

2019 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, 2019 – December 31, 2019

1.1. System Description

The Drumbo Sequencing Batch Reactor (SBR) is a Class II rated treatment facility with a nominally separate wastewater collection system, servicing the village of Drumbo. 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 2019, as demonstrated by the table below.

Facility	Drumbo Wastewater Treatment Plant
Design Capacity	300 m ³ /d
2019 Average Daily Flow	297 m ³ /d
2019 Maximum Daily Flow	620 m ³ /d
2019 Total Volume of Wastewater	108,558 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 2019 with 284 samples out of 288 meeting compliance or 100% compliance to its regulatory limits for all effluent.

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 2019. 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	107	32
Total Suspended Solids	92	27
Total Phosphorus	3	1
Total Kjeldahl Nitrogen	29	8

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 – 3.8	95.9 – 97.8
Total Suspended Solids	weekly	9.3	3.0 – 5.0	94.6 – 96.7
Total Phosphorus	weekly	0.46	0.1 – 0.23	92.3 – 96.7
Total Ammonia Nitrogen (May 1 to October 31)	weekly	2.7	0.82 – 1.67	--
Total Ammonia Nitrogen (Nov. 1 to April 30)	weekly	4.5	0.86 – 2.15	--

E. coli	weekly	200 organisms/100 mL (monthly Geometric Mean Density)	1.7 – 6.8 organisms/100 mL (monthly Geometric Mean Density)	--
DO	weekly	5.0 or higher	6.8 - 9.3	--
pH any single sample	weekly	6.0 - 9.5	6.8 – 8.0	--

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 – 3.8
Total Suspended Solids	weekly	4.7	3.0 – 5.0
Total Phosphorus	weekly	0.27	0.1 – 0.23
Total Ammonia Nitrogen (May 1 to October 31)	weekly	1.8	0.82 – 1.67
Total Ammonia Nitrogen (Nov. 1 to April 30)	weekly	3.6	0.86 – 2.15
E. coli	weekly	150 organisms/100 mL (monthly Geometric Mean Density)	1.7 – 6.8 organisms/100 mL (monthly Geometric Mean Density)
DO	weekly	6 or higher	6.8 - 9.3
pH any single sample	weekly	6.5 - 8.5	6.8 – 8.0

The plant has had difficulty meeting its objectives as the plant 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 m³/day to 450 m³/day by upgrading the existing Sequential Batch Reactor plant (SBR) to a Membrane Bioreactor plant (MBR). Design work is underway 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	TSS	4.7	4.8
February	TSS	4.7	5.0
March	INF. FLOW	300 m ³ /d	313 m ³ /d
April	INF. FLOW	300 m ³ /d	400 m ³ /d
May	INF. FLOW	300 m ³ /d	405 m ³ /d
November	INF. FLOW	300 m ³ /d	313 m ³ /d

December	INF. FLOW	300 m ³ /d	305 m ³ /d
	TSS	4.7	4.8

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

There were no overflows, bypassing, upsets, spills an abnormal conditions in 2019.

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 2019.

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 2019

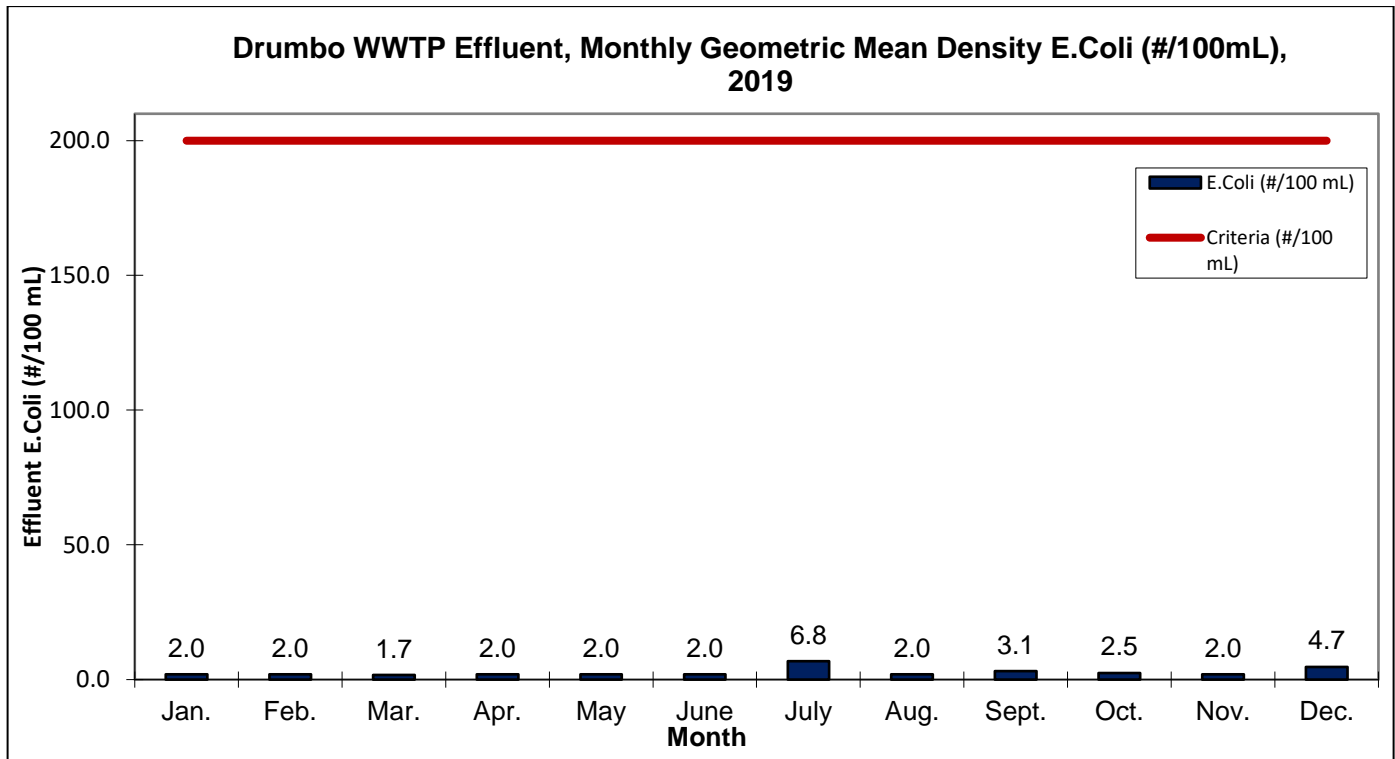
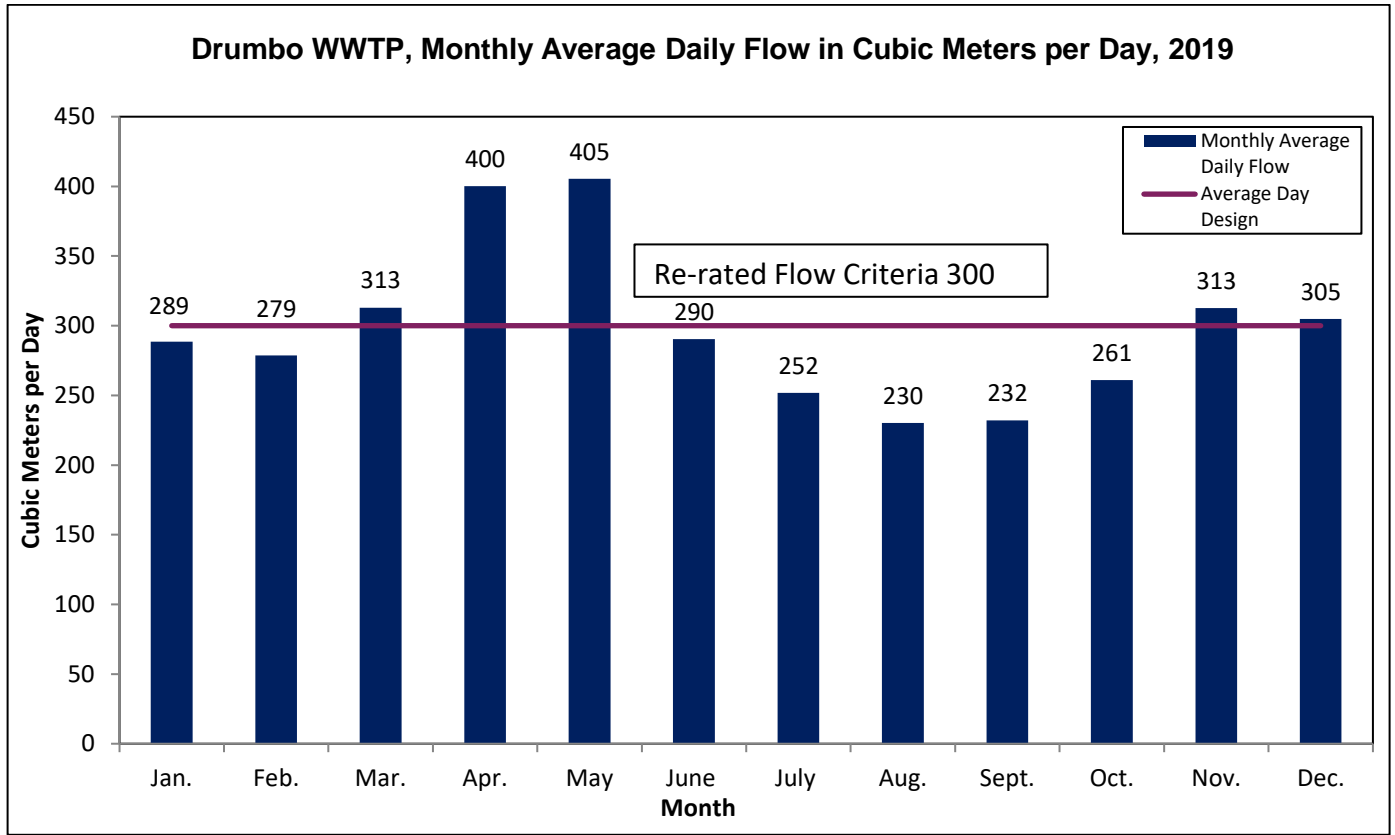
Co-thickened primary sludge is transported to Woodstock WWTP for further treatment.

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.

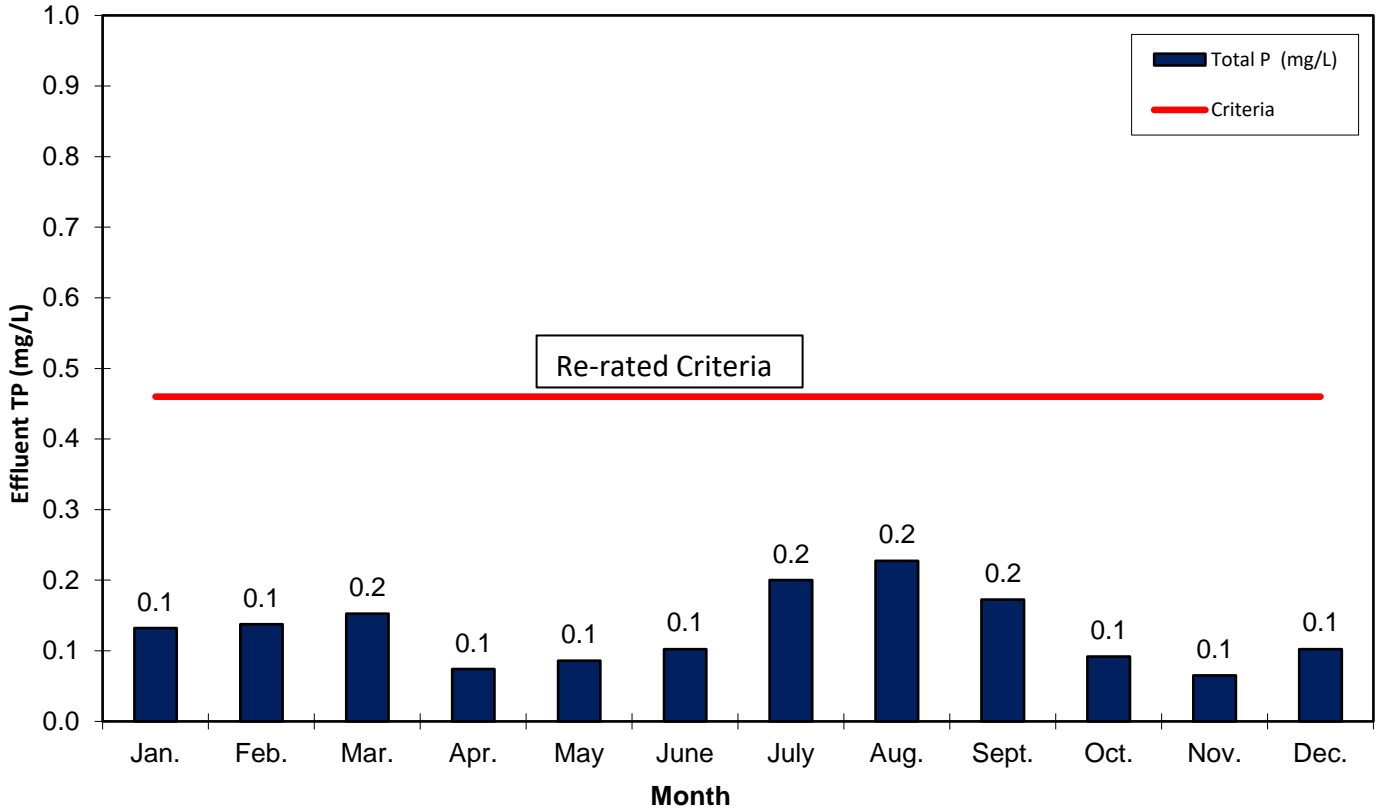
7. Inspection, Pilots, and Trials

The Ministry of Environment, Conservation and Parks (MECP) did not conduct a facility inspection in 2019. The MECP inspections typically occur on a 3-year schedule.

