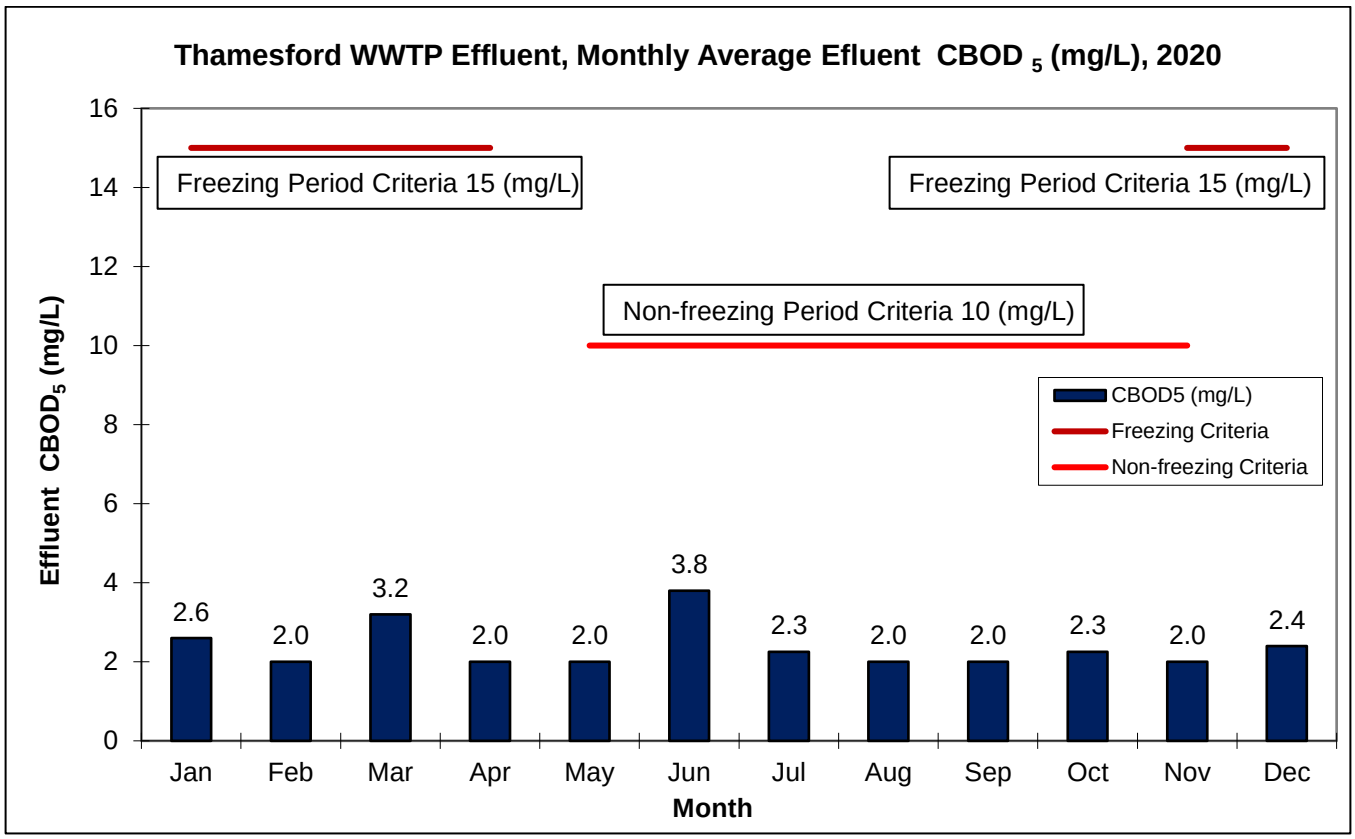
Biosolids are anaerobically digested and dewatered at the Ingersoll WWTP using an Alfa-Laval Centrifuge. The biosolids are then stored at the Oxford County Biosolids Centralized Storage Facility (BCSF) prior to land application. The sampling results and land application details are summarized in a separate Biosolids Annual report, available at www.oxfordcounty.ca/Services-for-You/Water-Wastewater/Wastewater/Annual-reports.

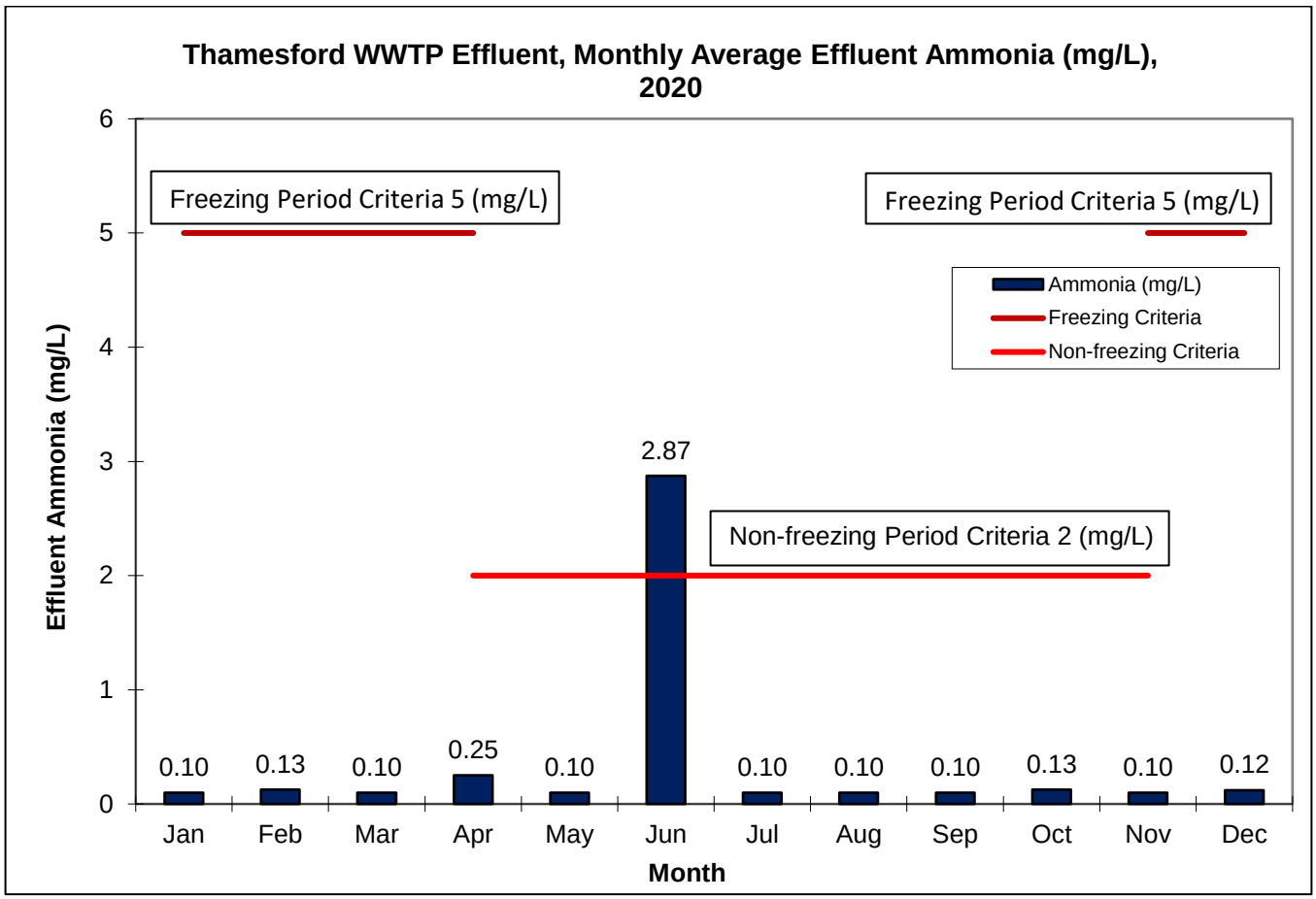
7. Audits, Pilots, and Trials

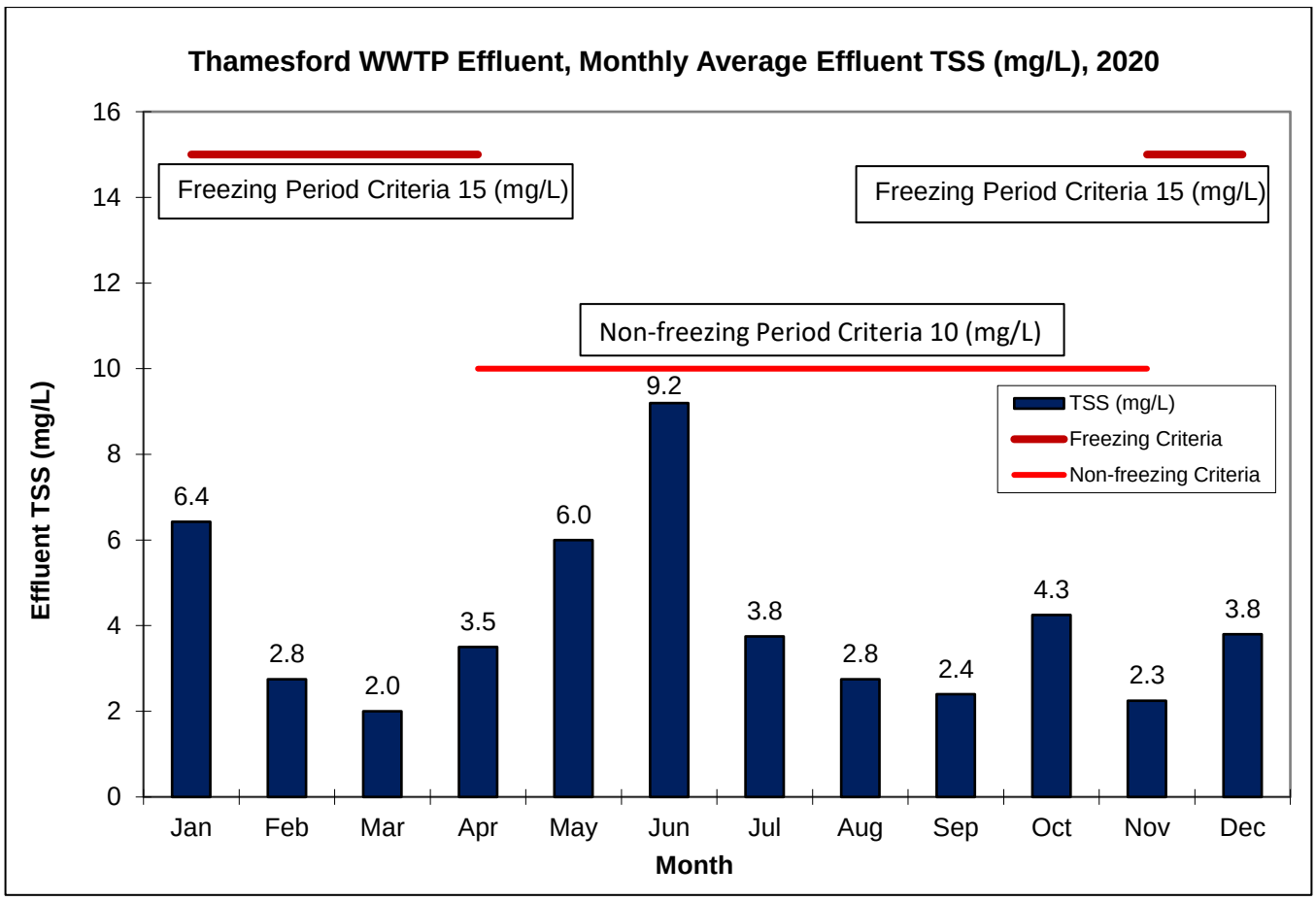
There was no MECP audit in 2020.