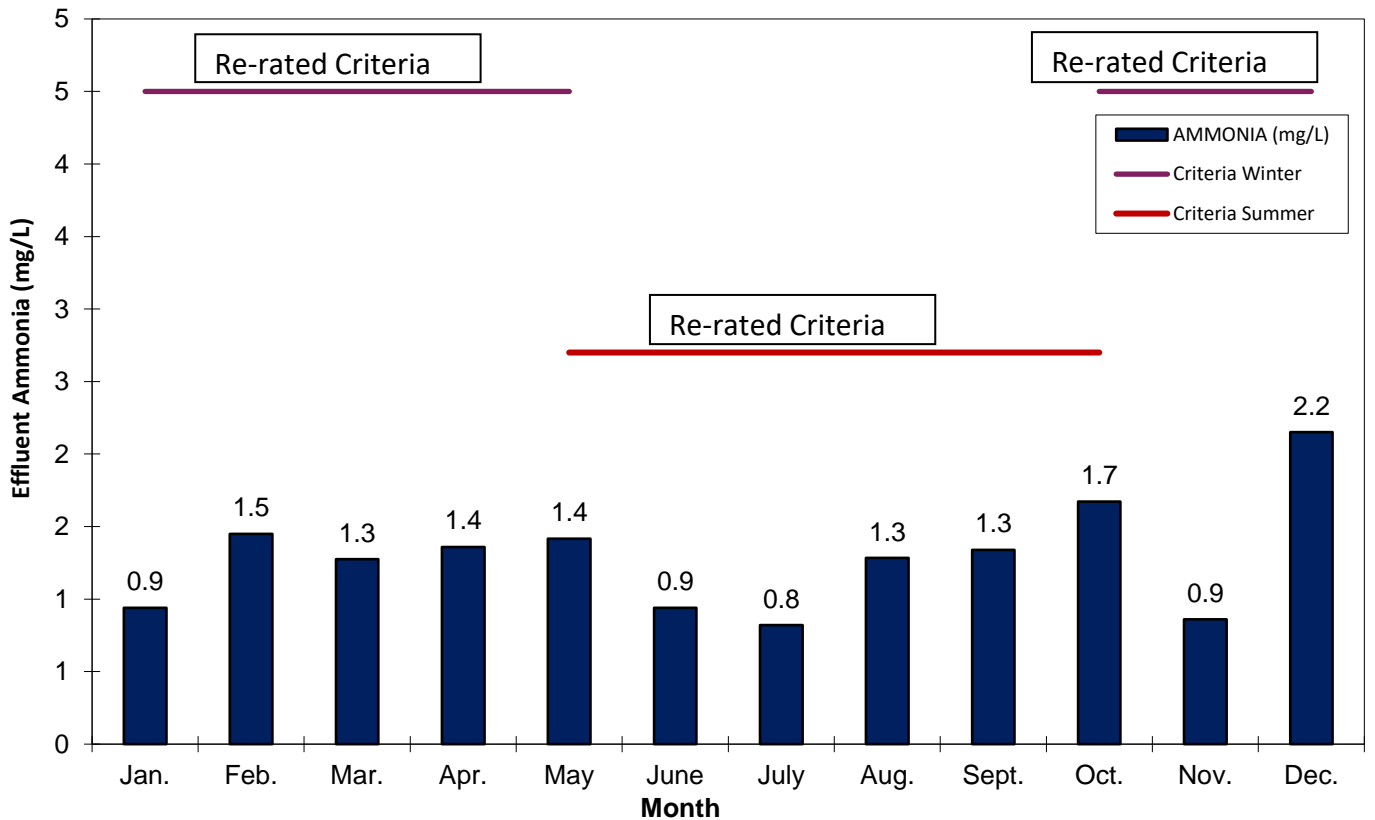
APPENDIX A: GRAPHS OF 2019 DISCHARGE PARAMETERS VS. EFFLUENT DISCHARGE LIMITS



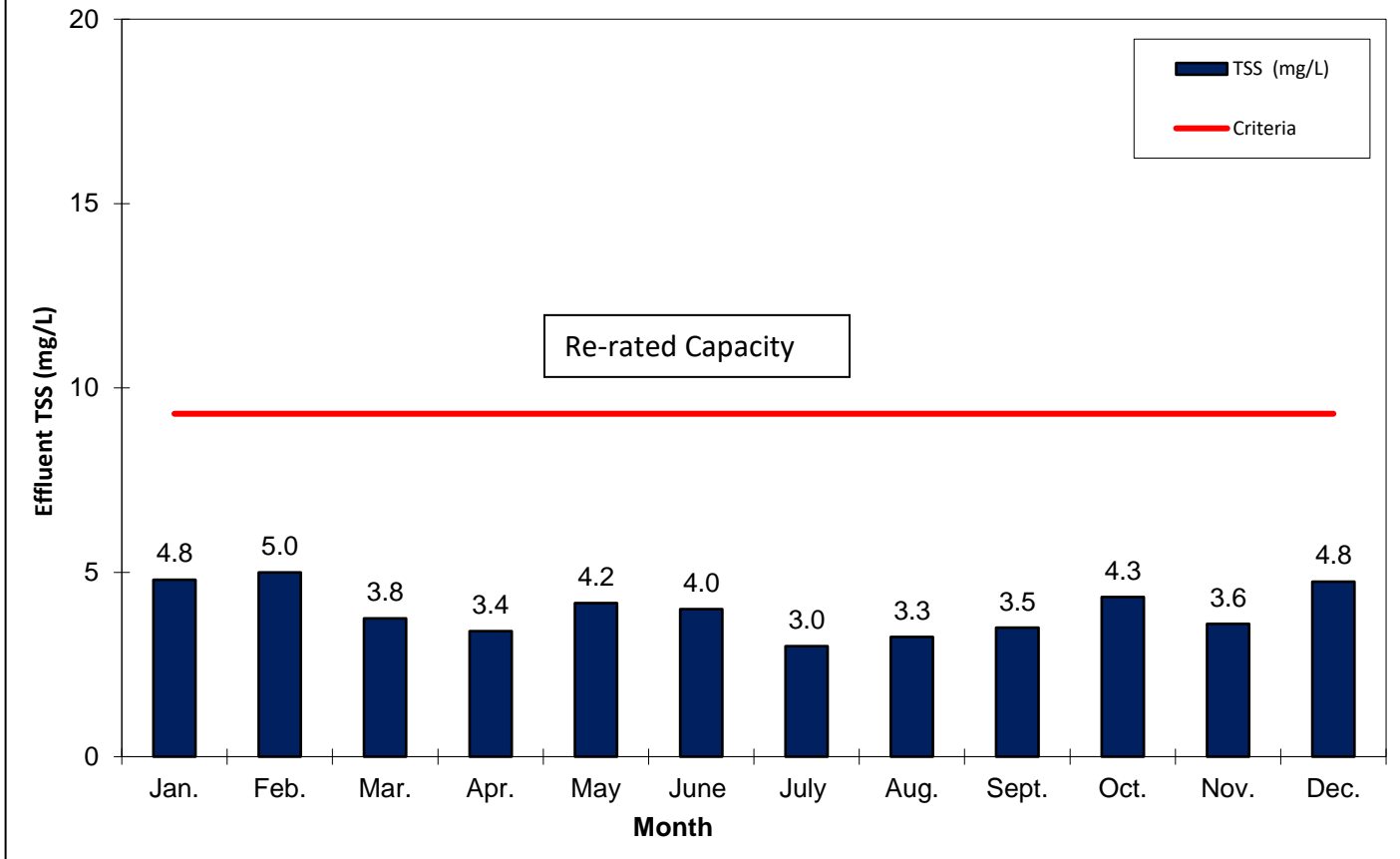
Drumbo WWTP Effluent , Monthly Average TP (mg/L), 2019



Drumbo WWTP Effluent, Monthly Average Ammonia (mg/L), 2019



Drumbo WWTP Effluent. Monthly Average TSS (mg/L), 2019





2019 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, 2019 – December 31, 2019

1.1. System Description

The Ingersoll WWTP is a Class III rated treatment facility with a nominally separate wastewater collection system, and 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 two treatment trains within the Ingersoll WWTP began operation in 1947 and 1974. As of June 2018, the 1947 plant had been demolished and replaced with a new plant. Both 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
2019 Average Daily Flow	7,751 m ³ /d

2019 Maximum Daily Flow	15,149 m ³ /d
2019 Total Volume of Wastewater	2,826,933 m ³ /year
2019 Total Received Hauled Waste	23,584 m ³ /year (22,703 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 2019, with the exception one month. During November the monthly average Total Suspended Solids concentration limit of 15 mg/L was exceeded with a result of 15.3 mg/L. This was caused by a few operational challenges presented during a digester cleanout and aeration tank repair/installation. The total solids within the plant had increased as the digester clean out was taking place. In addition, an aeration tank was taken out of service to have new membrane diffusers installed, which limited the operator ability to regulate the biomass concentrations across both aeration basins. To remedy the problem, extra raw sludge loads were removed by vacuum truck for processing at the Woodstock WWTP, and the flow was increased to another aeration train while the diffusers were being installed.

For 2019, 500 samples out of a total 509 met compliance, or 98.2% compliance to its regulatory limits for all effluent at 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 2019.

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	891
Total Suspended Solids	179	1387
Total Phosphorus	2.2	17
Total Kjeldahl Nitrogen	17	132

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	3.8 – 12.8	88.3 – 96.5
Total Suspended Solids	weekly	15	10.0 – 15.3	91.4 – 94.4
Total Phosphorus	weekly	0.6	0.26 – 0.34	84.5 – 88.2
Total Ammonia Nitrogen (May 1 to November 30)	weekly	2.0	0.1 – 1.3	N/A
Total Ammonia Nitrogen (Dec. 1 to April 30)	weekly	6.0	0.3 – 1.3	N/A
pH any single sample	weekly	6.0 - 9.5	6.65 – 7.93	N/A
E. coli	weekly	200 organisms/100 mL (Monthly Geometric Mean Density)	2.8 – 59.0 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 thirty-eight single sample objective failures related to total suspended solids, one single objective sample failure related to CBOD, 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 2019.

Baffle plates are currently being fabricated to be installed in the 2018 secondary clarifier. The effect of the baffles will be to slow down the aeration effluent flow, which should improve solids settling and result in decreased solid concentrations within the effluent.

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	3.8 – 12.8
Total Suspended Solids	weekly	10	10.0 – 15.3
Total Phosphorus	weekly	0.40	0.26 – 0.34
Total Ammonia Nitrogen (May 1 to November 30)	weekly	1.5	0.1 – 1.3

Total Ammonia Nitrogen (Dec. 1 to April 30)	weekly	4.0	0.3 – 1.3
pH any single sample	weekly	6.5 - 9.0	6.65 – 7.93
E. coli	weekly	100 organisms/100 mL (Monthly Geometric Mean Density)	2.8 – 59.0 organisms/100 mL (Monthly Geometric Mean Density)

Failures to meet effluent objectives are provided in the following table.

Month	Parameter	Objective mg/L	Result mg/L
Jan. 2 2019	TSS	10	13
Jan. 9 2019	TSS	10	14
Jan. 15 2019	TSS	10	11
Jan. 23 2019	TSS	10	11
Jan. 29 2019	TSS	10	15
Feb. 13 2019	TSS	10	11
Feb. 19 2019	TSS	10	11
Mar. 6 2019	TSS	10	13
Mar. 27 2019	TSS	10	13
Apr. 3 2019	TSS	10	11
Apr. 9 2019	TSS	10	11
May 8 2019	TSS	10	12
May 14 2019	TSS	10	23
June 4 2019	TSS	10	13
June 12 2019	TSS	10	11
June 19 2019	TSS	10	11
June 26 2019	TSS	10	13
July 10 2019	TSS	10	11
July 23 2019	TSS	10	14
Aug. 21 2019	TSS	10	12
Aug. 27 2019	TSS	10	12
Sept. 10 2019	TSS	10	16
Sept. 19 2019	TSS	10	16
Sept. 20 2019	TSS	10	12
Sept. 25 2019	TSS	10	11
Oct. 2 2019	TSS	10	11
Oct. 16 2019	TSS	10	15
Oct. 22 2019	TSS	10	12
Oct. 30 2019	TSS	10	12

Nov. 7 2019	TSS	10	18
Nov. 13 2019	TSS	10	18
Nov. 21 2019	TSS	10	15
Dec. 2 2019	TSS	10	11
Dec. 4 2019	TSS	10	13
Dec. 12 2019	TSS	10	13
Dec. 19 2019	TSS	10	13
Dec. 21 2019	TSS	10	12
Dec. 23 2019	TSS	10	12
Jan. 23 2019	CBOD	10	14
Nov. 7 2019	CBOD	10	11
Dec. 12 2019	CBOD	10	14
Dec. 19 2019	CBOD	10	16
Dec. 23 2019	CBOD	10	11
Feb. 6 2019	Total Phosphorus	0.4	0.42
Mar. 27 2019	Total Phosphorus	0.4	0.41
June 4 2019	Total Phosphorus	0.4	0.41
Jan. 23 2019	Ammonia	4.0	5.2
Nov. 28 2019	Ammonia	4.0	4.2
Apr. 17 2019	E. coli	100 #/100 mL	2040
Nov. 13 2019	E. coli	100 #/100 mL	306

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

There were no overflows, bypassing, upsets, spills, or abnormal conditions at the Ingersoll WWTP in 2019.

There was an odour complaint on January 16, 2019. A local resident indicated that she was walking along the trail on the south bank of the Thames River (on the opposite side as the treatment plant), and could smell the odour of raw sewage coming from the vicinity of the Ingersoll Waste Water Treatment Plant. The smell was not overpowering, but highly noticeable. Staff had performed a routine maintenance procedure of grit and scum removal earlier in the day, which may have been the source of the abnormal odour.

On September 15-16, 2019 there was a leak of approximately 1,000 m³ of wastewater from the sanitary sewer on Victoria Street between Union Street and Wonham Street. The leak happened at a construction site when storm water and grit entered the sanitary sewer on the weekend and caused a partial blockage and then caused the level to rise and leak out through a previously abandoned lateral. Once discovered the partial blockage was cleared and a pump was placed in the nearby excavation to pump the wastewater back into the sanitary sewer.

This event was reported to the MECP at the time it occurred and MECP staff investigated and were satisfied with the action taken.

The Limited Operational Flexibility for modification to the wastewater treatment plant was not used in 2019.

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. 2019 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 2019.