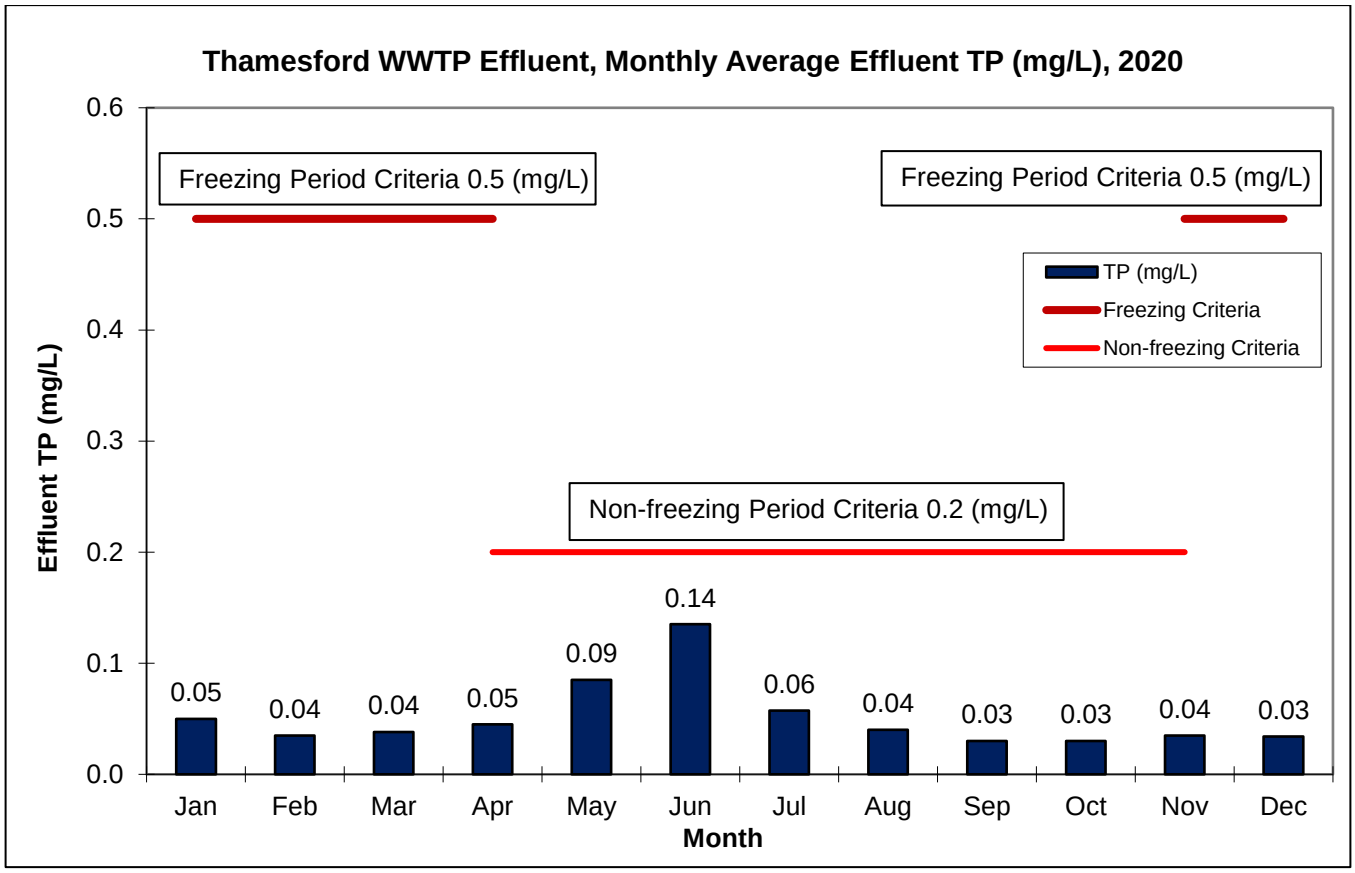
APPENDIX A: GRAPHS OF 2020 DISCHARGE PARAMETERS VS. EFFLUENT DISCHARGE LIMITS






Thamesford WWTP Effluent, Monthly Average Effluent Ammonia (mg/L), 2020
Effluent Ammonia (mg/L)
Month
Freezing Period Criteria 5 (mg/L)
Freezing Period Criteria 5 (mg/L)
Non-freezing Period Criteria 2 (mg/L)
Ammonia (mg/L)
Freezing Criteria
Non-freezing Criteria
0.10
0.13
0.10
0.25
0.10
2.87
0.10
0.10
0.10
0.13
0.10
0.12
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec


Thamesford WWTP Effluent, Monthly Average Effluent TSS (mg/L), 2020
Effluent TSS (mg/L)
Month
Freezing Period Criteria 15 (mg/L)
Freezing Period Criteria 15 (mg/L)
Non-freezing Period Criteria 10 (mg/L)
TSS (mg/L)
Freezing Criteria
Non-freezing Criteria
6.4
2.8
2.0
3.5
6.0
9.2
3.8
2.8
2.4
4.3
2.3
3.8
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec


Thamesford WWTP Effluent, Monthly Average Effluent TP (mg/L), 2020
Effluent TP (mg/L)
0.6
0.5
0.4
0.3
0.2
0.1
0.0
Freezing Period Criteria 0.5 (mg/L)
Freezing Period Criteria 0.5 (mg/L)
Non-freezing Period Criteria 0.2 (mg/L)
TP (mg/L)
Freezing Criteria
Non-freezing Criteria
0.05
0.04
0.04
0.05
0.09
0.14
0.06
0.04
0.03
0.03
0.04
0.03
Jan
Feb
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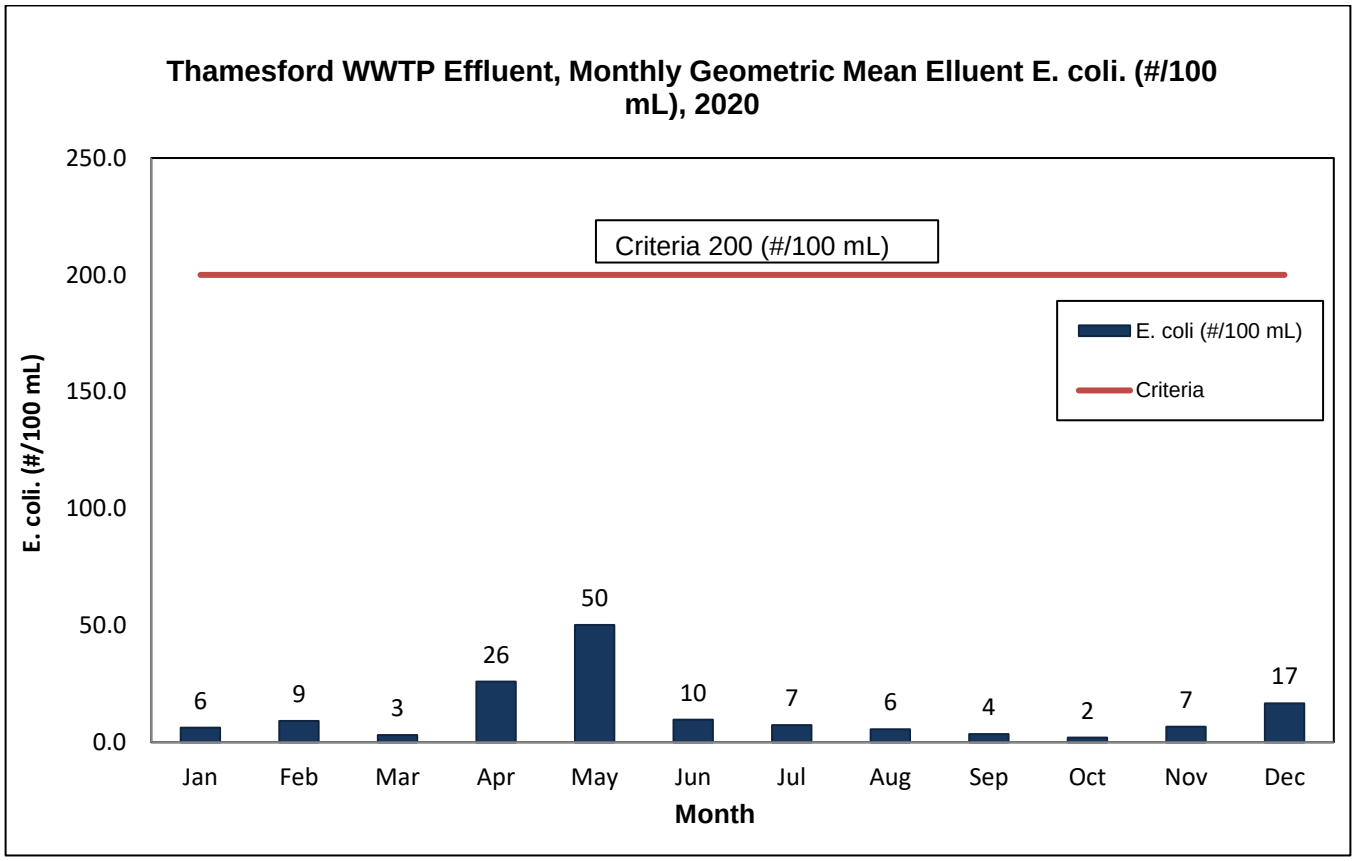
Month


Thamesford WWTP Effluent, Monthly Geometric Mean Elluent E. coli. (#/100 mL), 2020
E. coli. (#/100 mL)
250.0
200.0
150.0
100.0
50.0
0.0
Criteria 200 (#/100 mL)
E. coli (#/100 mL)
Criteria
6
9
3
26
50
10
7
6
4
2
7
17
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month

2020 ANNUAL WASTEWATER TREATMENT SYSTEM SUMMARY REPORT
Tillsonburg Wastewater Treatment Plant

1. General Information

Oxford County prepares individual annual reports summarizing each wastewater treatment plant's operation and treated effluent discharge quality for the nine wastewater treatment plants it owns and operates. The reports detail the latest quality testing results and quantity statistics and any non-compliance conditions that may have occurred. They are available for review by the end of March on the internet at www.oxfordcounty.ca/Services-for-You/Water-Wastewater/Wastewater/Annual-reports or by contacting the Public Works Department.

All efforts have been made to ensure the information presented in this report is as accurate as possible.
If you have any questions or comments concerning the report, please contact the County of Oxford at the address and phone number listed below or by email at publicworks@oxfordcounty.ca.

Wastewater Treatment Plant:	Tillsonburg Wastewater Treatment Plant (WWTP)
Wastewater Treatment Plant Number:	110000757
Environmental Compliance Approval (ECA)	#5564-AQNLC2
Wastewater Treatment Plant Owner & Contact Information:	Oxford County Public Works Department P.O. Box 1614, 21 Reeve Street Woodstock, ON N4S 7Y3 Telephone: 519-539-9800 | Toll Free: 866-537-7778
Reporting Period:	January 1, 2020 – December 31, 2020

1.1. System Description

The Tillsonburg WWTP is a Class III facility that provides wastewater treatment for residential, commercial, and industrial users in the Town of Tillsonburg. The nominally separated wastewater collection system includes 3 sewage pumping stations, 115.8 kilometers of sanitary gravity sewers, and 2.4 kilometers of sanitary forcemain sewers. The WWTP is a conventional activated sludge plant consisting of primary and secondary treatment, with an outfall pipe to the Big Otter Creek.

A standby generator is available to run the main influent pump station (John Pound Road lift station) in the event of a power failure.

The system is maintained by licensed wastewater system operators and licensed mechanics that operate, monitor, and maintain the treatment equipment, in accordance to the regulations, and collect samples as required by the ECA. Alarms automatically notify operators in the event of failure of critical operational requirements.

The wastewater treatment plant is located in Coronation Park, Tillsonburg, Ontario. The Facility description is provided below.

Facility	Tillsonburg Wastewater Treatment Plant
Design Capacity	8,180 m^3/d
2020 Average Daily Flow	5,848 m^3/d
2020 Maximum Daily Flow	11,927 m^3/d
2020 Total Volume of Wastewater	2,140,605 $m^3/year$

Summary and Interpretation of Monitoring Data

1.2. Effluent Quality Assurance and Control Measures

Sampling Procedure

Raw sewage samples are collected where the influent streams combine before entering the sewage works. A composite sampler collects samples over a 24-hour duration on a bi-weekly basis.

The final effluent 24-hour composite sample is collected on a weekly basis after secondary treatment and disinfection, and prior to the effluent discharge to Big Otter Creek.

Laboratory and Field Testing

Laboratory analysis is performed by SGS Lakefield Research Ltd. on all samples that are reported for compliance except for pH, DO, and temperature which are field collected. All other in-house testing is done for process control, results of which are not included in this report.

1.3. Plant Performance & Effluent Quality

The Tillsonburg WWTP was mainly compliant with all its regulatory limits in 2020, with 561 samples out of a total of 568 samples meeting compliance, or 98.8 % compliance to its regulatory limits for all effluent discharged from the Tillsonburg Wastewater Treatment Plant.

Treatment at the facility in 2020 was complicated by events of high-strength influent (TSS/oil) and equipment malfunctions that hindered operational performance. The Town of Tillsonburg implemented a new sewer flushing program this year, which helped to reduce the effects of the increased solids loading to the plant, especially during high flow periods. The plant staff intensified the solids removal processing at the treatment facility throughout the year, in order to remain compliant. In the future, regular sewer flushing will decrease the accumulation of material in the wastewater collection system, and reduce the stress on treatment plant operations. The Sewer Use By-law staff have started investigating the source of the oil that impacted the plant late in the year.

During the month of December, several contributing factors combined which caused the plant to exceed the effluent monthly average total suspended solids compliance concentration of 25 mg/L, with an observed effluent monthly average total suspended solids concentration of 27.7 mg/L. Periodic high strength influent had an extremely negative impact on the aeration microorganisms. The plant return activated sludge slip pipes also became restricted with debris, which may have also contributed to the exceedance. Operations staff drained the secondary clarifier and unplugged the slip pipes. Seed aeration basin sludge was brought in from the Ingersoll and Woodstock Wastewater Treatment Plants, to improve biological activity. The Sewer Use By-law staff began trying to narrow down the source of the oil in the influent. Design is almost complete on plant upgrades that will see larger, deeper primary and secondary clarifiers that will aid in the plant's ability to handle upset conditions. The non-compliance was reported to the MECP at the time.

On a bi-weekly basis, the operator measures pH of the influent stream and on a weekly basis, measures pH of the effluent stream. There was no single pH result for the effluent outside the discharge limit of 6 - 9.5 in 2020.
-
Graphs of discharge parameters versus effluent discharge limits are included in this report in Appendix A.

Influent wastewater characteristics and effluent discharge values are presented in the tables below.

Influent Wastewater Characteristics		
Parameter	Concentration mg/L	Loading kg/d
$CBOD_5$	257	1,503
Total Suspended Solids	254	1,485
Total Phosphorus	4.6	27
Total Kjeldahl Nitrogen	34	199

Effluent Parameter	Sample Frequency	ECA Effluent Limit (Monthly Average) (milligram per liter unless otherwise indicated)	Monthly Average Result Min.-Max. (milligram per liter unless otherwise indicated)	Percentage Removal
$CBOD_5$	weekly	25	2.0 – 13.2	94.9 – 99.2
Total Suspended Solids	weekly	25	7.3 – 27.7	89.1 – 97.1
Total Phosphorus	weekly	1	0.3 – 0.58	87.4 – 93.5
E. coli (May 1 – October 31)	weekly	200 organisms/100 mL (monthly Geometric Mean Density)	3.0 – 13.9 organisms/100 mL (monthly Geometric Mean Density)	--
pH any single sample	weekly	6.0 - 9.5	6.84 – 7.94	--

Annual Average Effluent Daily Loadings	Annual Average Concentration (mg/L)	Annual Average Daily Effluent Flow (1000 m^3/d)	Result (kg/d)	Limit (kg/d)
$CBOD_5$	4.6	5.848	26.9	206
Total Suspended Solids	14.2	5.848	83.0	206
Total Phosphorus	0.44	5.848	2.6	8

1.4. Effluent Objectives

Objectives are non-enforceable effluent quality values which the owner is obligated to use best efforts to strive towards achieving on an ongoing basis. These objectives are to be used as a mechanism to trigger corrective action proactively, and voluntarily before environmental impairment occurs and before the compliance limits are exceeded.

There were some objectives that were not met at the Tillsonburg WWTP in 2020, namely;

- The monthly average concentration objective for TSS of 15 mg/L for the months of January (24.2 mg/L), and December (27.7 mg/L).
- Several single sample objective exceedances occurred throughout 2020 and are listed below.

During the months of January and December the plant experienced higher effluent TSS. To react to these objective exceedances, the alum dosing was increased and polymer dosing occurred, to aide in settling within the secondary clarifier. Additionally, centrifuge operations were increased to make room in the digesters for increased raw sludge loading and wasting from the secondary clarifier.

The following table presents the range of effluent discharge values vs. ECA Objectives.

Effluent Parameter	Sample Frequency	Monthly Average Objective Concentration (milligram per liter unless otherwise indicated)	Monthly Average Result Min-Max (milligram per liter unless otherwise indicated)
$CBOD_5$	weekly	15	2.0 – 13.2
Total Suspended Solids	weekly	15	7.3 – 27.7
Total Phosphorus	weekly	0.8	0.3 – 0.58
E. coli (May 1 – October 31)	weekly	150 organisms/100 mL (monthly Geometric Mean Density)	3.0 – 13.9 organisms/100 mL (monthly Geometric Mean Density)

pH any single sample	weekly	6.5 - 8.0	6.84 – 7.94

Tillsonburg single sample effluent objective exceedances in 2020 included the following:

Date	Parameter	Objective mg/L	Result mg/L
Jan.9 2020	CBOD	15.0	19
Jan. 9 2020	TSS	15.0	40
Jan. 23 2020	TSS	15.0	24
Jan. 30 2020	CBOD	15.0	19
Jan. 30 2020	TSS	15.0	47
Jan. 30 2020	Phosphorus	0.8	0.81
Feb. 6 2020	CBOD	15.0	16
Feb. 6 2020	TSS	15.0	25
Feb. 6 2020	Phosphorus	0.8	0.89
Mar. 5 2020	TSS	15.0	16
Apr. 23 2020	TSS	15.0	20
May 28 2020	E. coli	150 #/100 mL	680 #/100 mL
June 3 2020	TSS	15.0	17
June 18 2020	TSS	15.0	16
Sept. 10 2020	TSS	15.0	22
Nov. 5 2020	E. coli	150 #/100 mL	196 #/100 mL
Nov. 26 2020	TSS	15.0	18
Dec. 10 2020	CBOD	15.0	16
Dec. 10 2020	TSS	15.0	90
Dec. 10 2020	Phosphorus	0.8	1.42
Dec. 23 2020	TSS	15.0	48
Dec. 23 2020	Phosphorus	0.8	0.97
Dec. 30 2020	CBOD	15.0	16
Dec. 30 2020	TSS	15.0	29

Operations staff have monitored the pH variations at the plant and adjusted return activated sludge rates, MLSS concentrations, waste activated sludge quantities, and reseeding of the micro-organisms as needed to retain treatment capability and attempt to meet the objectives.

2. Overflows, Bypassing, Upsets, Spills, and Abnormal Conditions

Treatment at the facility in 2020 was complicated by periodic receipt of high strength wastewater, problems arising from unknown oily and foamy substances, and mechanical problems. The Sewer Use By-law department continued to be the front line protection for the treatment plant.

On October 22, 2020 there was a leak of approximately 15 m^3 of wastewater from the 10’ sewer forcemain connected to the Tillsonburg North Street SPS. The leak happened at a construction site where an excavator was digging and broke the forcemain. The wastewater was contained within the excavated area and removed by vac-trucks.
This event was reported to the MECP at the time it occurred.

The Limited Operational Flexibility for modifications to the wastewater plant was not used in 2020.

3. Maintenance of Works

The operating and maintenance staff at the Tillsonburg WWTP conducts regularly scheduled maintenance of the plant equipment. The Plant utilizes a database known as Cartegraph, to issue work orders and maintain records for regular maintenance and repair at the treatment facility.

4. Monitoring Equipment Maintenance and Calibration

Calibration of flow meters is conducted yearly by Indus-Controls Inc. The records are kept on-site at the Plant. Operational monitoring equipment calibration records are kept on-site at the Plant.

5. 2020 Biosolids Program

Biosolids are aerobically digested and dewatered at the Tillsonburg WWTP using an Alfa-Laval Centrifuge. The Biosolids are then stored at the Oxford County Biosolids Centralized Storage Facility (BCSF) prior to land application. The sampling results and land application details are summarized in a separate Biosolids Annual report, available at: www.oxfordcounty.ca/Services-for-You/Water-Wastewater/Wastewater/Annual-reports.

6. Audits, Pilots, and Trials

There was no MECP audit in 2020.

Optimization

The County continued participation with the MECP innovations branch in optimization training and the staff applied that knowledge to specific processes at the plant. The Operators began the implementation of Mass Balance for secondary treatment solids control, optimization of the nitrification process, phosphorus reduction strategies and the use of a benchtop centrifuge as an alternate to traditional filtering of samples. This work is part of Performance Based Training, that aides Operators in the understanding of techniques and concepts to optimize plant performance.