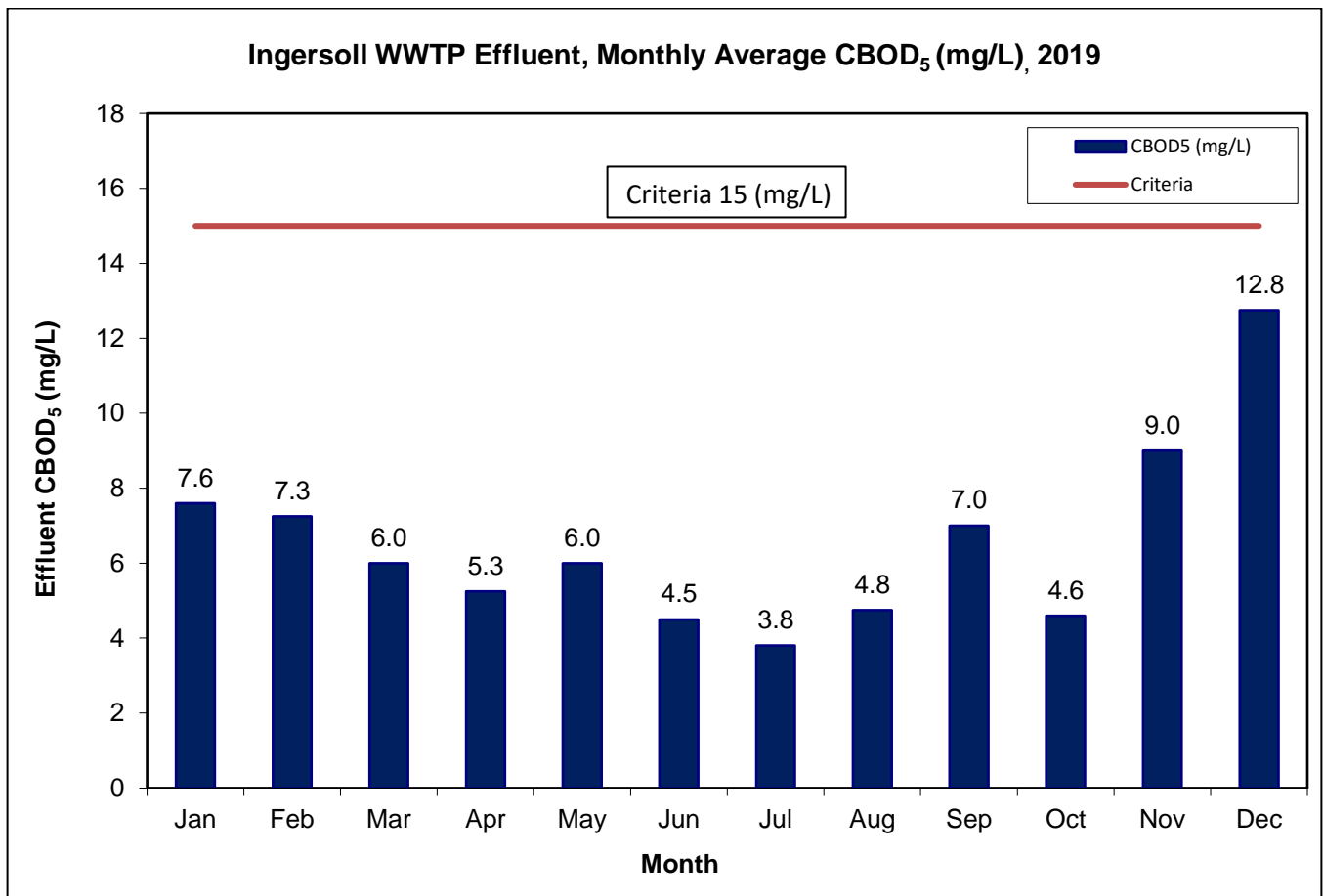
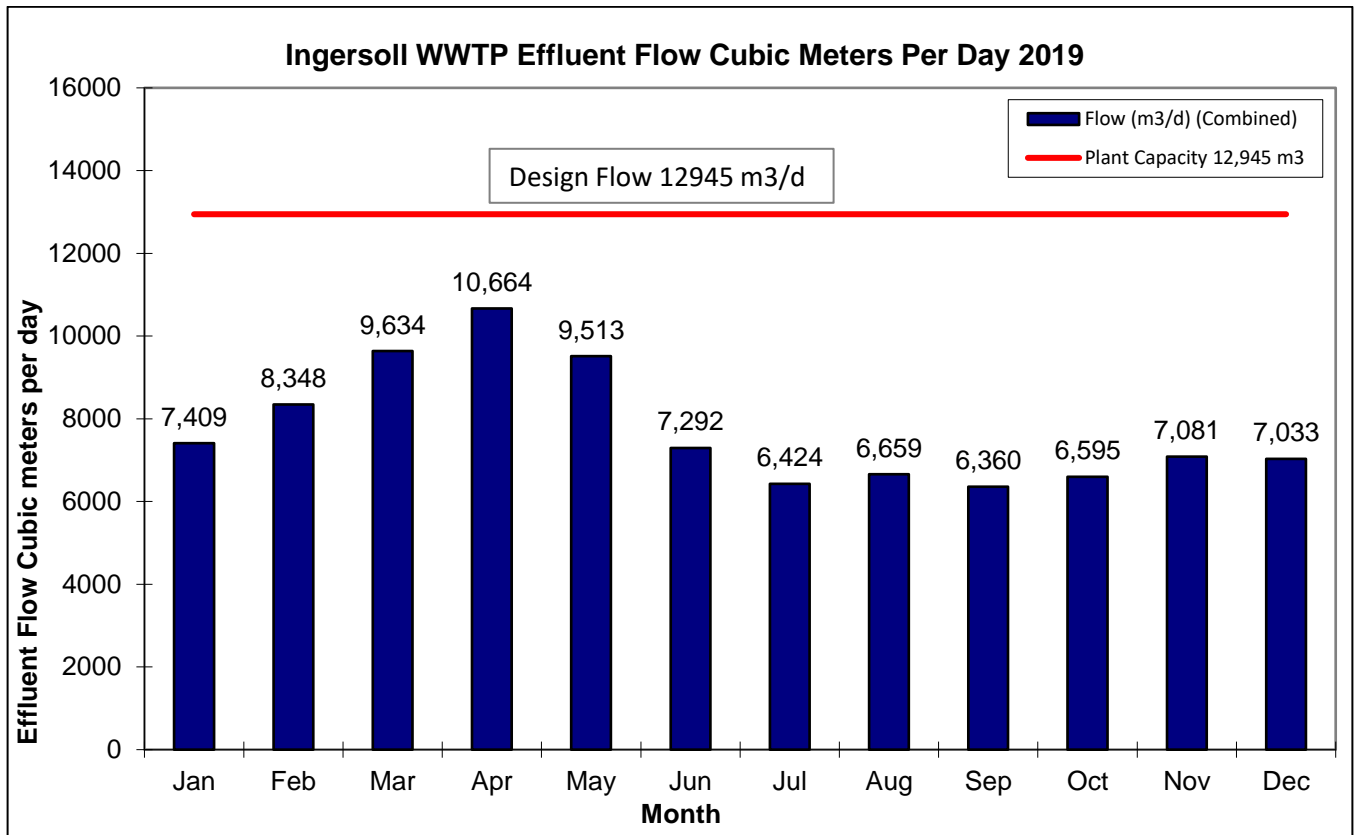
Energy Optimization

To decrease energy demand at the Ingersoll plant, one of the 2018 plant aeration trains was taken offline. The other 2018 aeration train had stone diffusers replaced by membrane diffusers. The plant influent flow was also adjusted between the 2018 and 1974 plant, which had an end result of decreasing the amount of blowers needed to operate the plant from 2 to 1 and substantial hydro savings.

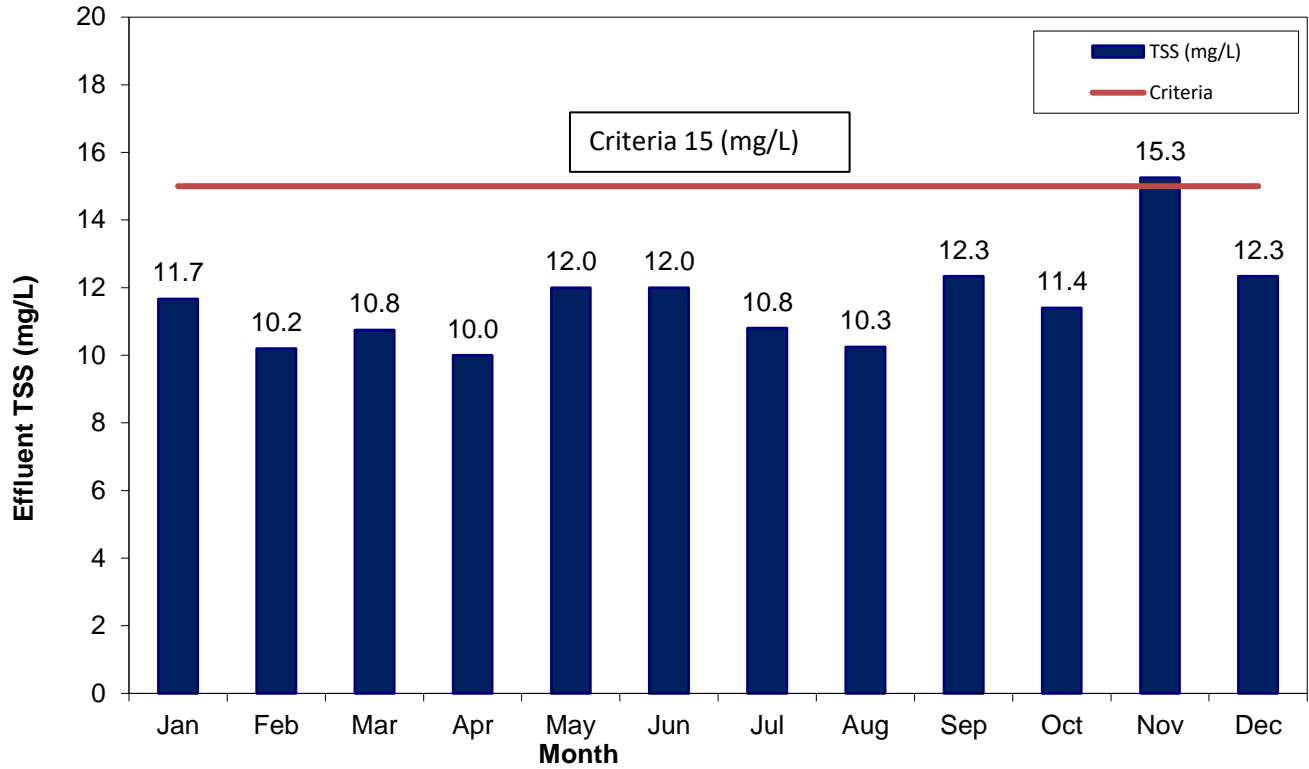
Digester Cleanout

The primary digester was cleaned out in the later portion of the year. This allowed for maintenance to the sludge recirculation system and methane gas equipment within the digester. These activities should optimize digestion and provide maximum gas production for the unit.

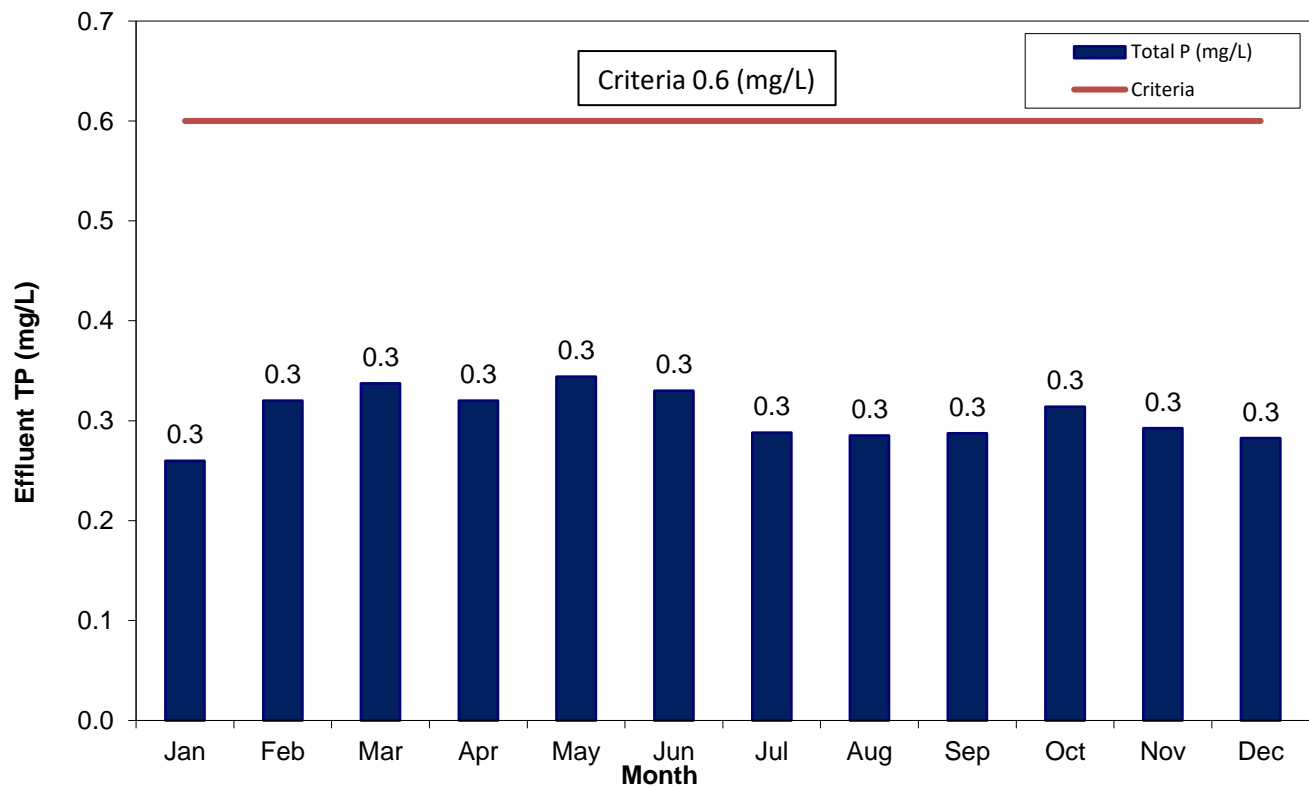
APPENDIX A: GRAPHS OF 2019 DISCHARGE PARAMETERS VS. EFFLUENT DISCHARGE LIMITS



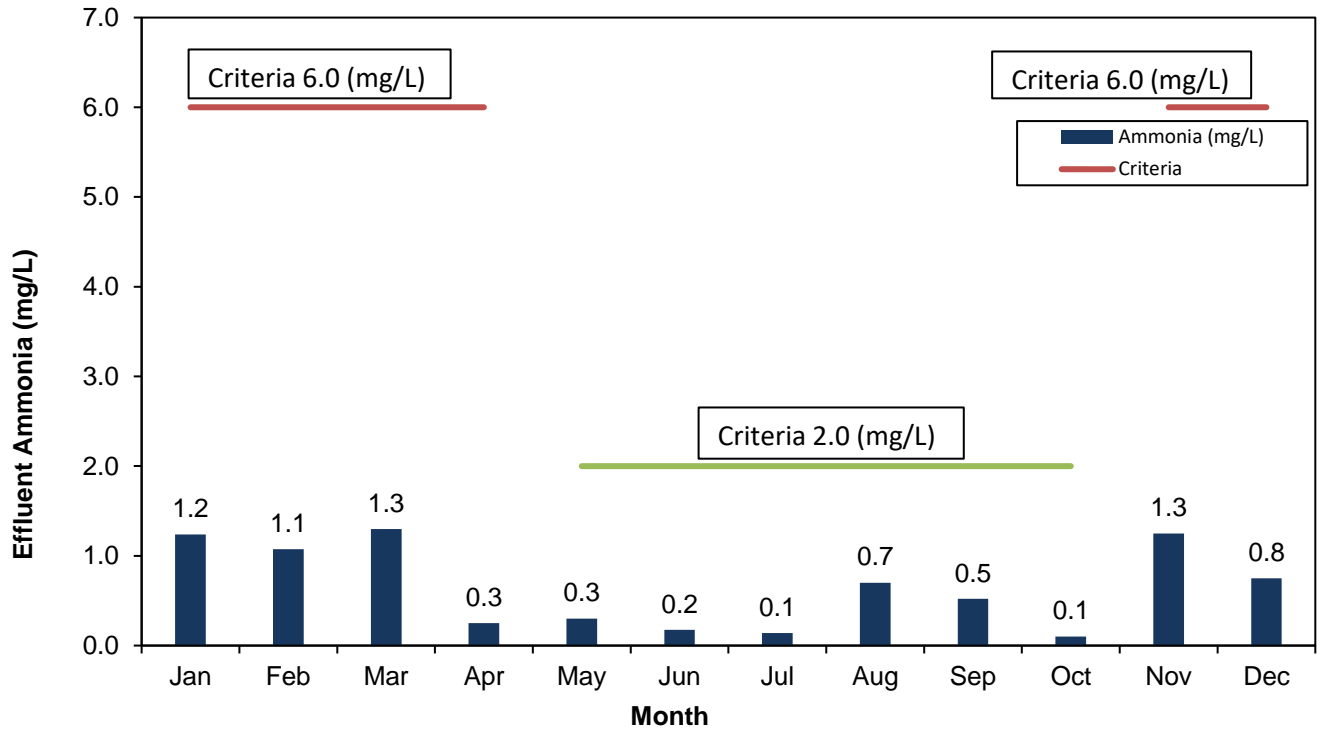
Ingersoll WWTP Effluent , Monthly Average TSS (mg/L), 2019