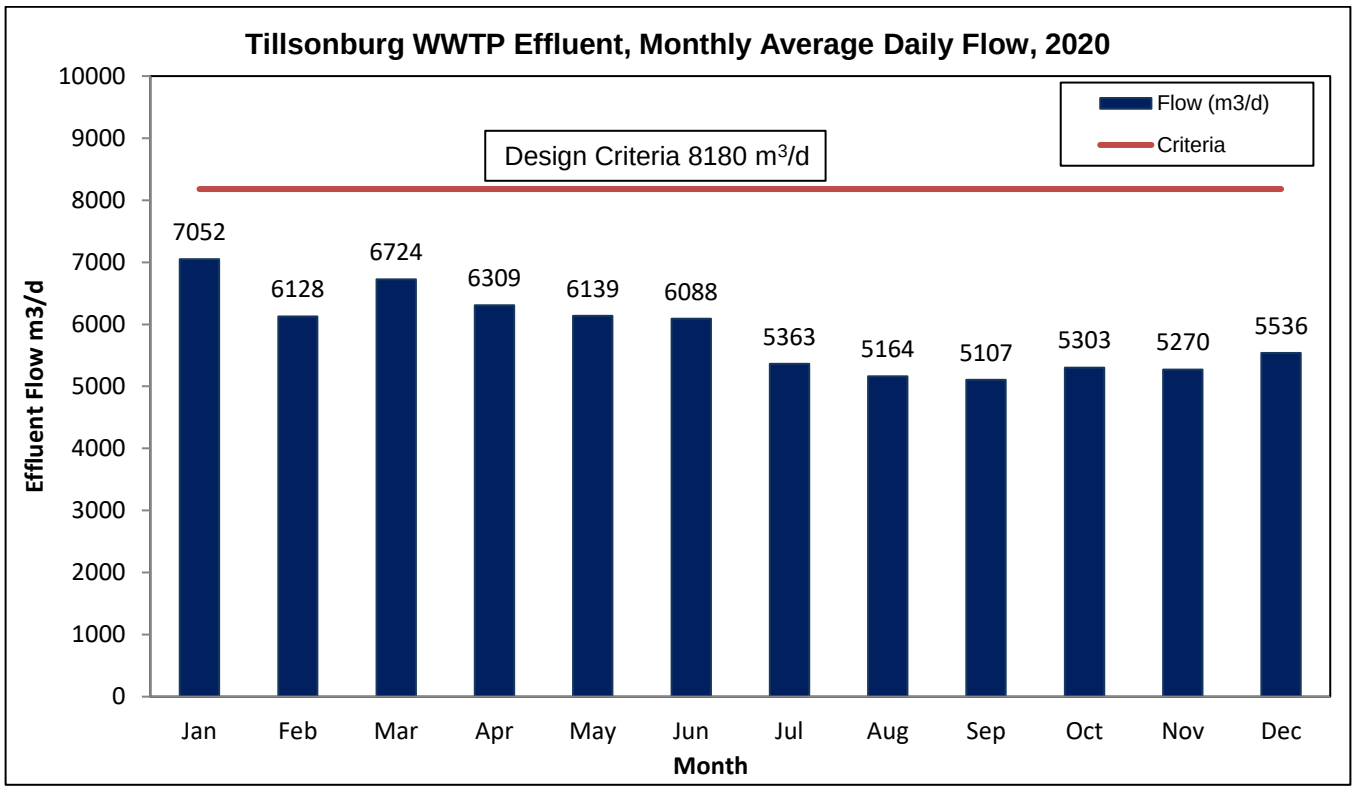
Digester Cleanout

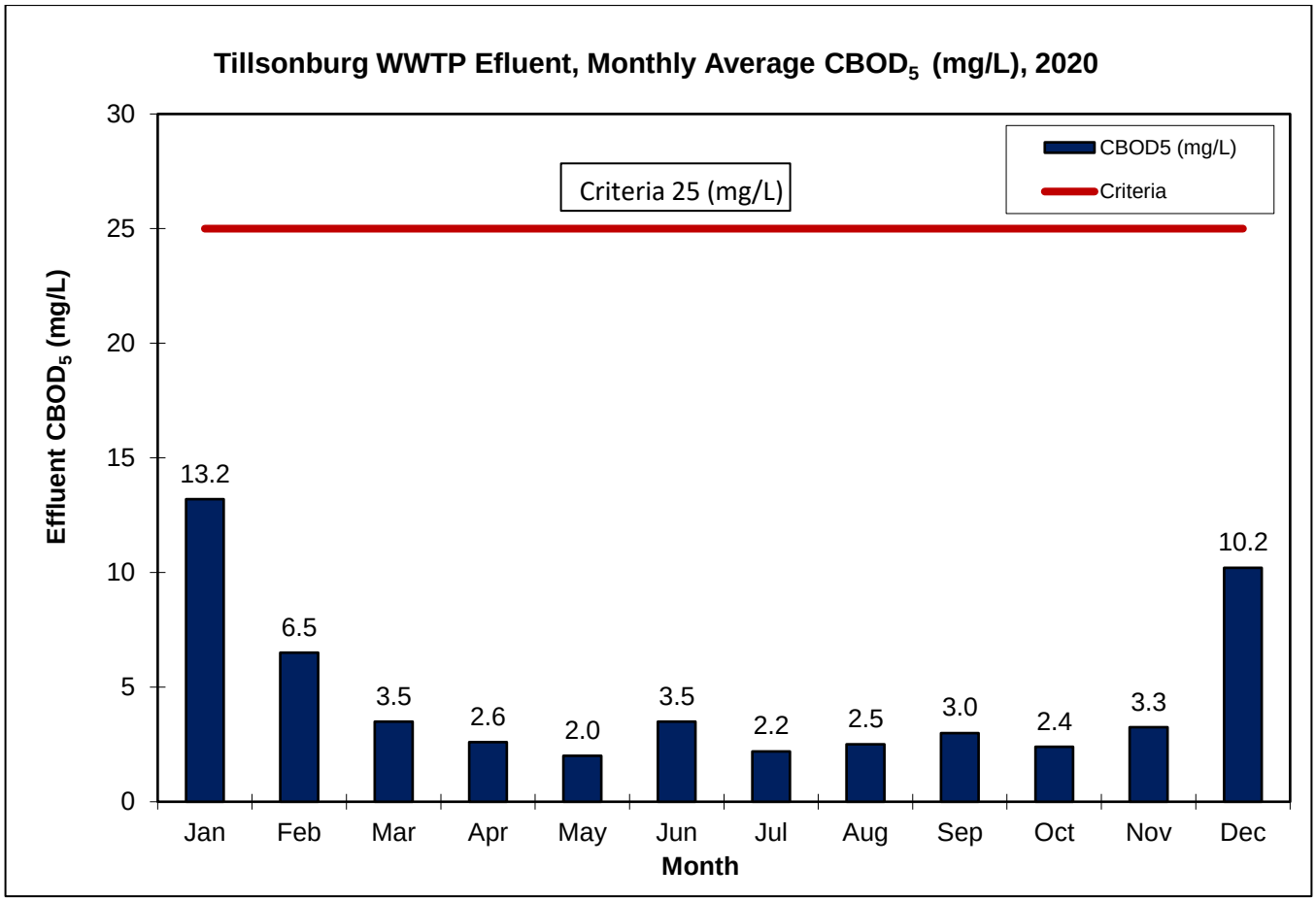
Digester 3 was cleaned out during fall of 2020. This was part of a departmental long term biosolids monitoring plan aimed at optimizing the capacity and equipment of the aerated digesters at the Tillsonburg plant.

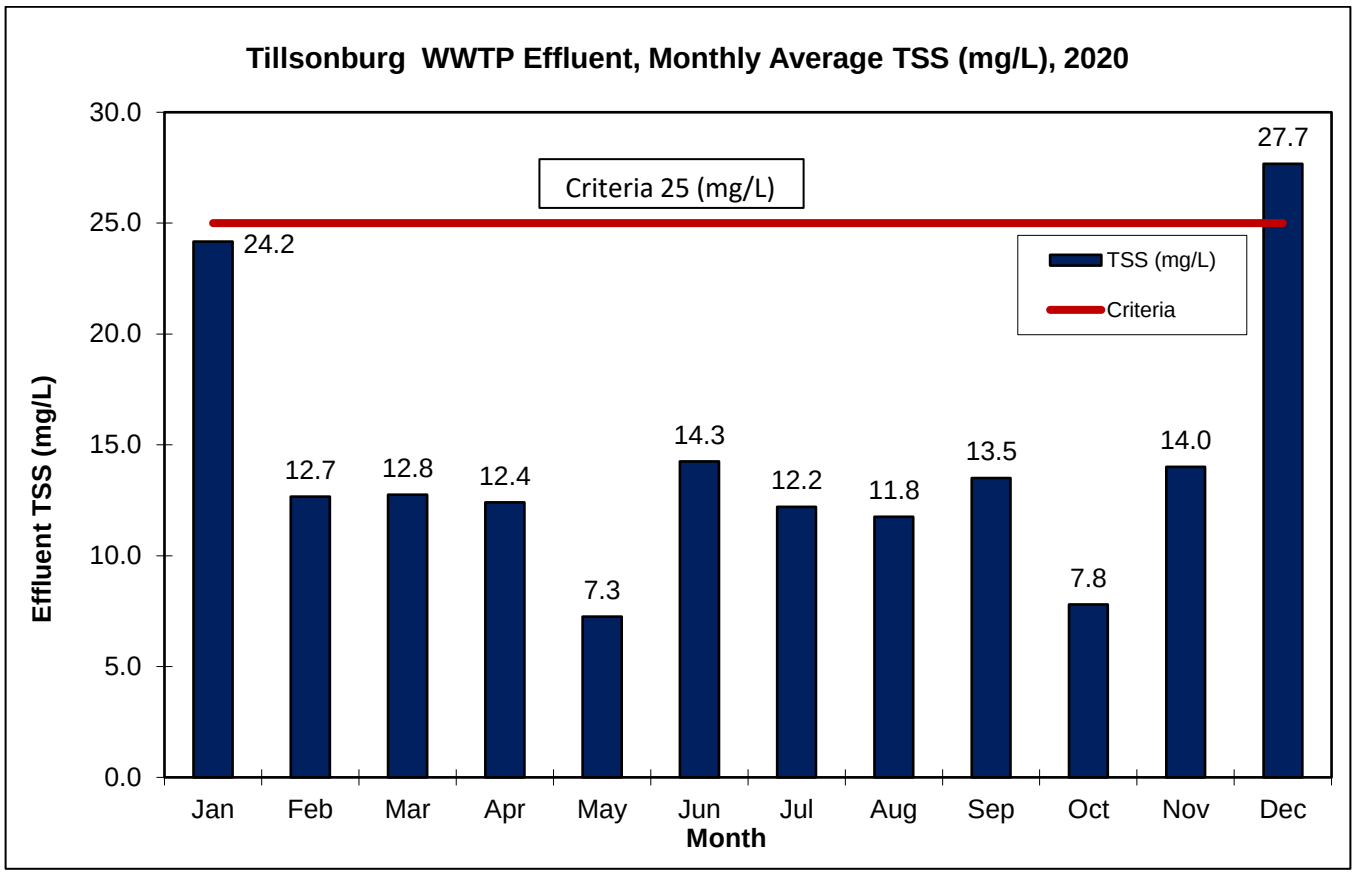
Plant Upgrade

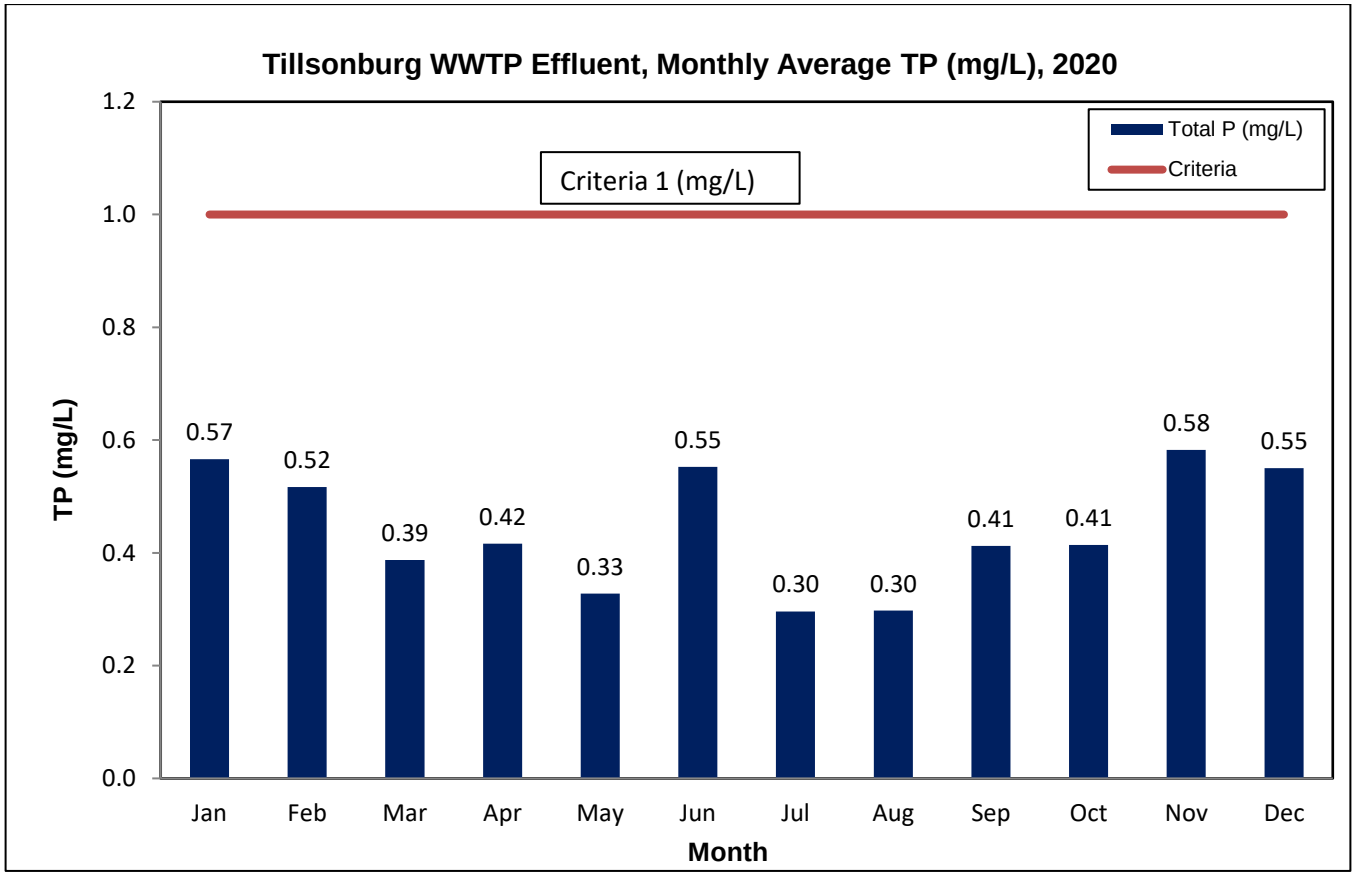
Designs for the upgrade to the Tillsonburg Wastewater Treatment plant are ongoing. Upgrades to headworks, primary and secondary clarification are in the last stages of design. The upgrade will address bottlenecks in the treatment process and solids retention.

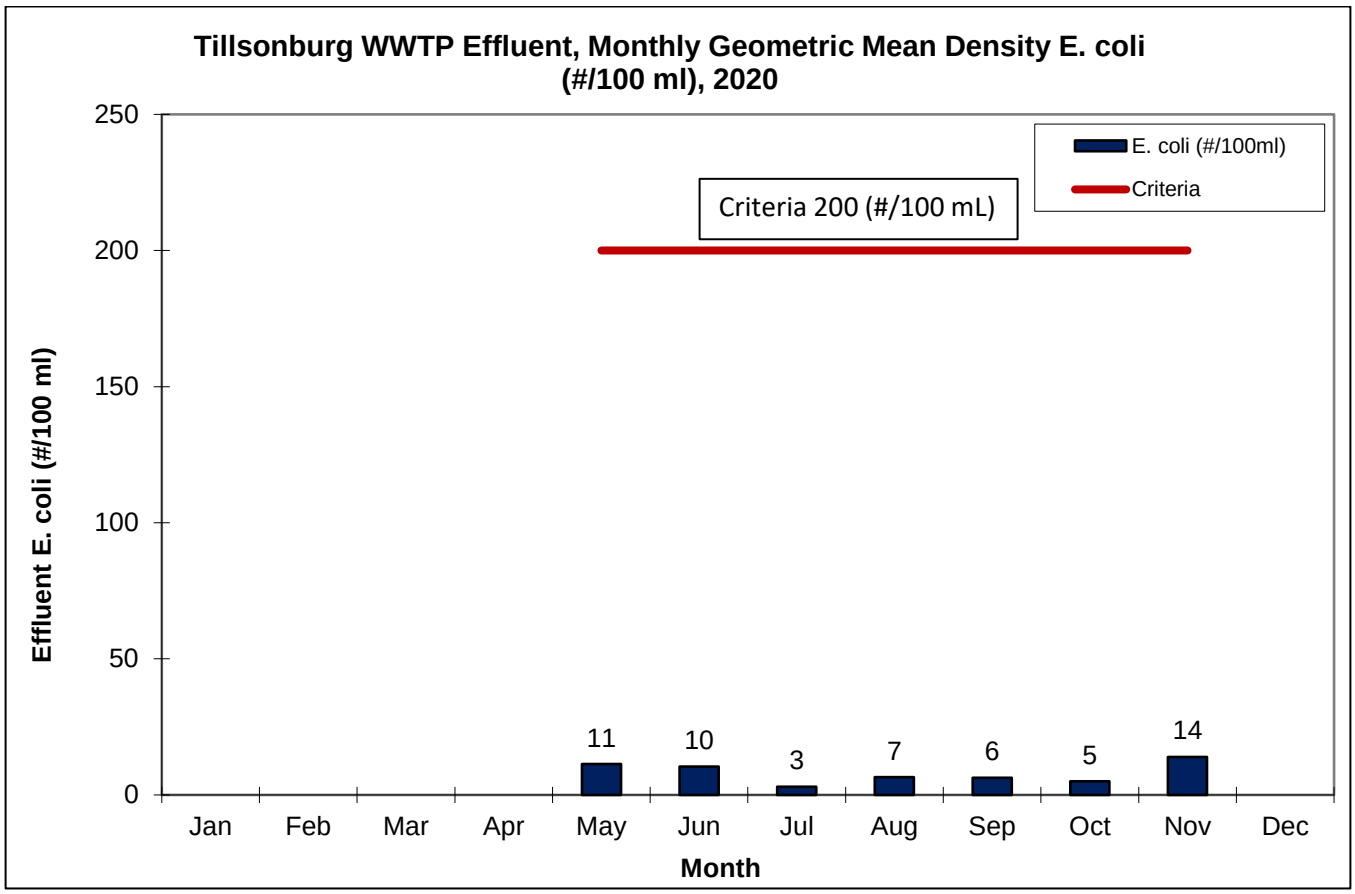
APPENDIX A: GRAPHS OF 2020 DISCHARGE PARAMETERS VERSUS EFFLUENT DISCHARGE LIMITS






Tillsonburg WWTP Effluent, Monthly Average TSS (mg/L), 2020
Effluent TSS (mg/L)
30.0
25.0
20.0
15.0
10.0
5.0
0.0
Criteria 25 (mg/L)
TSS (mg/L)
Criteria
24.2
12.7
12.8
12.4
7.3
14.3
12.2
11.8
13.5
7.8
14.0
27.7
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month


Tillsonburg WWTP Effluent, Monthly Average TP (mg/L), 2020
TP (mg/L)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
Criteria 1 (mg/L)
Total P (mg/L)
Criteria
0.57
0.52
0.39
0.42
0.33
0.55
0.30
0.30
0.41
0.41
0.58
0.55
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month


Tillsonburg WWTP Effluent, Monthly Geometric Mean Density E. coli (#/100 ml), 2020
250
200
150
100
50
0
Effluent E. coli (#/100 ml)
E. coli (#/100ml)
Criteria
Criteria 200 (#/100 mL)
11
10
3
7
6
5
14
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month

2020 ANNUAL WASTEWATER TREATMENT SYSTEM SUMMARY REPORT
Woodstock Wastewater Treatment Plant

1. General Information

Oxford County prepares individual annual reports summarizing each wastewater treatment plant's operation and treated effluent discharge quality for the nine wastewater treatment plants it owns and operates. The reports detail the latest quality testing results and quantity statistics and any non-compliance conditions that may have occurred. They are available for review by the end of March on the internet at www.oxfordcounty.ca/Services-for-You/Water-Wastewater/Wastewater/Annual-reports or by contacting the Public Works Department.

All efforts have been made to ensure the information presented in this report is as accurate as possible.
If you have any questions or comments concerning the report, please contact the County of Oxford at the address and phone number listed below or by email at publicworks@oxfordcounty.ca.

Wastewater Treatment Plant:	Woodstock Wastewater Treatment Plant
Wastewater Treatment Plant Number:	120000685
Environmental Compliance Approval (ECA) #:	#5950-7XQKXS
Wastewater Treatment Plant Owner & Contact Information:	Oxford County Public Works Department P.O. Box 1614, 21 Reeve Street Woodstock, ON N4S 7Y3 Telephone: 519-539-9800 | Toll Free: 866-537-7778
Reporting Period:	January 1, 2020 – December 31, 2020

1.1. System Description

The Woodstock WWTP is a Class IV rated treatment facility that provides wastewater treatment for residential, commercial, and industrial users in the City of Woodstock and for the communities of Embro and Innerkip. It also provides treatment for septic tank waste, hauled waste, and holding tank waste from within Oxford County. The Woodstock nominally separated wastewater collection system includes 5 sewage pump stations, 241 kilometers of sanitary gravity sewers, 4.9 kilometers of sanitary forcemain sewers and 1.6 kilometers of sanitary low pressure sewers. The Embro and Innerkip wastewater collection systems together include 7 sewage pump stations, 18 kilometers of sanitary gravity sewers, 22.5 kilometers of sanitary forcemain sewers and 0.8 kilometers of sanitary low pressure sewers.