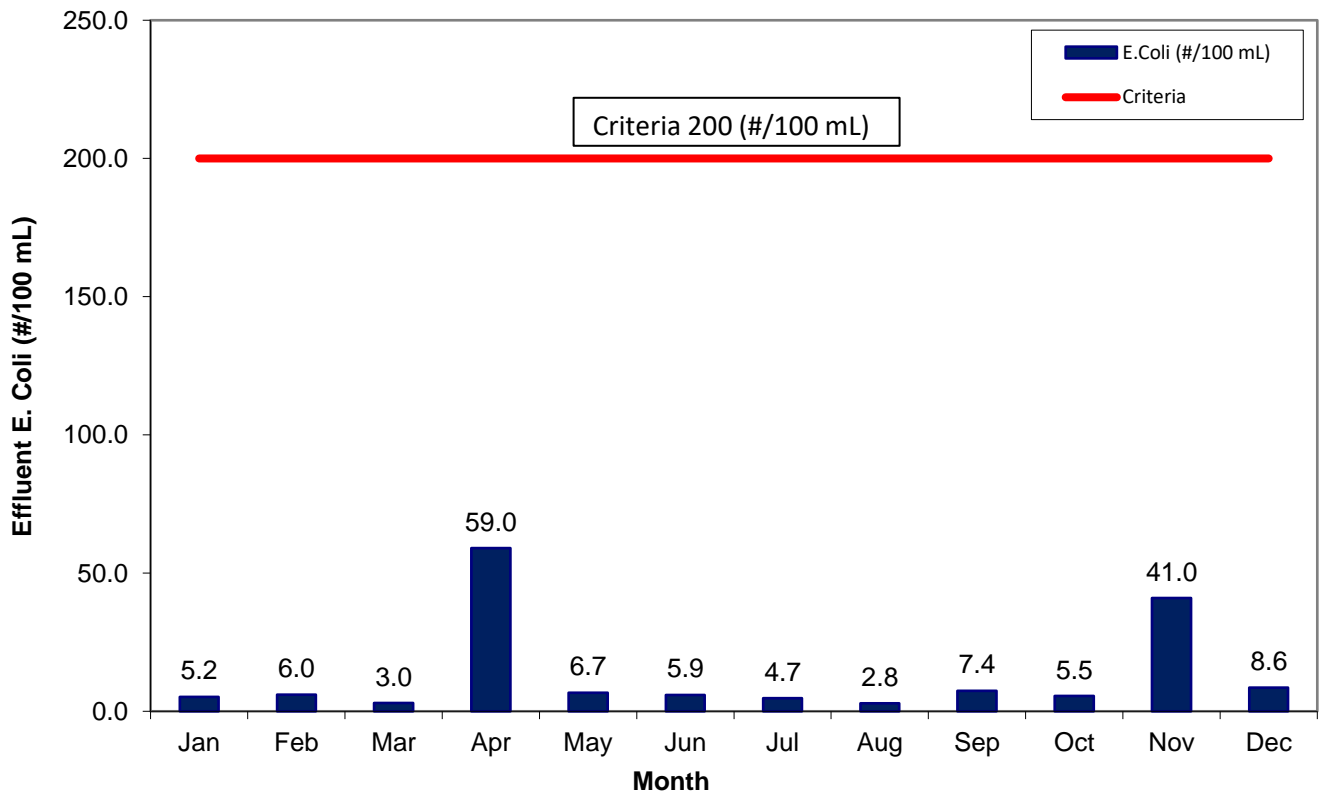
Ingersoll WWTP Effluent , Monthly Average TP (mg/L), 2019



Ingersoll WWTP Effluent, Monthly Average Ammonia (mg/L), 2019



Ingersoll WWTP Effluent , Monthly Geometric Mean Density E. Coli (#/100 mL), 2019



**2019 ANNUAL WASTEWATER TREATMENT SYSTEM SUMMARY REPORT
Mount Elgin Wastewater Treatment Plant**

1. General Information

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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, 2019 – December 31, 2019

1.1. System Description

The Mount Elgin Wastewater Treatment Plant (WWTP) consists of a central Recirculating Sand Filter (RSF) and subsurface discharge. 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 drainfield that provides for the subsurface discharge of the treated effluent. Effluent samples are collected from the dosing tank ahead of the drainfield.

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
2019 Average Daily Flow	74 m ³ /d
2019 Maximum Daily Flow	160 m ³ /d
2019 Total Volume of Wastewater	26,845 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 (CBOD₅), Total Suspended Solids (TSS), Total Phosphorus (TP), and Total Kjeldahl Nitrogen (TKN).

Effluent grab samples are analyzed for CBOD₅, 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 2019 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 CBOD₅ 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 limits 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	117	8.7
Total Suspended Solids	64	4.7
Total Phosphorus	7.4	0.5
Total Kjeldahl Nitrogen	67	5.0

Ground Water Results:

Parameter	2019						
	Well 1	Well 2	Well 3		Well 1	Well 2	Well 3
	March 25/19	March 25/19	March 25/19		June 10/19	June 10/19	June 10/19
Well Level (meters)	0.42	0.24	0.00		0.56	0.43	0.12
Nitrite (mg/L N)	0.03	0.08	0.08		0.03	0.14	0.09
Nitrate (mg/L N)	0.06	20.9	2.10		0.06	20.1	7.07
Nitrate+Nitrite (mg/L N)	0.06	21.0	2.18		0.06	20.2	7.16
pH	7.07	7.22	7.08		7.25	7.22	7.36

	Well 1	Well 2	Well 3		Well 1	Well 2	Well 3
Parameter	Aug 20/19	Aug 20/19	Aug 20/19		Nov 26/19	Nov 26/19	Nov 26/19
Well Level (meters)	0.65	0.65	0.40		0.53	0.80	0.71
Nitrite (mg/L N)	0.03	0.04	0.08		0.03	0.06	0.13
Nitrate (mg/L N)	0.06	9.44	4.22		0.06	26.4	2.9
Nitrate+Nitrite (mg/L N)	0.06	9.48	4.30		0.06	26.5	3.03
pH	7.39	7.30	7.31		7.08	7.31	7.34
Well depths	3.66m	3.96m	3.96m				

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 2019.

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 – 3.0
Suspended Solids	quarterly	10	2.0 – 6.5

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

There were no overflows, bypassing, upsets, spills, or abnormal Conditions for 2019.

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.

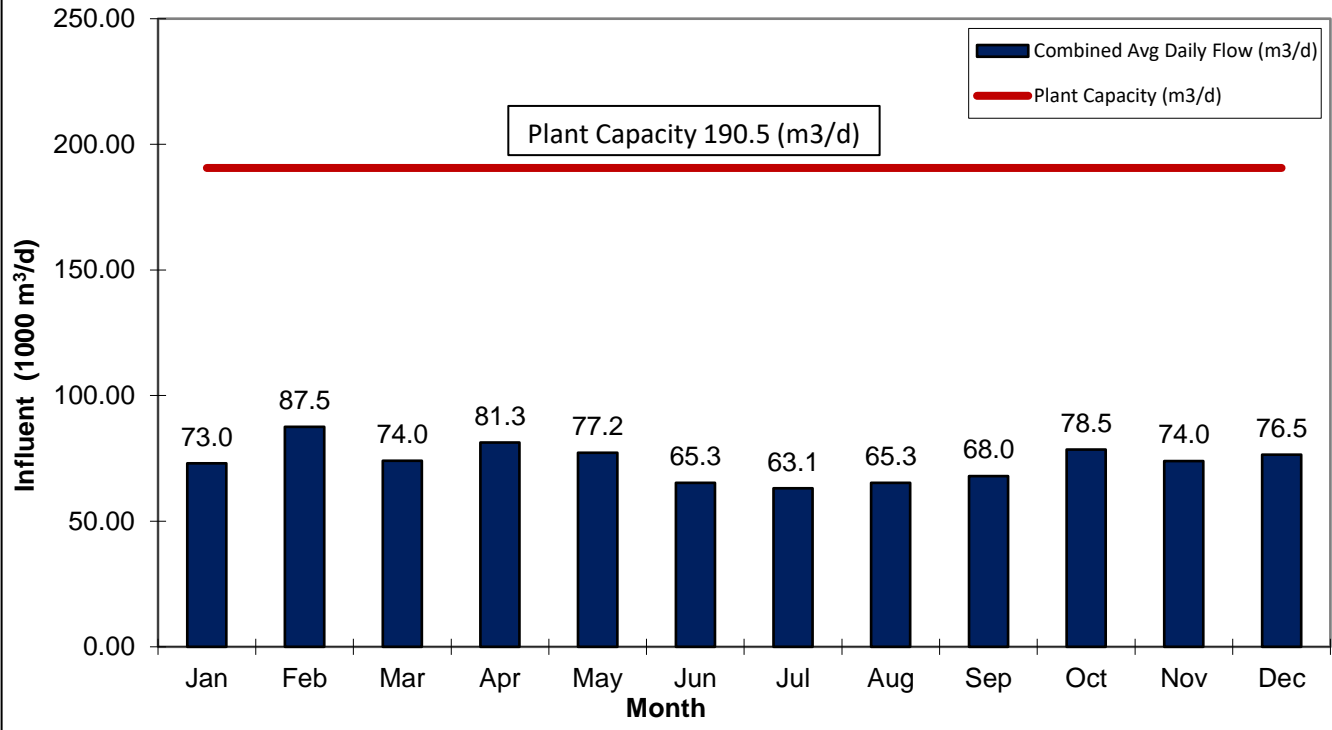
5. Monitoring Equipment Maintenance and Calibration

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.

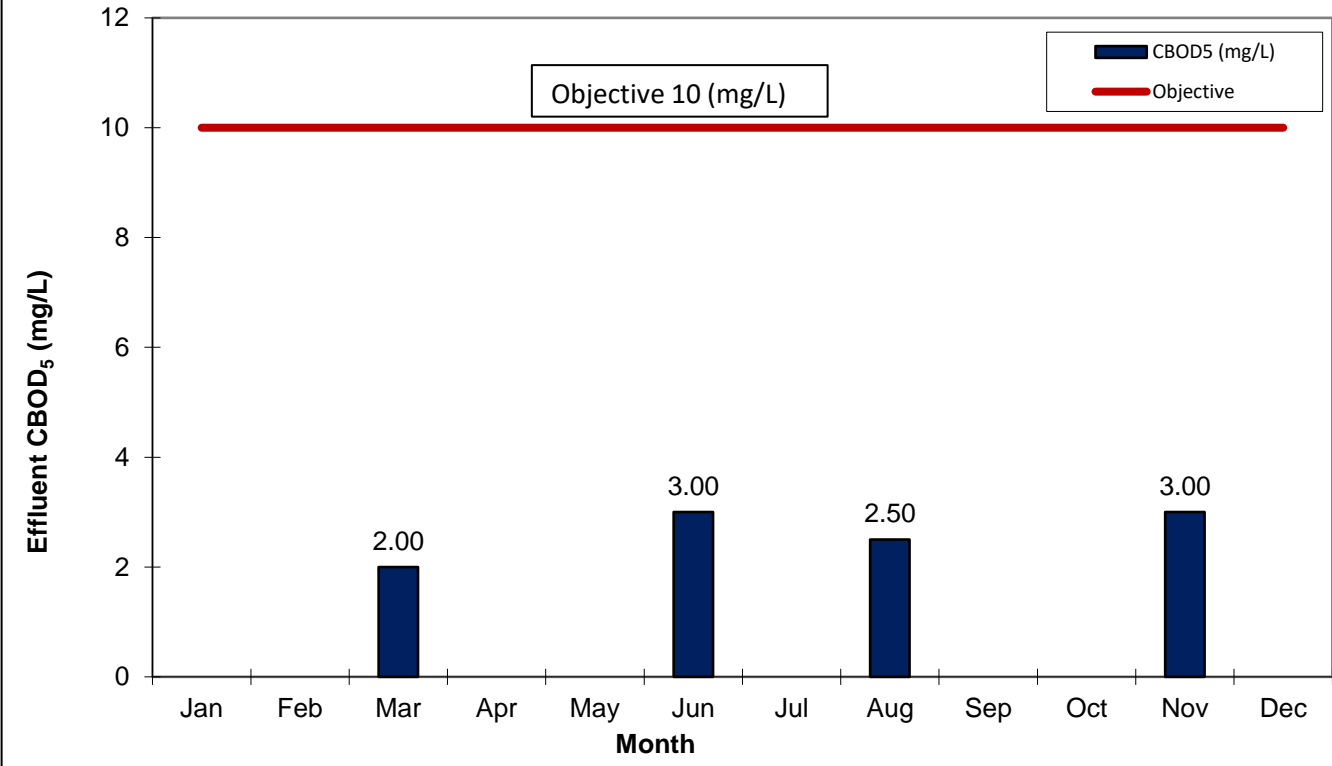
All other operational monitoring equipment is calibrated by staff and records are kept on-site at the Plant.

APPENDIX A: GRAPHS OF 2019 DISCHARGE PARAMETERS VS. EFFLUENT DISCHARGE LIMITS

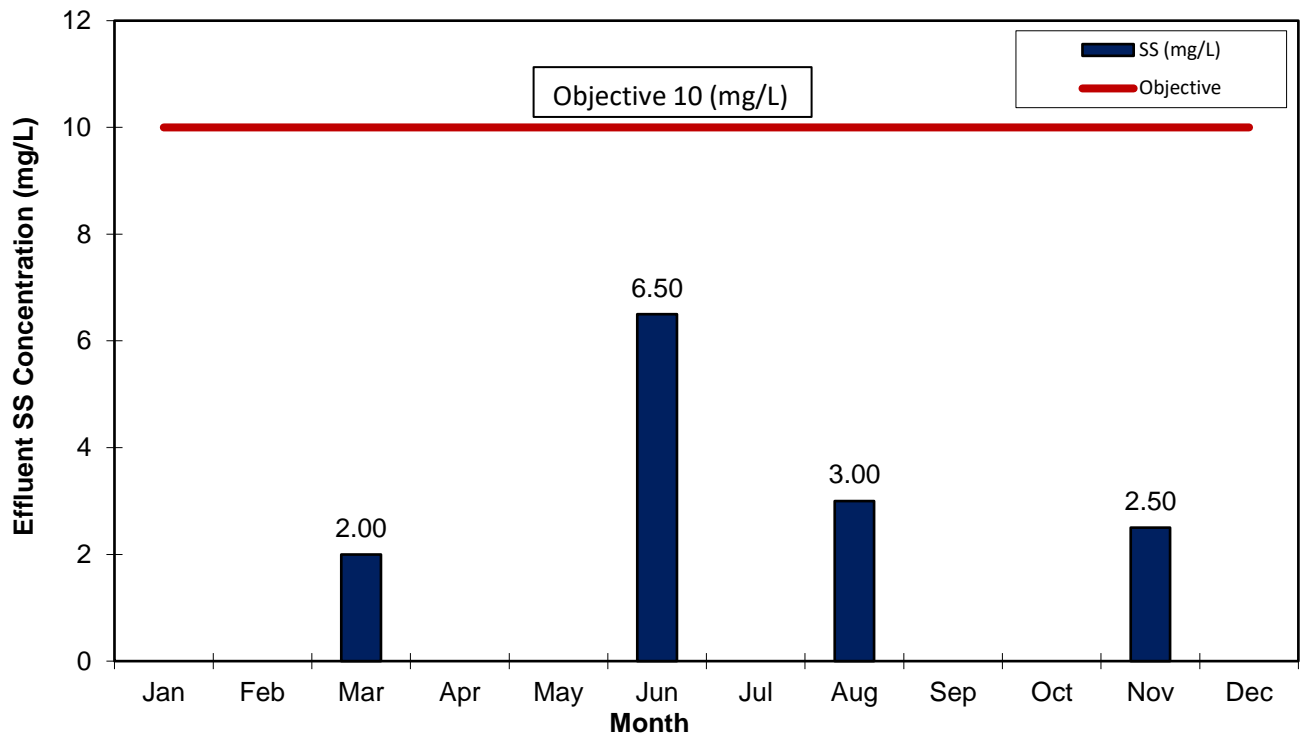
Mount Elgin Influent, Average Daily Flow (1000 m³/d), 2019



Mount Elgin Effluent CBOD₅ (mg/L), 2019



Mount Elgin Effluent, SS Concentration (mg/L), 2019



2019 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, 2019 – December 31, 2019

1.1. System Description

The Norwich WWTP is a Class I facility with a nominally separate wastewater collection system, and provided effective wastewater treatment in 2019. The Norwich WWTP is a lagoon wastewater treatment system serving the community of Norwich. The wastewater is pumped from two pump stations 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
2019 Average Daily Flow	1,218 m ³ /d
2019 Maximum Daily Flow	4,013 m ³ /d
2019 Total Volume of Wastewater	443,887 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 (BOD₅), 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. BOD₅ 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 2019 with 297 samples out of 308 meeting compliance or 96% compliance to its regulatory limits for all effluent.