The wastewater treatment plant is located at 195 Admiral Street Woodstock, Ontario and is a conventional activated sludge system consisting of primary and secondary treatment, with an outfall pipe to the Thames River.

A standby generator is available to run the entire Woodstock Wastewater Treatment Plant and onsite Thames Valley Lift Station in the event of a power failure. A secondary backup generator is available and dedicated to Thames Valley Lift Station in case of emergency.

The treatment plant is maintained by licensed wastewater system operators and licensed mechanics that operate, monitor, and maintain the treatment equipment, in accordance to the regulations, and collect samples as required by the ECA. Alarms automatically notify operators in the event of failure of critical operational requirements.

The facility provided effective wastewater treatment in 2020, as demonstrated by the table below.

Facility	Woodstock Wastewater Treatment Plant
Design Capacity (Average Day)	33,000 m^3/d

Design Capacity (Peak Flow)	66,000 m^3/d
2020 Average Daily Flow	22,563 m^3/d
2020 Maximum Daily Flow	96,138 m^3/d
2020 Total Volume of Wastewater	* 8,264,376 m^3/year
2020 Total Received Hauled Waste	37,044 m^3/year

* Included in this total is 148,921 m^3/year from Embro & Innerkip collection systems

Summary and Interpretation of Monitoring Data

1.2. Effluent Quality Assurance and Control Measures

Sampling Procedure

Wastewater samples are collected on a weekly basis. Raw sewage samples are collected where the sewer trunks combine before entering the sewage works. An automatic composite sampler collects samples over a 24-hour period. Following primary treatment, a second 24-hour composite sample is collected. A third and final effluent 24-hour composite sample is collected following secondary treatment, disinfection and de-chlorination prior to the effluent discharge to the Thames River.

Laboratory and Field Testing

Laboratory analysis is performed by SGS Lakefield Research Ltd. on all samples that are reported for compliance, except for pH, DO, chlorine residual and temperature, which are field collected. All other in-house testing is done for process control and is not included in this report.

1.3. Plant Performance & Effluent Quality

The Woodstock WWTP provided effective treatment in 2020 meeting all its regulatory limits, achieving 100% compliance.

On a weekly basis (minimum), the operator measures pH of both the influent and effluent streams. There was no single pH result for the effluent outside the discharge limit of 6 - 9.5 in 2020.

Staff tests Total Residual Chlorine (TRC) in the treated effluent on a daily basis; well in excess of the required weekly testing frequency. In 2020, the monthly average results at all times met the Monthly Average TRC limit and were less than 0.05 mg/L and, therefore, were in compliance. The Federal Government's P2 target for TRC of 0.02 mg/L was met on the annual average TRC of 0.02 mg/L in 2020.

Graphs of discharge parameters versus effluent discharge limits are included in this report in Appendix A.

Influent wastewater characteristics and effluent discharge values are presented in the tables below.

Influent Wastewater Characteristics		
Parameter	Concentration mg/L	Loading kg/d
BOD_5	155	3,497
Total Suspended Solids	200	4513
Total Phosphorus	2.7	61
Total Kjeldahl Nitrogen	23.2	523

Effluent Parameter	**Sample Frequency**	**ECA Effluent Limit (Monthly Average)** (milligram per liter unless otherwise indicated)	**Monthly Average Result Min.-Max.** (milligram per liter unless otherwise indicated)	**Percentage Removal**

$CBOD_5$ (May 01 to November 30)	weekly	15	2.0 – 3.4	97.4 – 98.5
$CBOD_5$ (December 01 to April 30)	weekly	20	2.0 – 6.3	95.3 – 98.5
Total Suspended Solids	weekly	15	3.6 – 6.4	96.8 – 98.2
Total Phosphorus	weekly	0.75	0.17 – 0.35	87.0 – 93.7
Total Ammonia Nitrogen (May 1 to November 30)	weekly	3	0.1 – 0.4	97.9 – 99.5
Total Ammonia Nitrogen (Dec. 1 to April 30)	weekly	5.0	0.1 – 1.3	93.1– 99.5
Total Chlorine Residual (May 1-October 31)	weekly	<0.05	0.02	N/A
E. coli (May 1 – October 31)	weekly	200 organisms/100 mL (monthly Geometric Mean Density)	2.8 – 22.0 organisms/100 mL (monthly Geometric Mean Density)	N/A
pH any single sample	weekly	6.0 - 9.5	6.5 – 7.8	N/A

1.4. Effluent Objectives

Objectives are non-enforceable effluent quality values which the owner is obligated to use best efforts to strive towards achieving on an ongoing basis. These objectives are to be used as a mechanism to trigger corrective action proactively, and voluntarily before environmental impairment occurs and before the compliance limits are exceeded.

All effluent discharge objectives listed in the Plant's ECA were met at the Woodstock WWTP in 2020.

The following table presents the range of effluent discharge values vs. ECA Objectives.

Effluent Parameter	**Sample Frequency**	**Monthly Average Objective Concentration** (milligram per liter unless otherwise indicated)	**Monthly Average Result Min-Max** (milligram per liter unless otherwise indicated)
$CBOD_5$	weekly	12	2.0 – 6.3
Total Suspended Solids	weekly	12	3.6 – 6.4
Total Phosphorus	weekly	0.5	0.17 – 0.35
Total Ammonia Nitrogen (May 1 to November 30)	weekly	2.0	0.1 – 0.4
Total Ammonia Nitrogen (Dec. 1 to April 30)	weekly	3.0	0.1 – 1.3
E. coli (May 1 – October 31)	weekly	200 organisms/100 mL (monthly Geometric Mean Density)	2.8 – 22.0 organisms/100 mL (monthly Geometric Mean Density)
pH any single sample	weekly	6.0 - 8.5	6.5 – 7.8

2. Overflows, Bypassing, Upsets, Spills, and Abnormal Conditions

There were no overflows, bypassing, upsets, spills, or abnormal conditions at the Woodstock WWTP in 2020.

There were no complaints received regarding the plant for 2020.

3. Maintenance of Works

The operating and maintenance staff at the Woodstock WWTP conducts regularly scheduled maintenance of the plant equipment. The Plant utilizes a database known as Cartegraph to issue work orders and maintain records for regular maintenance and repair at the treatment facility.

4. Monitoring Equipment Maintenance and Calibration

Calibration of flow meters is conducted by Indus-Controls Inc. in accordance with the requirements of the ECA. The records are kept on-site at the Plant.

All other operational monitoring equipment is calibrated by staff and records are kept on-site at the Plant.

5. 2020 Biosolids Program

Biosolids are anaerobically digested and dewatered at the Woodstock WWTP using two Alfa-Laval Centrifuges. The biosolids are then stored at the Oxford County Biosolids Centralized Storage Facility (BCSF) prior to land application. The sampling results and land application details are summarized in a separate Biosolids Annual report, available at: www.oxfordcounty.ca/Services-for-You/Water-Wastewater/Wastewater/Annual-reports.

6. Inspection, Pilots, and Trials

The Ministry of Environment, Conservation and Parks (MECP) did not conduct a facility inspection in 2020. The MECP inspections typically occur on a 3-year schedule.

COVID-19 Study

In 2020, the County of Oxford began working with McMaster University, joining the COVID-19 Wastewater Consortium of Ontario. An innovative study was launched, to detect COVID-19 in wastewater, and to trace the spread of the virus within the community. The study brings together industry, private labs, technology firms, government and universities, to help pool resources and expertise to best respond to current and future pandemics. Testing is underway, primarily focusing on the Woodstock Wastewater Plant and collections system, with plans to test other Oxford municipalities in 2021.

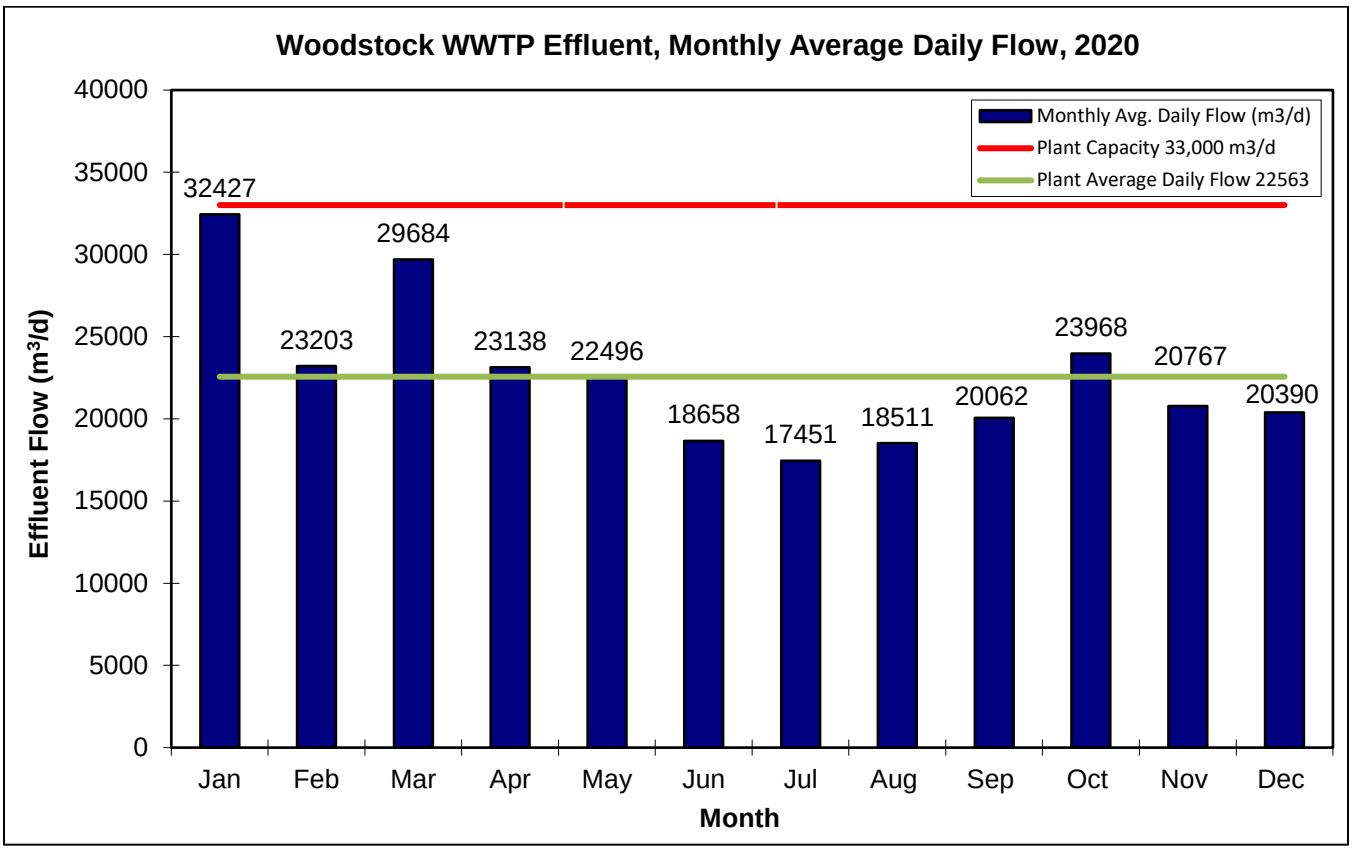
Primary Digester Cleanout/Equipment Maintenance

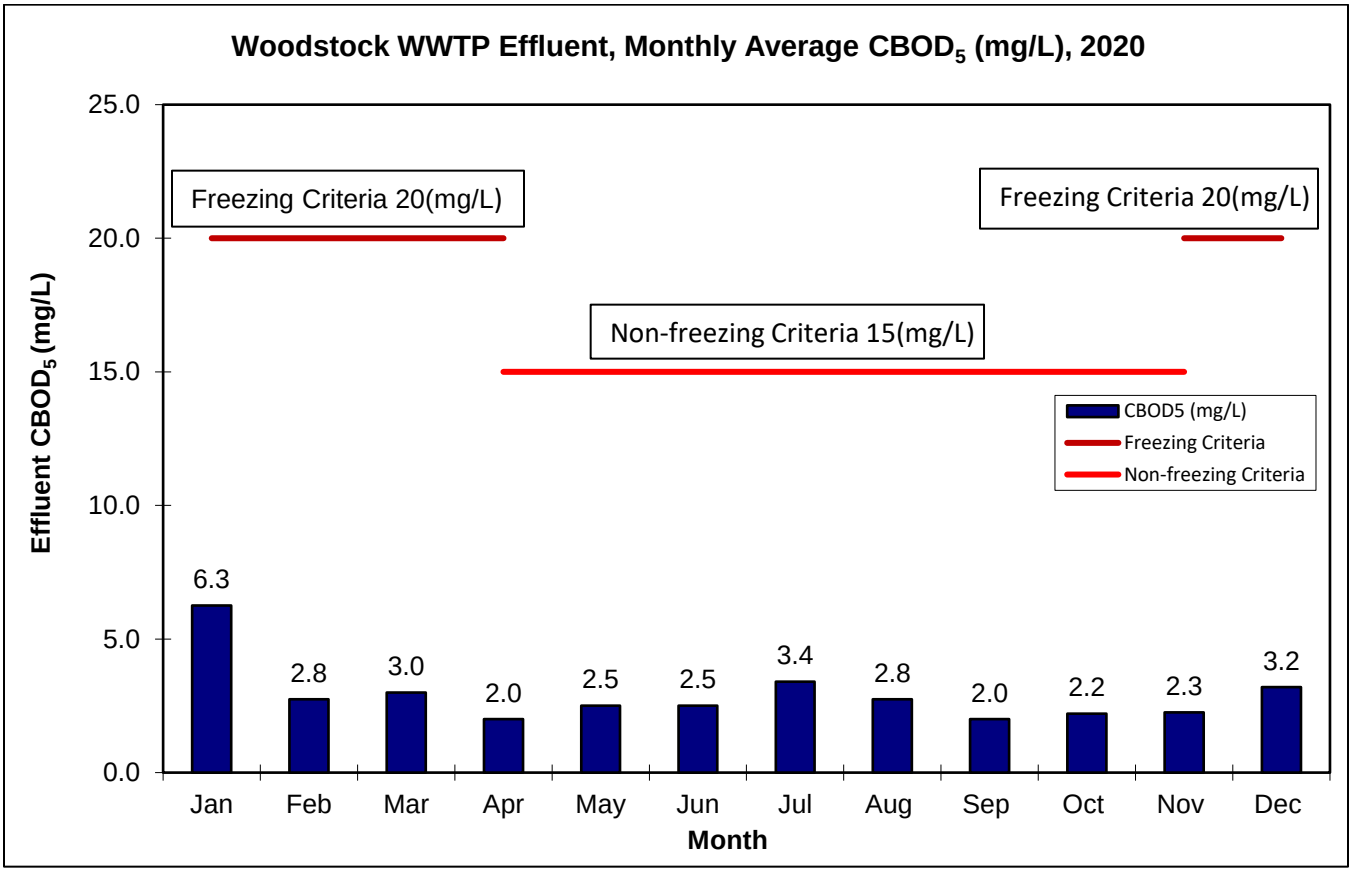
Primary digester #4 was cleaned out in the later portion of the year, as part of the department's biosolids monitoring plan. This allowed for maintenance to the digester sludge recirculation system and methane gas mixing equipment within the digester. These activities will enhance the digestion process to provide maximum biogas production for the unit. The biogas in turn is used as fuel for the plant's boiler system, to provide heat to the facility, and decrease the reliance on supplied natural gas.

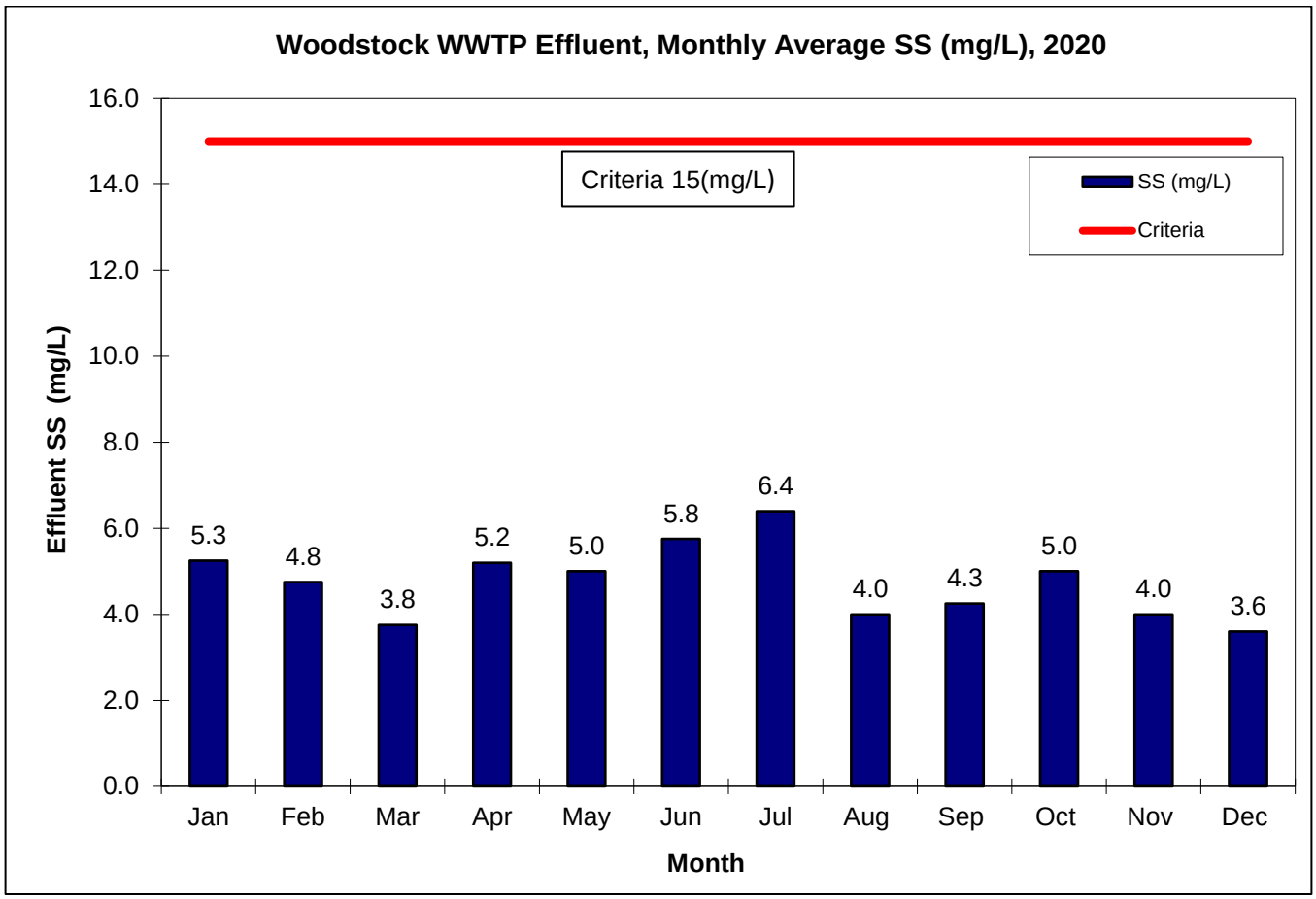
Green Energy Production

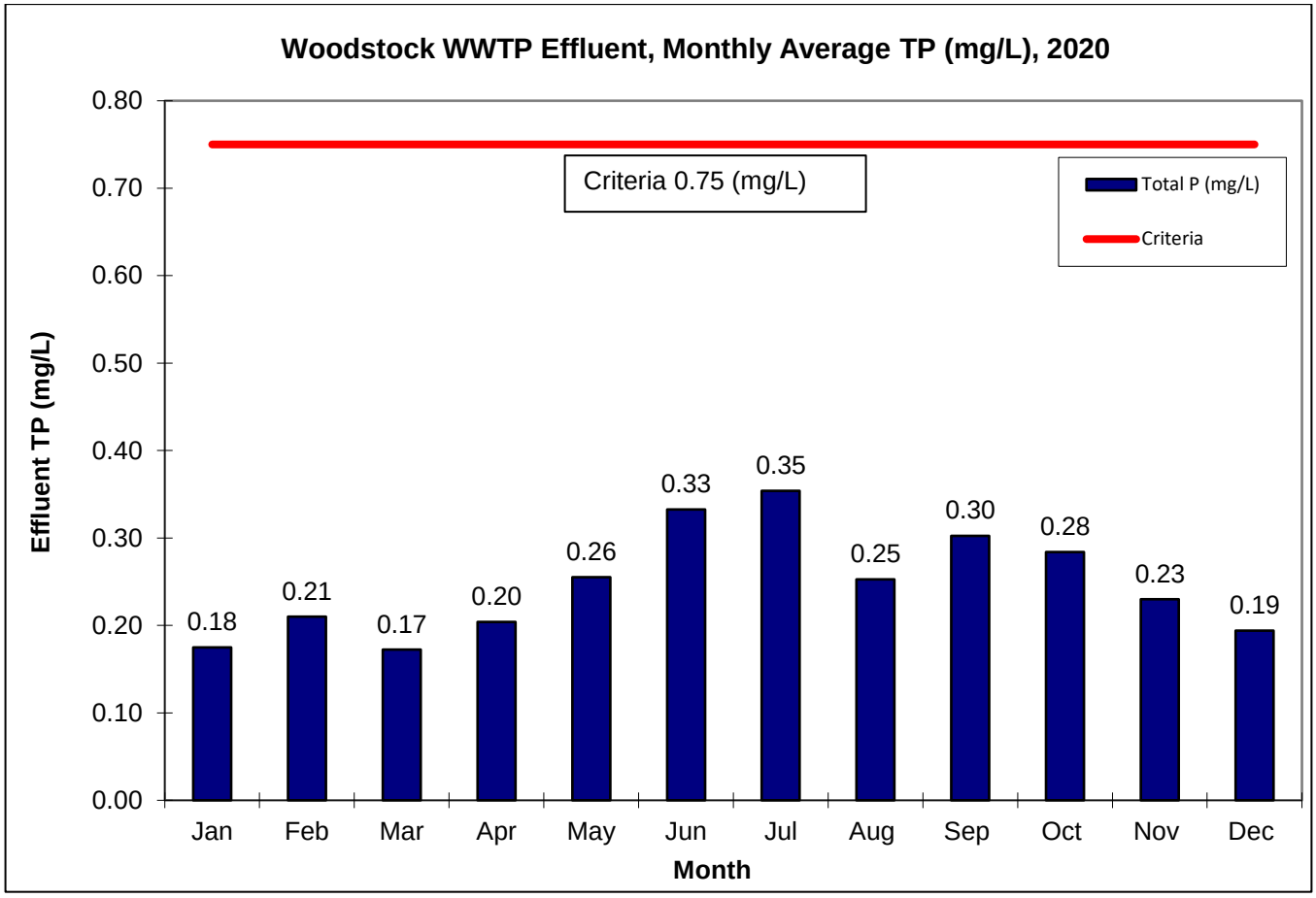
A 460 kW solar farm had been installed out front of the plant in 2019, and was operational in May of 2020. This power generation technology falls in line with the County of Oxfords direction of innovative and green technology.