In July the monthly geometric mean density for E. coli was 886 organisms/100 mL, which exceeded the limit of 200 organisms/100 mL. The discharge was stopped due to the low level of pond 2. This low level contributed to the higher E. coli results. The level within pond 2 was increased and the discharge was resumed.

In November the monthly total suspended solids loading limit of 28.2 kg/d exceeded the monthly average limit of 23.7 mg/L. The cause of this was high levels of algae in the lagoon, due to higher than normal ambient temperatures. The lagoon was recirculated to bring down pond solids levels, and solids concentrations decreased as the month went on.

The December 12th daily ammonia loading limit of 19.1 kg/d exceeded the daily ammonia loading limit of 18.9 kg/d. The daily and monthly average ammonia concentrations remained below limits, and the effluent volume was decreased to lower the overall daily ammonia loading.

The December monthly geometric mean density for E. coli was 436 organisms/100 mL, which exceeded the limit of 200 organisms/100 mL. This may have been caused by equalizing both of the lagoons during the discharge. The valve between the two ponds was closed and E. coli results dropped off afterwards. Operating practice has now been changed to keep the ponds isolated during discharge periods.

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 2019.

The lab reported un-ionized ammonia results were all less than the limits listed in the ECA for 2019.

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	140	171
Total Suspended Solids	154	188
Total Phosphorus	3.4	4.1
Total Kjeldahl Nitrogen	32	39

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 – 5.3	96.2 – 98.6
Suspended Solids	monthly	10	2 – 9.8	93.6 – 98.7
Total Phosphorus (non-freezing period)*	3/week	0.5	0.11 – 0.19	94.4 – 96.8
Total Phosphorus (freezing Period)*	3/week	1	0.16 – 0.17	95.0 – 95.3
Total Ammonia Nitrogen (non-freezing period)*	3/week	3	0.1 – 0.2	--
Total Ammonia Nitrogen (freezing period)*	3/week	5	0.4 – 2.9	--
E. coli	weekly	200 organisms/100 mL (monthly Geometric Mean Density)	12 – 886 organisms/100 mL (monthly Geometric Mean Density)	--
pH any single sample	3/week	6.0 - 9.5	7.2 – 7.77	--

* 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, 2019 to April 30, 2019.

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 eight single sample objective failures related to total suspended solid concentrations, two single sample objective failures related to BOD concentration, two single sample objection failures related to ammonia concentration, three single sample objective failures related to dissolved oxygen concentration, and nine single sample objective failures related to E. coli counts. There were also two BOD loading objective failures and three TSS loading objective failures during the discharge from the lagoon in 2019. The results are below.

Varrious 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, and isolating the discharging pond 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 – 5.3
Total Suspended Solids	monthly	5	2 – 9.8
Total Phosphorus (non-freezing period) *	3/week	0.3	0.11 – 0.19
Total Phosphorus (freezing period)*	3/week	0.8	0.16 – 0.17
Total Ammonia Nitrogen (non-freezing period) *	3/week	2	0.1 – 0.2
Total Ammonia Nitrogen (freezing period)*	3/week	4	0.4 – 2.9
E. coli	weekly	150 organisms/100 mL (monthly Geometric Mean Density)	12 – 886 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, 2019 to April 30, 2019.

Norwich single sample effluent objective and monthly loading objective exceedances in 2019 included the following:

Date	Parameter	Objective mg/L	Result mg/L
July 30 2019	TSS	5	6
Nov. 7 2019	TSS	5	17
Nov. 12 2019	TSS	5	12
Nov. 20 2019	TSS	5	9
Nov. 21 2019	TSS	5	7
Nov. 26 2019	TSS	5	7
Nov. 28 2019	TSS	5	7
Dec. 3 2019	TSS	5	6
Nov. 7 2019	BOD	5	6
Nov. 12 2019	BOD	5	6
Dec. 12 2019	NH ₃ -N	4	6.2
Dec. 18 2019	NH ₃ -N	4	4.9
June 25 2019	E. coli	150 #/100 mL	481 #/100 mL
July 2 2019	E. coli	150 #/100 mL	1800 #/100 mL
July 29 2019	E. coli	150 #/100 mL	1700 #/100 mL
July 30 2019	E. coli	150 #/100 mL	560 #/100 mL
July 31 2019	E. coli	150 #/100 mL	360 #/100 mL
Dec. 3 2019	E. coli	150 #/100 mL	1440 #/100 mL
Dec. 10 2019	E. coli	150 #/100 mL	194 #/100 mL
Dec. 12 2019	E. coli	150 #/100 mL	1280 #/100 mL
Dec. 17 2019	E. coli	150 #/100 mL	338 #/100 mL
May 6 2019	D.O.	>5 mg/L	4.49
May 7 2019	D.O.	>5 mg/L	4.65
May 8 2019	D.O.	>5 mg/L	4.49
Nov. 2019	BOD loading	11.8 kg/d	15.3 kg/d
Dec. 2019	BOD loading	11.8 kg/d	13.9 kg/d
July 2019	TSS loading	11.8 kg/d	12.5 kg/d
Nov. 2019	TSS loading	11.8 kg/d	28.3 kg/d

Dec. 2019	TSS loading	11.8 kg/d	16.6 kg/d
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3. Overflows, Bypassing, Upsets, Spills, and Abnormal Conditions

There were no overflows, bypasses, or spills in 2019.

There were no complaints received in 2019.

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 2019

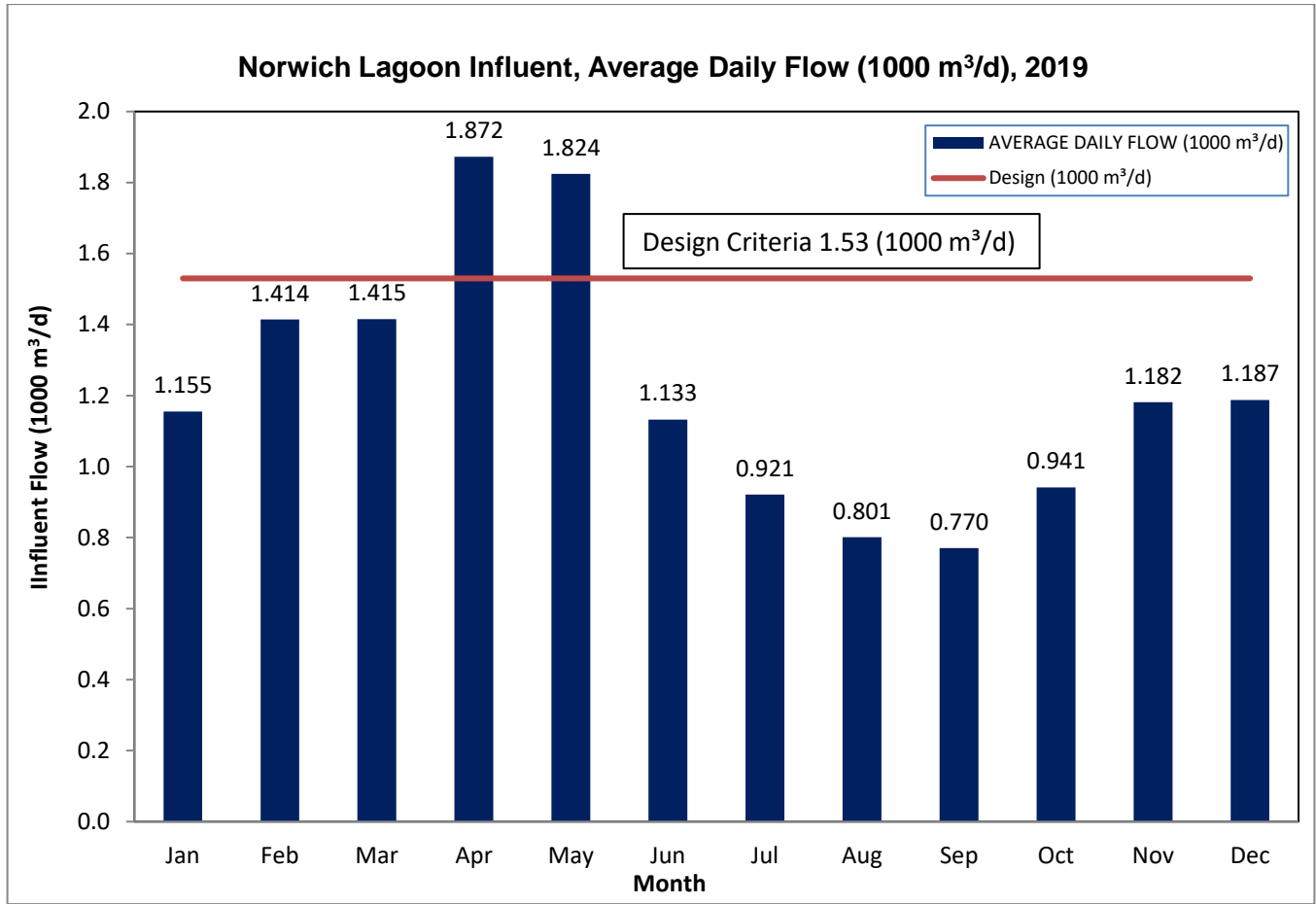
Approximately 3300 tonnes of Norwich biosolids were moved into the BCSF facility in 2019. It was mixed and land applied.

7. Audits, Pilots, and Trials

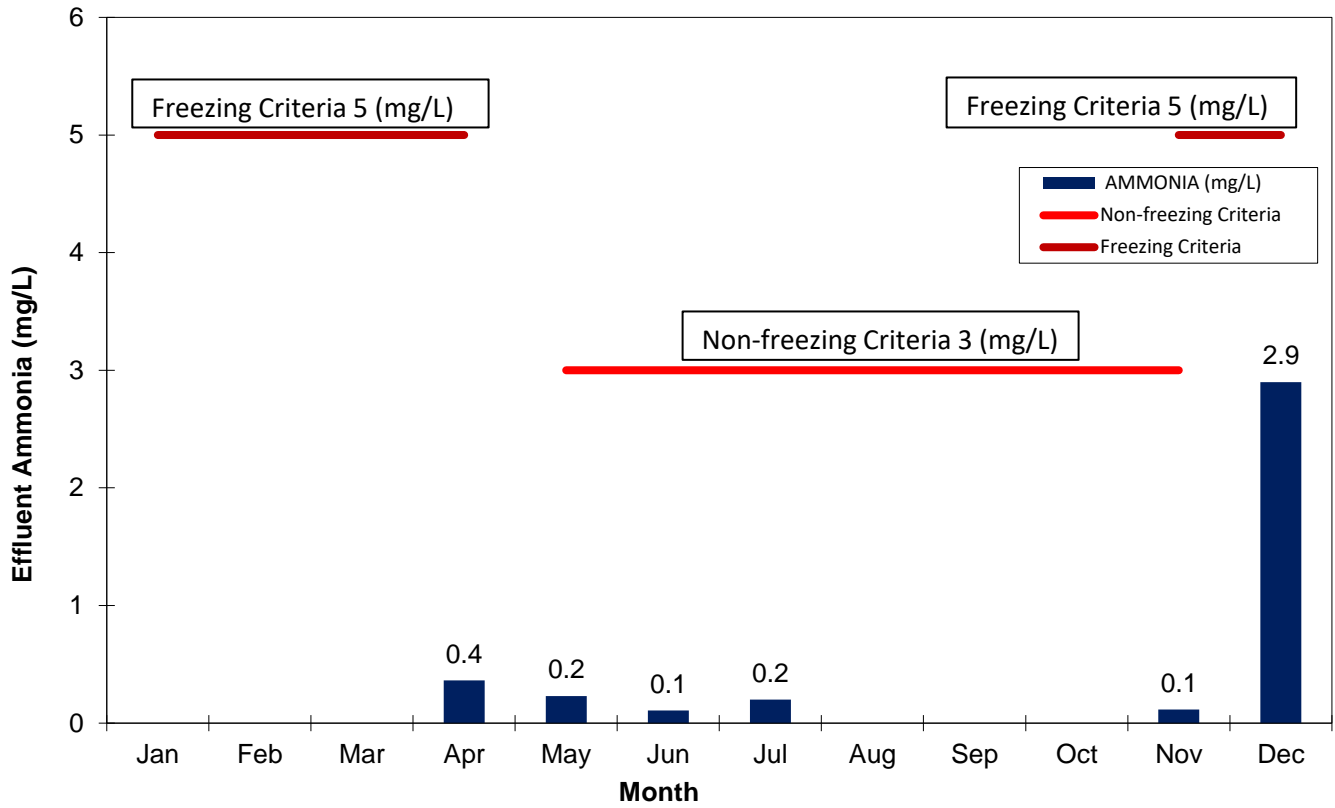
There was a MECP audit at the Norwich Lagoons in 2019.

There is a planned technical study to look 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.

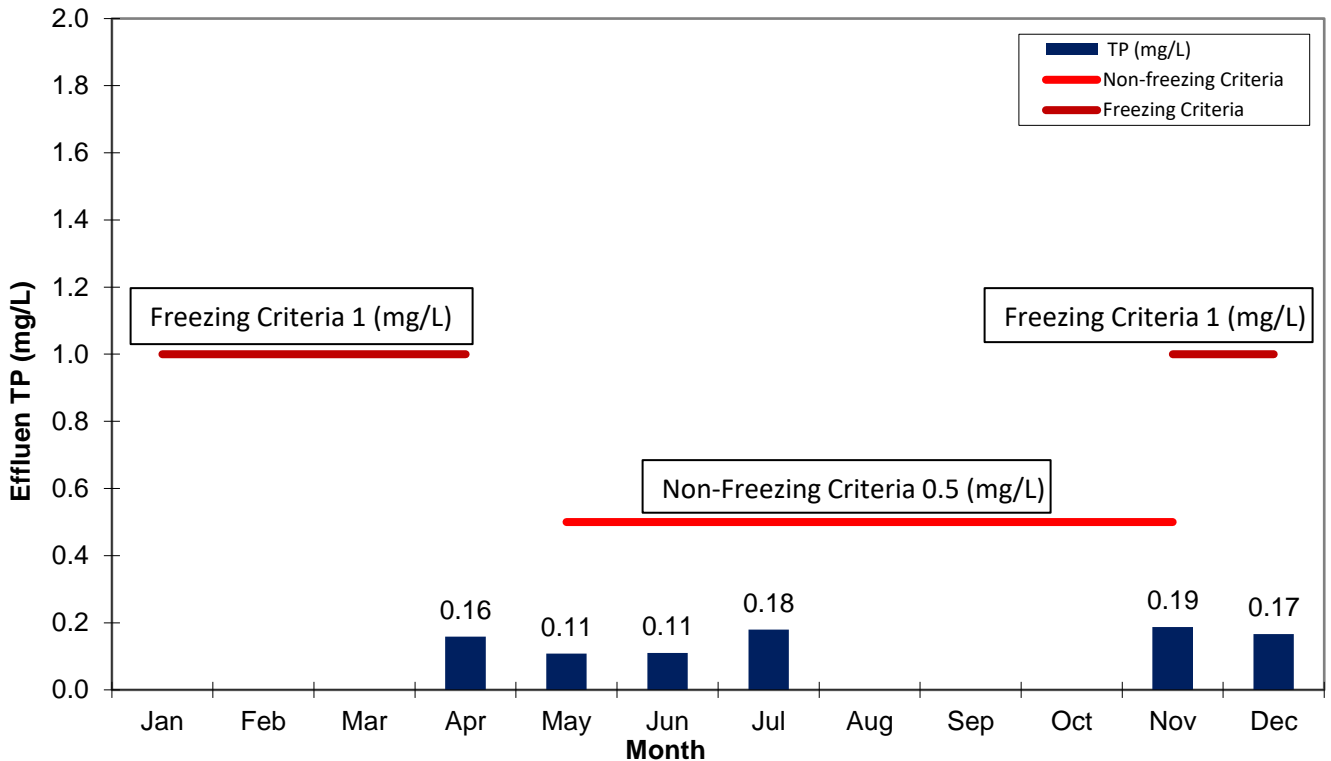
APPENDIX A: GRAPHS OF 2019 DISCHARGE PARAMETERS VS. EFFLUENT DISCHARGE LIMITS



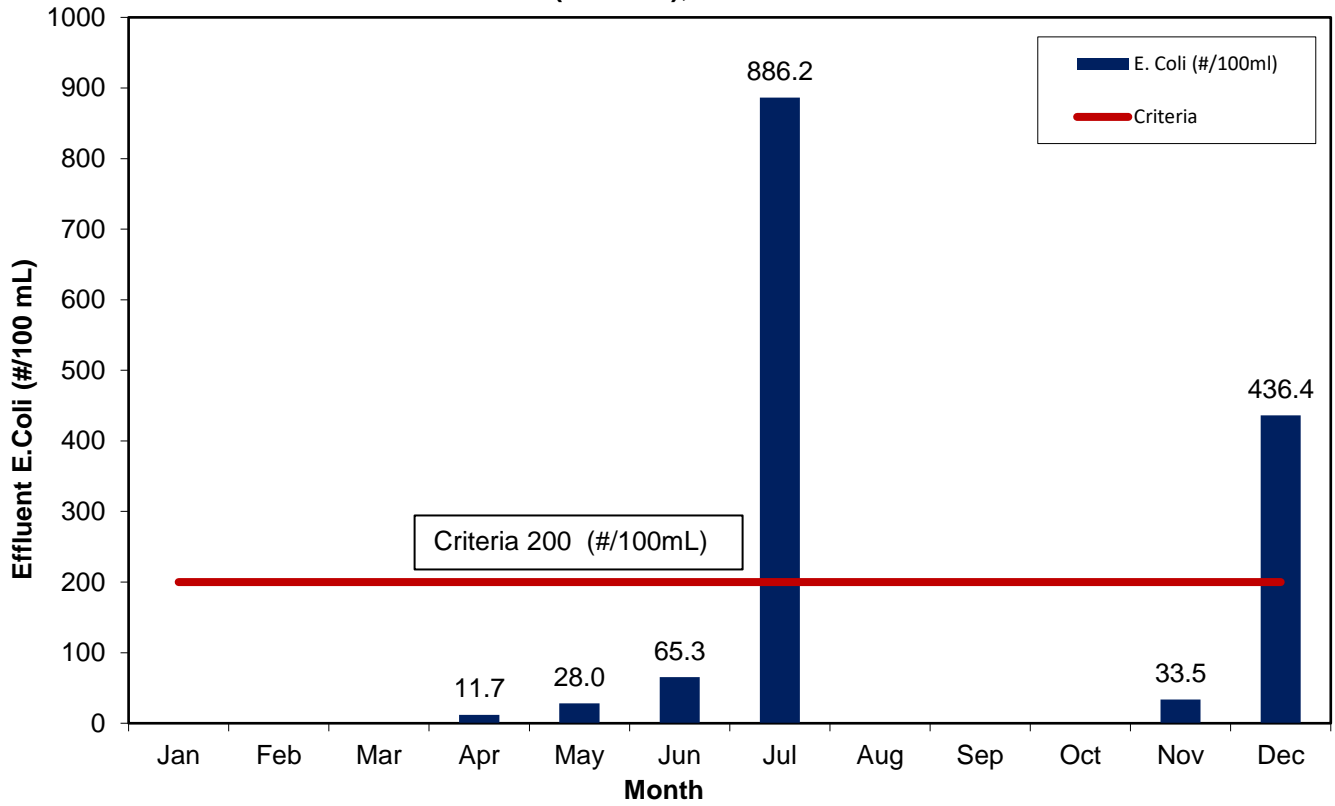
Norwich Lagoon Effluent, Monthly Average Ammonia (mg/L), 2019



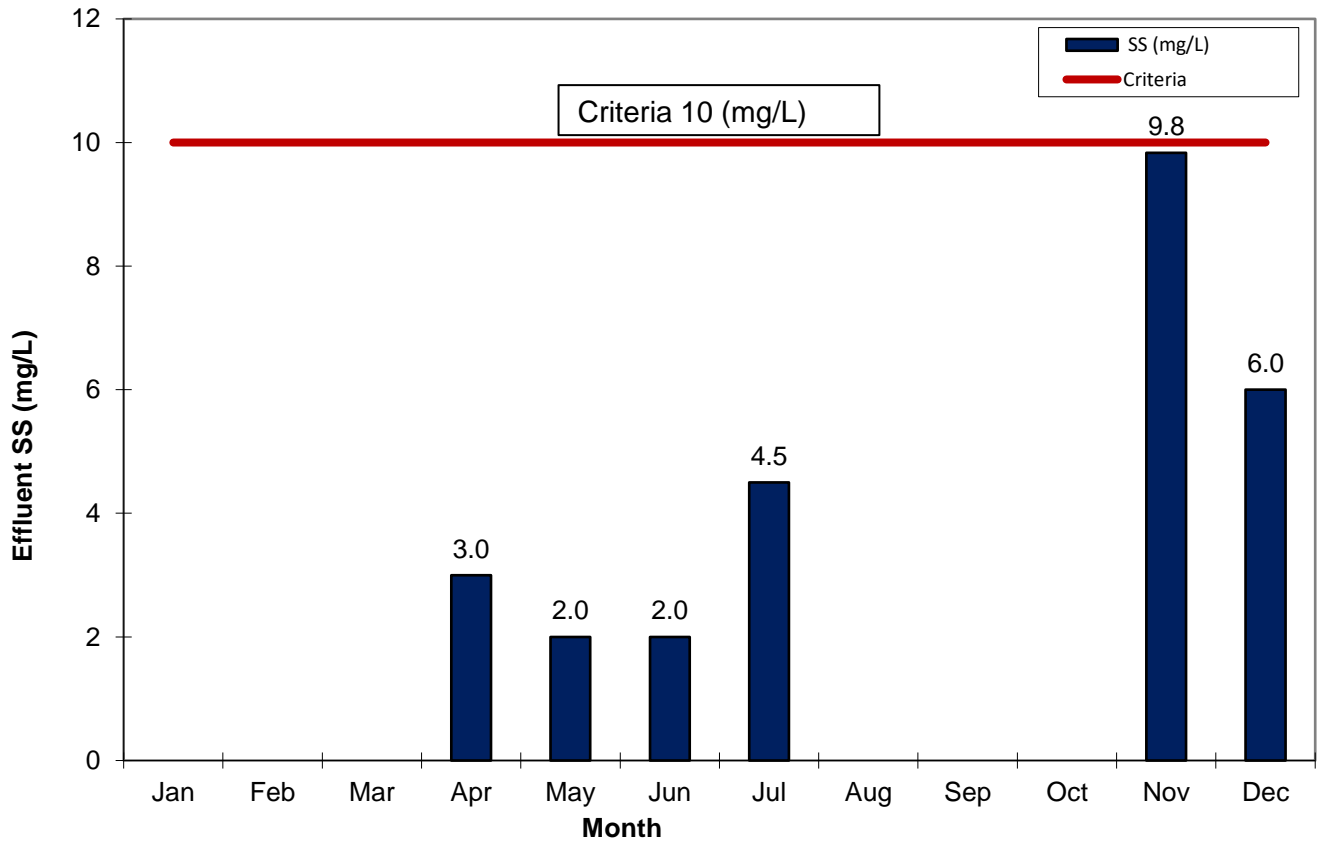
Norwich Lagoon Effluent, Monthly Average TP (mg/L), 2019



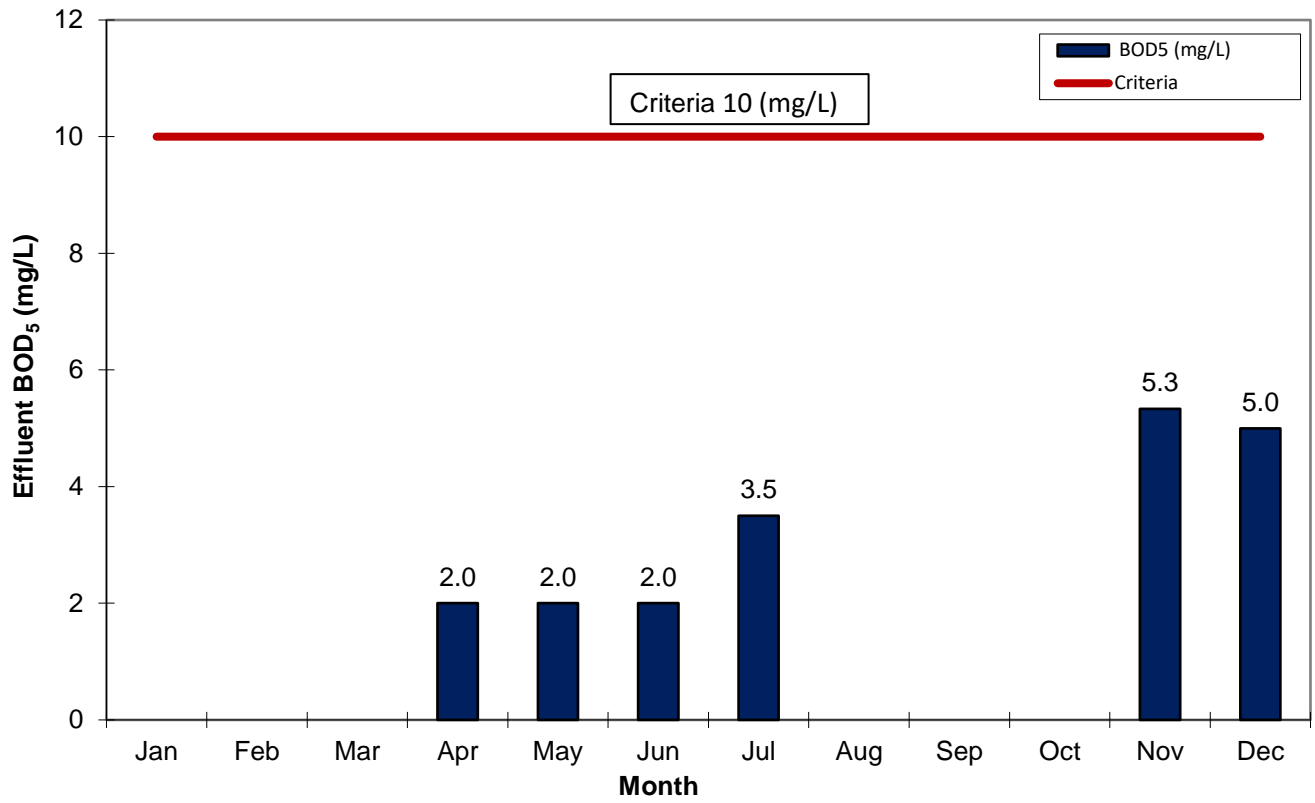
Norwich Lagoon Effluent, Monthly Geometric Mean Density E.Coli (#/100ml), 2019



Norwich Lagoons Effluent, Monthly Average SS (mg/L), 2019



Norwich Lagoons Effluent, Monthly Average BOD₅ (mg/L), 2019





2019 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, 2019 – December 31, 2019

1.1. System Description

The Plattsville WWTP is a Class I facility with a nominally separate wastewater collection system and provided effective wastewater treatment in 2019. 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
2019 Average Daily Flow	513 m ³ /d
2019 Maximum Daily Flow	952 m ³ /d
2019 Total Volume of Wastewater	187,078 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 BOD₅, 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 CBOD₅, 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 2019 and are referred to as the shallow well sample and deep well sample:

PLATTSVILLE WWTP GROUNDWATER SAMPLING								
	8-May-19	8-May-19	23-May-19	23-May-19	1-Nov-19	1-Nov-19	21-Nov-19	21-Nov-19
	Shallow	Deep	Shallow	Deep	Shallow	Deep	Shallow	Deep
Parameter								
TOC (mg/L)	1	< 1	< 1	< 1	1	< 1	1	< 1
Total P (mg/L)	< 0.03	0.12	0.03	0.44	0.03	1.20	< 0.03	0.27
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)	0.27	< 0.06	0.22	< 0.06	0.31	< 0.06	0.34	< 0.06
Nitrate + Nitrite (mg/L N)	0.27	< 0.06	0.22	< 0.06	0.31	< 0.06	0.34	< 0.06
Chloride (mg/L)	4	21	4	20	4	24	4	20

2.2. Plant Performance & Effluent Quality

The Plattsville Lagoon provided effective treatment in 2019 with 176 samples out of 191 meeting compliance or 92% compliance to its regulatory limits for all effluent. During the month of November the monthly TSS in the effluent was 17 mg/L, with a compliance limit of 10 mg/L.

The increased TSS concentrations were a result of excessively high amounts of algae in the treatment pond, caused by broken valves between Waste Stabilization Pond 1 and 2. In addition, the alum recirculation pump and electrical connections to the alum recirculation system had failed. These valves were identified as leaking in 2018, but were unable to be dug up and replaced due to the large inventory of water within the treatment ponds.

As corrective action, stop logs were fabricated/installed and attempts were made to isolate the two ponds, by placing a large sack of aggregate up against the valve intake to Waste Stabilization Pond 2. The electrical service was replaced and the recirculation pump was removed for service. While the pump was being rebuilt, alum was mixed into Waste Stabilization Pond 2 via a tote and pontoon boat. Once the pump was repaired, it was re-installed. The valve chamber was then pumped down, the sack of aggregate was removed, and the gate valve from pond 1 was pounded shut with a sledge hammer. The pond were now isolated from each other. The alum dosing pump and pond recirculation pump were then turned on, and pond 2 was recirculated.

The TSS concentration dropped off dramatically over the month, as the alum aided in coagulation and settling of the solids. The broken valves are planned to be replaced next year when the pond levels are low enough to do so. Options of adding additional valves within the recirculation pump chamber are also being explored.

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 2019.

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	173	89
Total Suspended Solids	201	103
Total Phosphorus	4.5	2.3
Total Kjeldahl Nitrogen	46.1	23.6

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 – 6.5	96.2 – 98.8
Total Suspended Solids	weekly	10	4.8 – 17.2	91.4 – 97.6
Total Phosphorus	weekly	0.5	0.01 – 0.11	97.6 - 99.8
Total Ammonia Nitrogen (when receiving stream >12 degrees Celsius)	weekly	2	0.1 – 0.16	99.6 – 99.7
Total Ammonia Nitrogen (when receiving stream < or = to 12 degrees Celsius)	weekly	5	0.22 – 0.78	98.0 – 99.4
E. coli	weekly	200 organisms/100 mL (monthly Geometric Mean Density)	4 – 140 organisms/100 mL	--
pH any single sample	weekly	6.0-9.5	6.6 – 8.1	--

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 twenty-one single sample objective failures related to TSS, four single sample objective failures related to CBOD, three single sample objective failures related to ammonia, and five single sample failures related to E. coli during the discharge from the lagoon in 2019.

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 – 6.5
Total Suspended Solids	weekly	5	4.8 – 17.2
Total Phosphorus	weekly	0.3	0.01 – 0.11
Total Ammonia Nitrogen (when receiving stream >12 degrees Celsius)	weekly	1	0.1 – 0.16
Total Ammonia Nitrogen (when receiving stream < or = to 12 degrees Celsius)	weekly	3	0.22 – 0.78
E. coli	weekly	150 organisms/100 mL (monthly Geometric Mean Density)	4 – 140 organisms/100 mL (monthly Geometric Mean Density)

Failures to meet effluent objectives are provided in the following table.

Month	Parameter	Objective mg/L	Result mg/L
Nov. 30 2019	TSS	5	20
Nov. 29 2019	TSS	5	12
Nov. 28 2019	TSS	5	13
Nov. 27 2019	TSS	5	16
Nov. 26 2019	TSS	5	15
Nov. 25 2019	TSS	5	14
Nov. 24 2019	TSS	5	14
Nov. 23 2019	TSS	5	14
Nov. 21 2019	TSS	5	18
Nov. 14 2019	TSS	5	24
Nov. 7 2019	TSS	5	30
Nov. 1 2019	TSS	5	16
Aug. 27 2019	TSS	5	8
Aug. 13 2019	TSS	5	6
July 30 2019	TSS	5	9
June 10 2019	TSS	5	18
June 3 2019	TSS	5	6
May 22 2019	TSS	5	6
May 15 2019	TSS	5	6
May 10 2019	TSS	5	6
May 6 2019	TSS	5	7
Nov. 21 2016	CBOD	5	6

Nov. 14 2019	CBOD	5	9
Nov. 7 2019	CBOD	5	7
Nov. 1 2019	CBOD	5	8
Nov. 30 2019	Ammonia	1	1.6
Nov. 28 2019	Ammonia	1	1.4
Nov. 21 2019	Ammonia	1	1.2
Nov. 7 2019	E. coli	150 #/100 mL	155 #/100 mL
July 24 2019	E. coli	150 #/100 mL	360 #/100 mL
July 17 2019	E. coli	150 #/100 mL	164 #/100 mL
July 10 2019	E. coli	150 #/100 mL	318 #/100 mL
July 4 2019	E. coli	150 #/100 mL	162 #/100 mL

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

There were no overflows, bypassing, upsets, spills, and abnormal conditions from the Plattsville WWTP in 2019.

There was no complaints in 2019.

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.

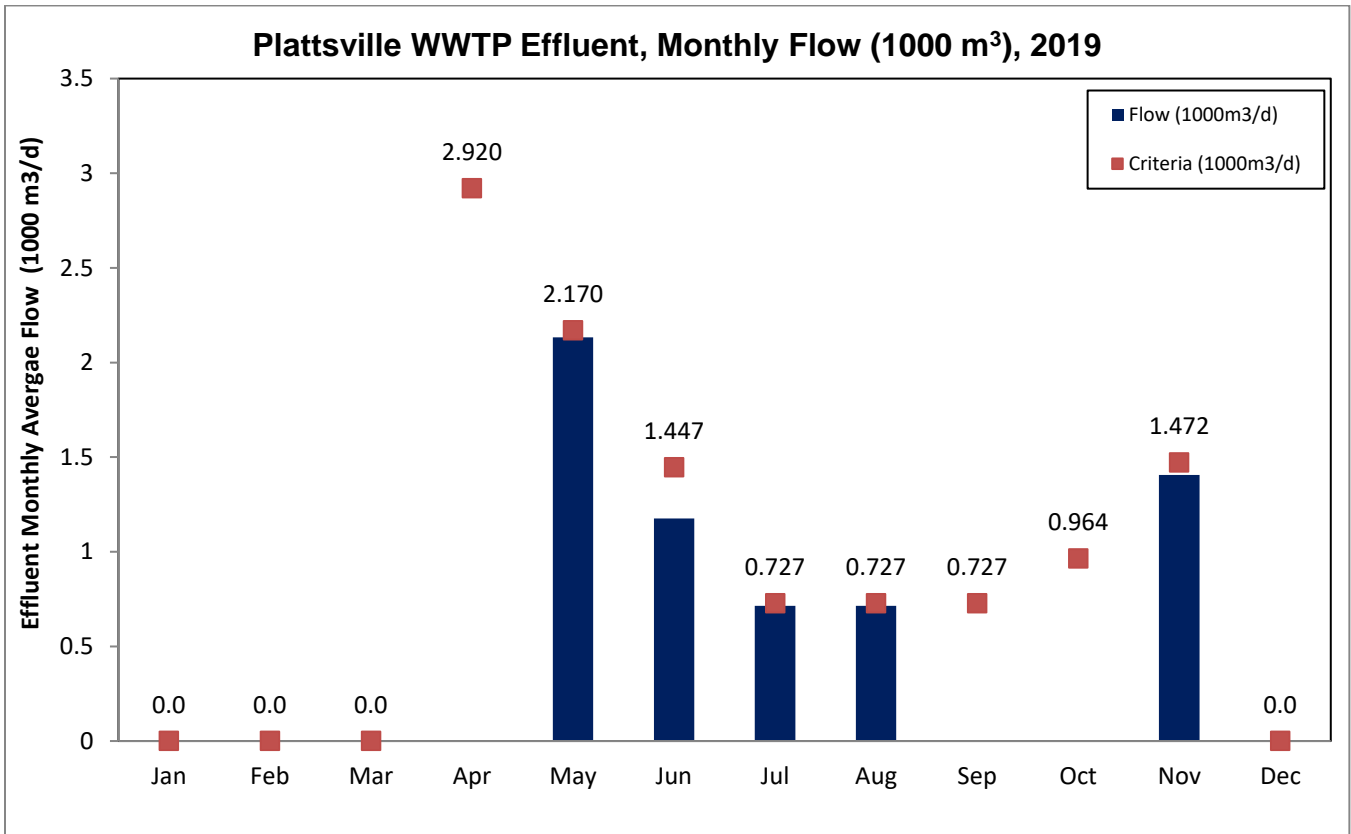
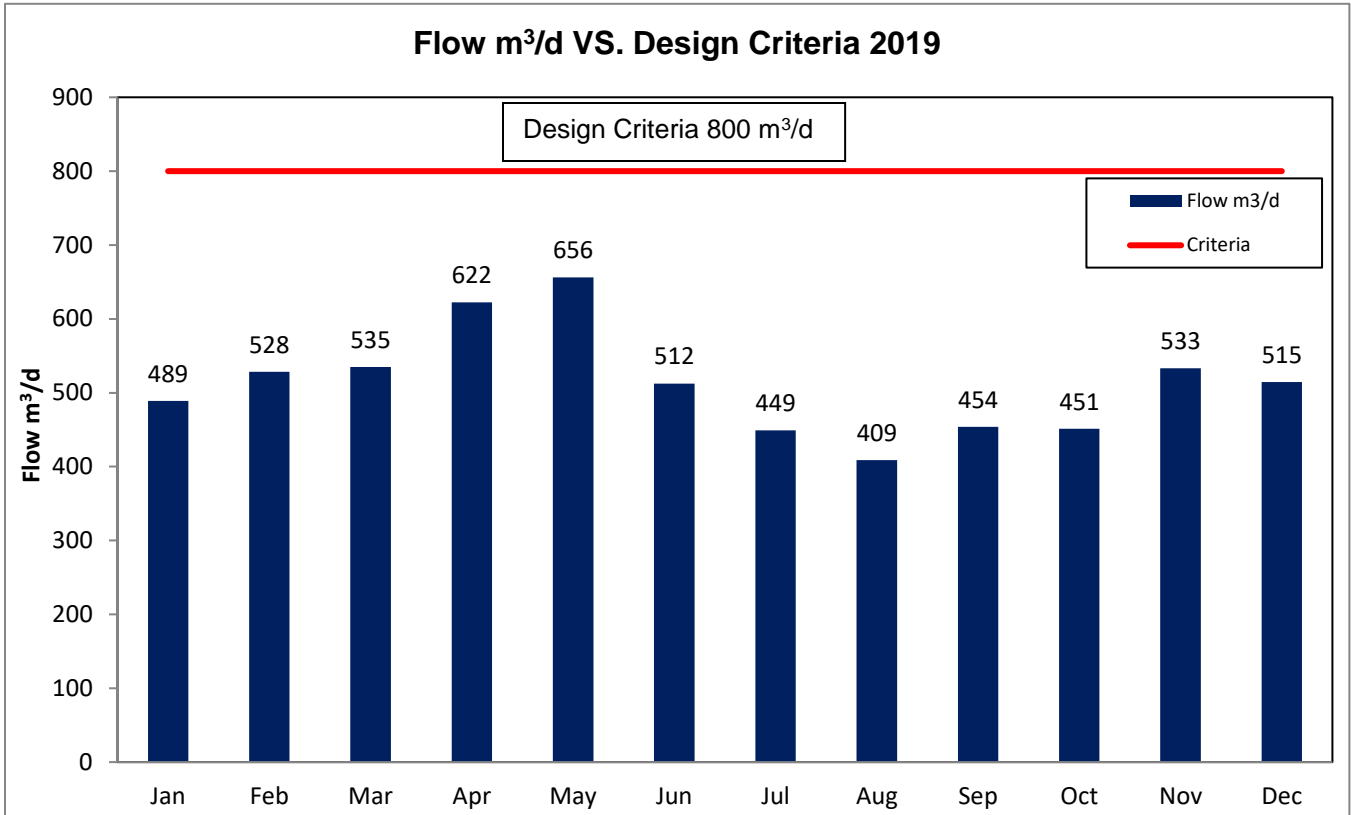
5. Monitoring Equipment Maintenance and Calibration

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

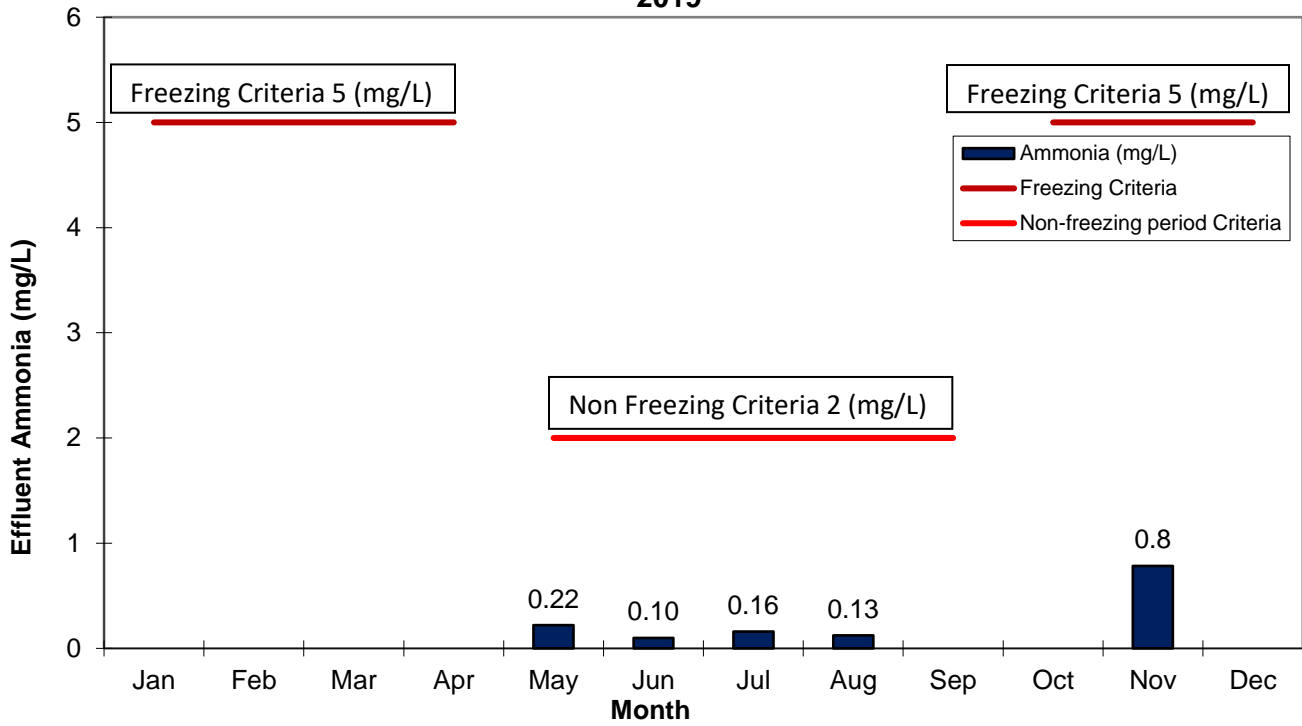
6. Audits, Pilots, and Trials

There was no MECP audit in 2019.

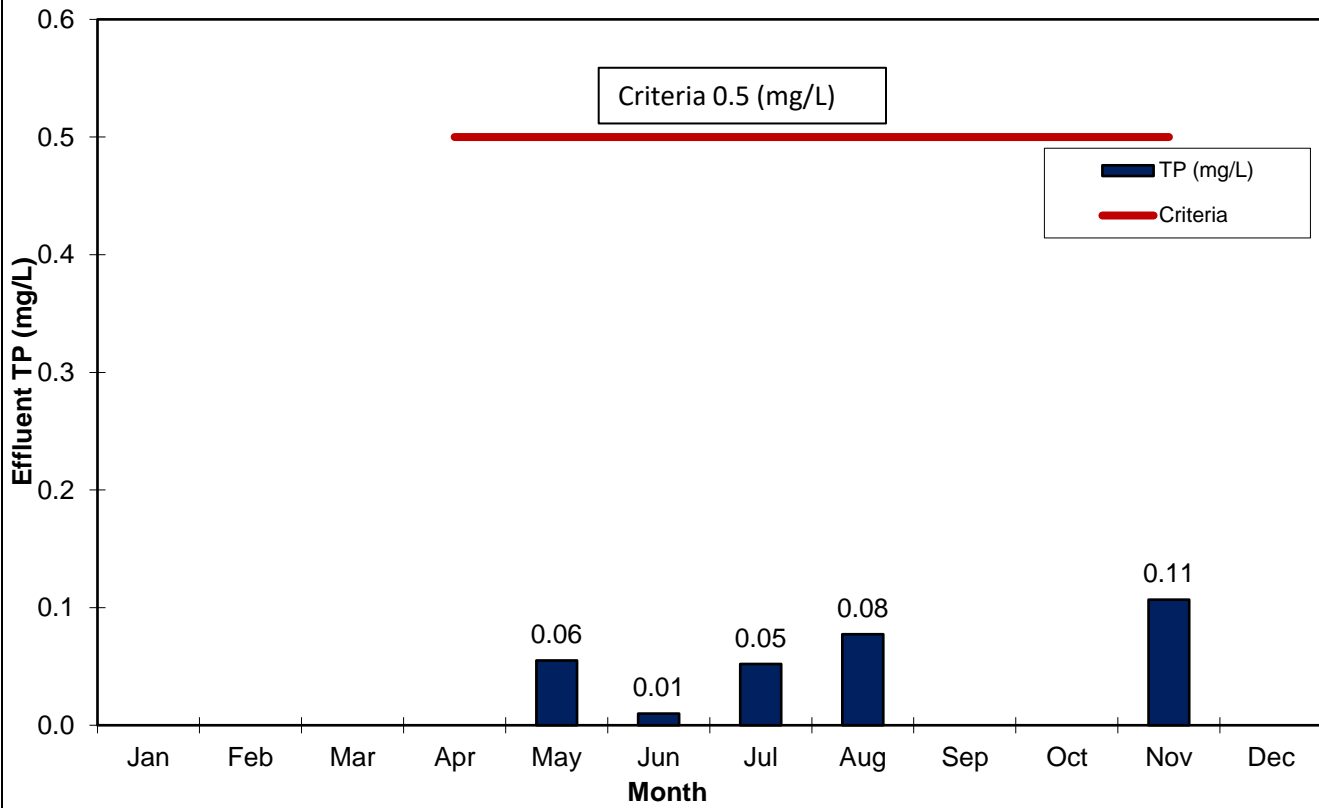
APPENDIX A: GRAPHS OF 2019 DISCHARGE PARAMETERS VS. EFFLUENT DISCHARGE LIMITS



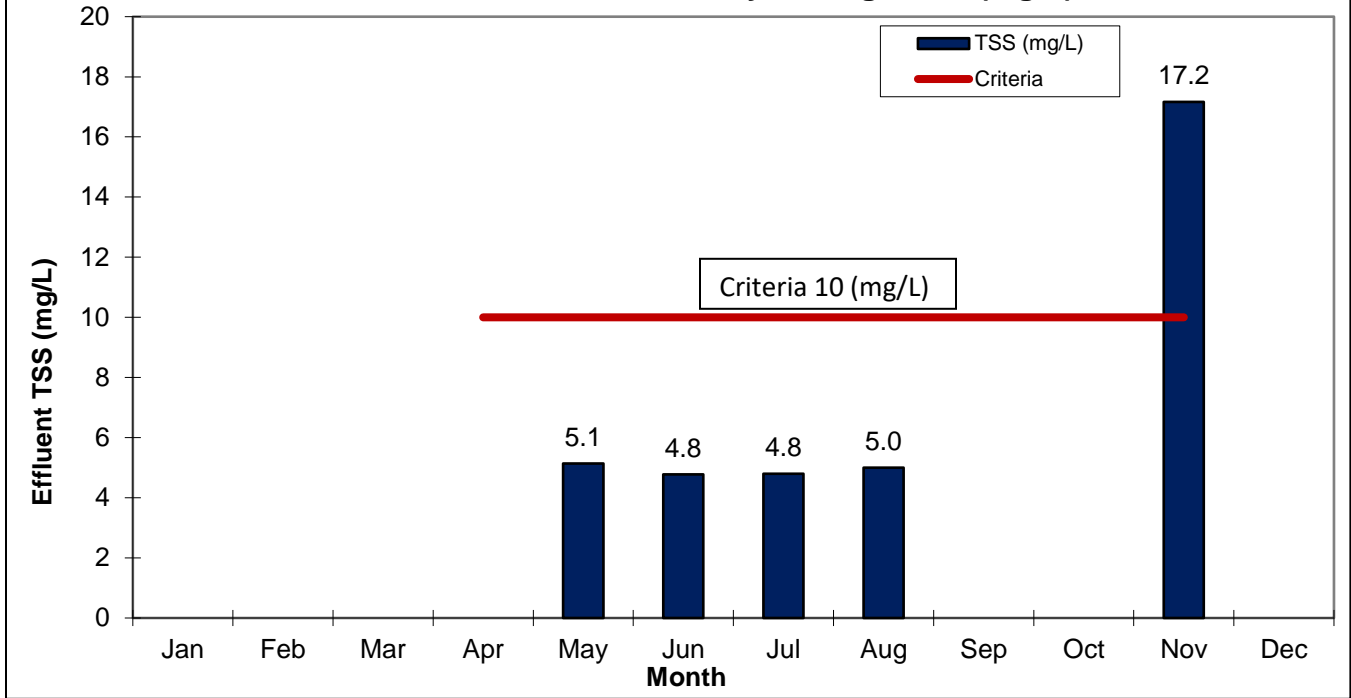
Plattsville WWTP Effluent, Monthly Average Ammonia Discharge (mg/L), 2019



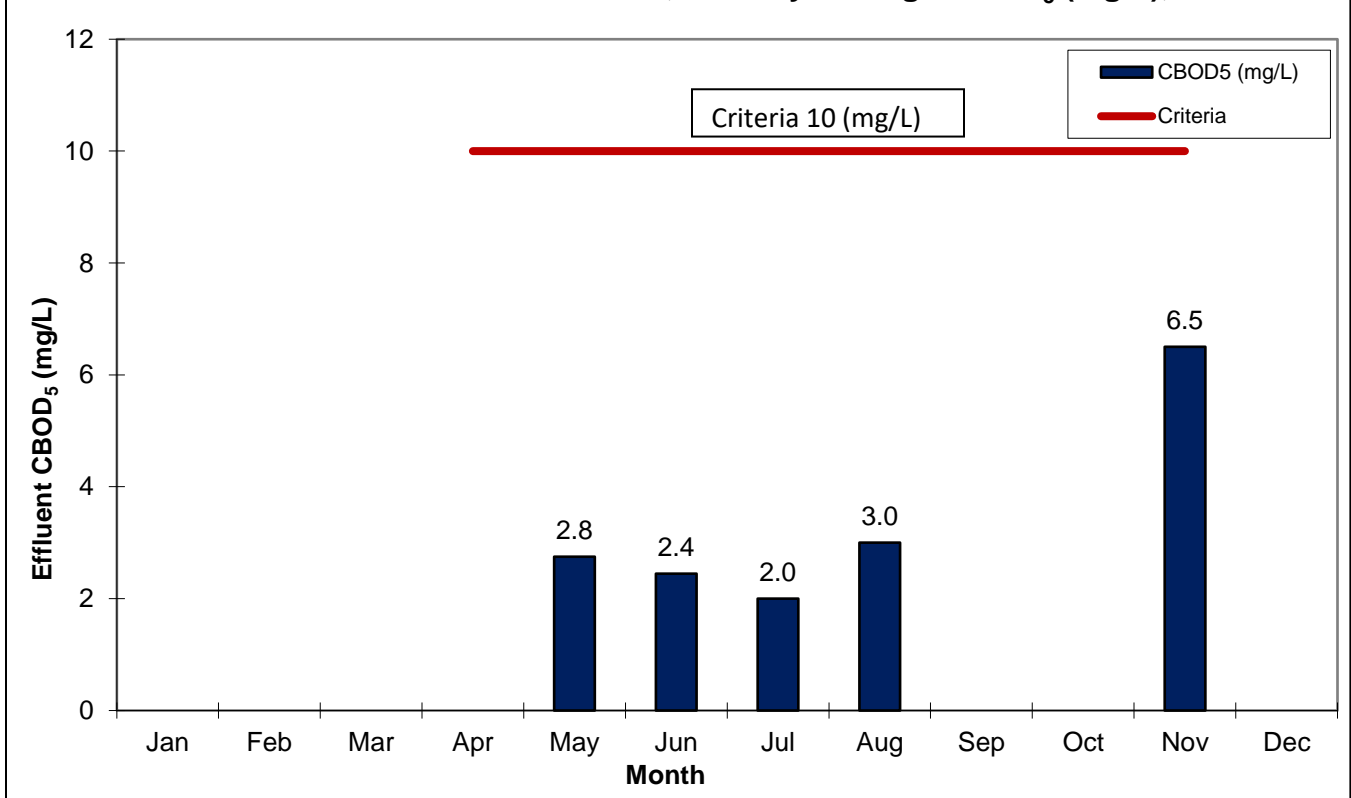
Plattsville WWTP Effluent, Monthly Average TP (mg/L), 2019



Plattsville WWTP Effluent, Monthly Average TSS (mg/L), 2019



Plattsville WWTP Effluent, Monthly Average CBOD₅ (mg/L), 2019





2019 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)	#7789-8AKJL5
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, 2019 – December 31, 2019

1.1. System Description

The Tavistock WWTP is a Class I facility with a nominally separate wastewater collection system, and provided effective wastewater treatment in 2019. The Tavistock WWTP consists of 3 aerated lagoon cells, one polishing pond and an Intermittent Sand Filter (ISF). The first three cells 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
2019 Average Daily Flow	1,985 m ³ /d

2019 Maximum Daily Flow	4,651 m ³ /d
2019 Total Volume of Wastewater	724,208 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 CBOD₅, 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 CBOD₅, suspended solids, total phosphorous, pH, temperature, dissolved oxygen, nitrate nitrogen, nitrite nitrogen and ammonia nitrogen.

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 2019, 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 2019.

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	538	1068
Total Suspended Solids	429	851
Total Phosphorus	15	29
Total Kjeldahl Nitrogen	39	77

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 – 3.6	99.3 - 99.6
Suspended Solids	weekly	15	2.0 – 6.0	98.6 - 99.5
Total Phosphorus (May-Nov.)	weekly	0.5	0.17 – 0.27	98.2 – 98.9
Total Phosphorus (Dec.-Apr.)	weekly	0.8	0.19 – 0.27	98.2 – 98.7
Total Ammonia Nitrogen (April)	weekly	8.0	0.1	–
Total Ammonia Nitrogen (May-Nov.)	weekly	1.0	0.1 – 0.28	–
Total Ammonia Nitrogen (December)	weekly	3.0	0.48	–
pH any single sample	weekly	6.0 - 9.5	6.7 – 8.5	–

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 2019.

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 – 3.6
Suspended Solids	weekly	10	2.0 – 6.0
Total Phosphorus (May-Nov.)	weekly	0.3	0.17 – 0.27
Total Phosphorus (Dec.-Apr.)	weekly	0.5	0.19 – 0.27
Total Ammonia Nitrogen (April)	weekly	7.0	0.1
Total Ammonia Nitrogen (May-Nov.)	weekly	0.8	0.1 – 0.28
Total Ammonia Nitrogen (December)	weekly	1.5	0.48
pH any single sample	weekly	6.5 - 9.0	6.7 – 8.5

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

There were no overflows, bypasses, upsets, or spills from the Tavistock WWTP in 2019.

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) conducted an inspection of the Tavistock Wastewater Treatment Plant on September 23, 2019. The inspection covered the period of January 1, 2016 to August 31, 2019.

The results of the inspection concluded that there were no non-compliance issues and no regulatory requirements or actions required.

Two recommendations for best practices were reported.

1. The owner of the facility did not have written contingency plans or other management methods in place to be used in the event that the facility's sludge storage capacity was not sufficient.

No formal plan was available in the Operations Manual. Sludge management is based on sampling results.

Recommendation:

It is recommended that a formal plan for sludge management be developed and placed in the Operations Manual.

2. The following issues were also noted during the inspection:

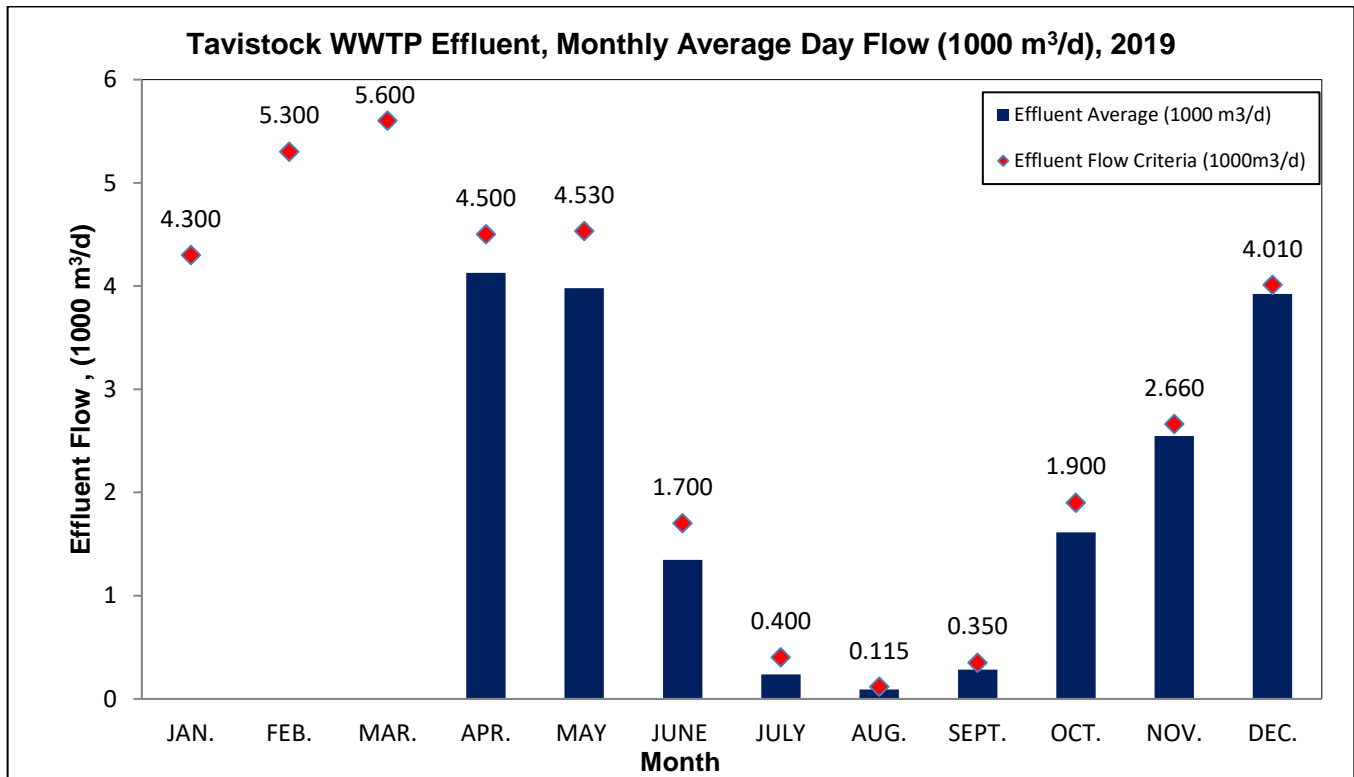