APPENDIX A: GRAPHS OF 2020 DISCHARGE PARAMETERS VS. EFFLUENT DISCHARGE LIMITS






Woodstock WWTP Effluent, Monthly Average SS (mg/L), 2020
Criteria 15(mg/L)
SS (mg/L)
Criteria
Effluent SS (mg/L)
16.0
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
5.3
4.8
3.8
5.2
5.0
5.8
6.4
4.0
4.3
5.0
4.0
3.6
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month


Woodstock WWTP Effluent, Monthly Average TP (mg/L), 2020
Criteria 0.75 (mg/L)
Total P (mg/L)
Criteria
Effluent TP (mg/L)
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
0.18
0.21
0.17
0.20
0.26
0.33
0.35
0.25
0.30
0.28
0.23
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Feb
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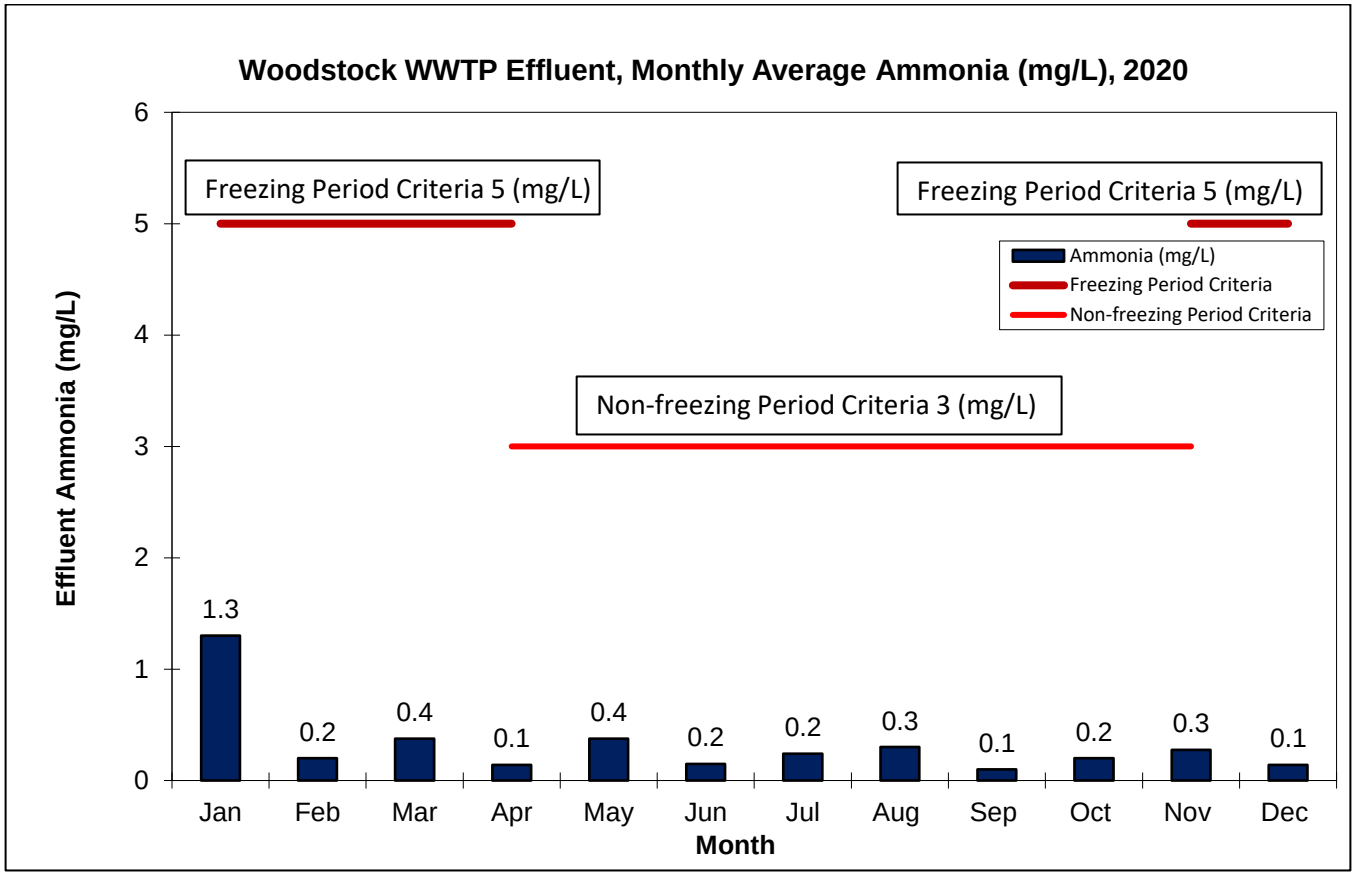
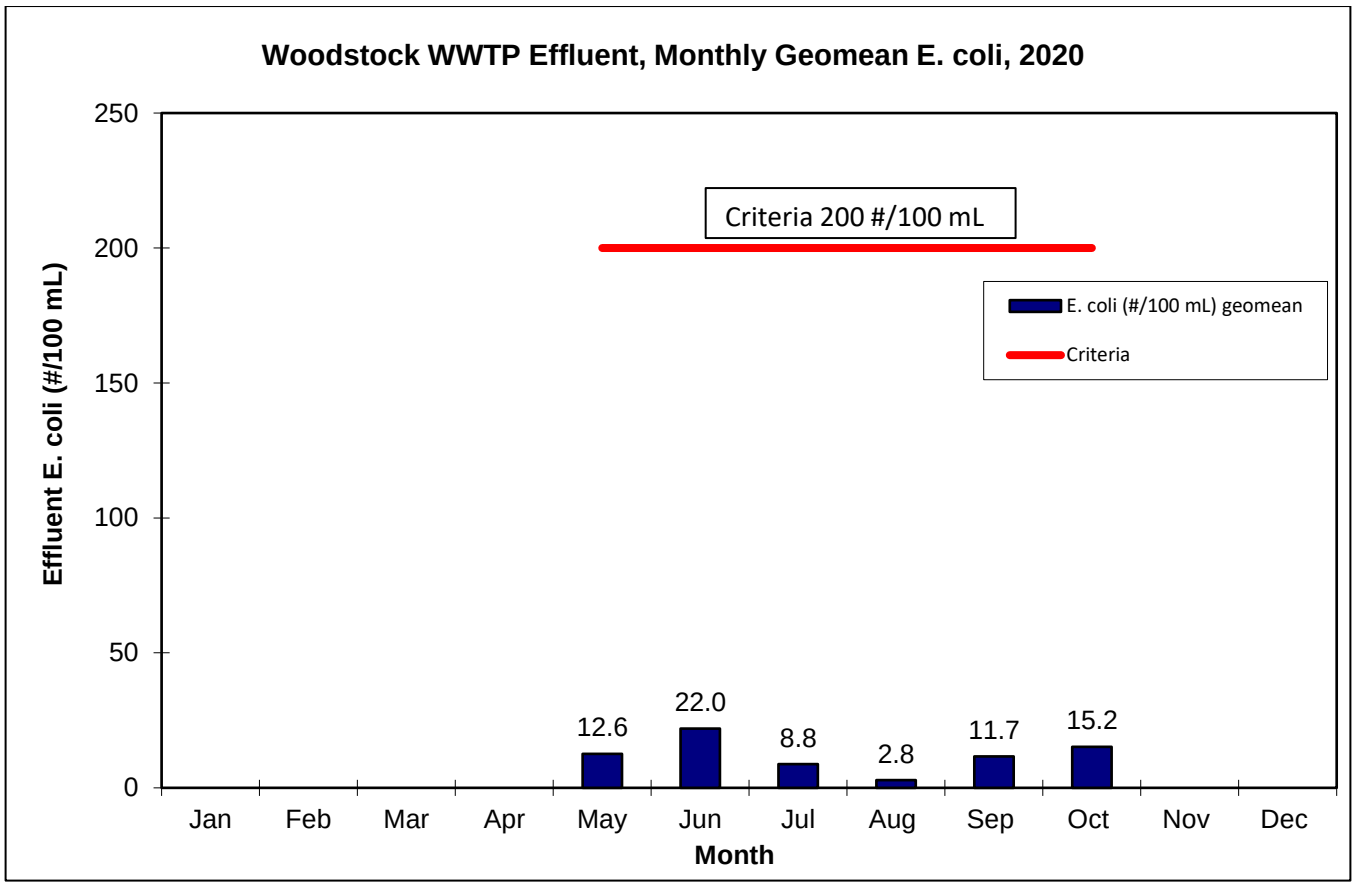
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month


Woodstock WWTP Effluent, Monthly Average Ammonia (mg/L), 2020
Effluent Ammonia (mg/L)
Month
Freezing Period Criteria 5 (mg/L)
Freezing Period Criteria 5 (mg/L)
Non-freezing Period Criteria 3 (mg/L)
Ammonia (mg/L)
Freezing Period Criteria
Non-freezing Period Criteria
1.3
0.2
0.4
0.1
0.4
0.2
0.2
0.3
0.1
0.2
0.3
0.1
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec


Woodstock WWTP Effluent, Monthly Geomean E. coli, 2020
Effluent E. coli (#/100 mL)
Month
Criteria 200 #/100 mL
E. coli (#/100 mL) geomean
Criteria
12.6
22.0
8.8
2.8
11.7
15.2
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec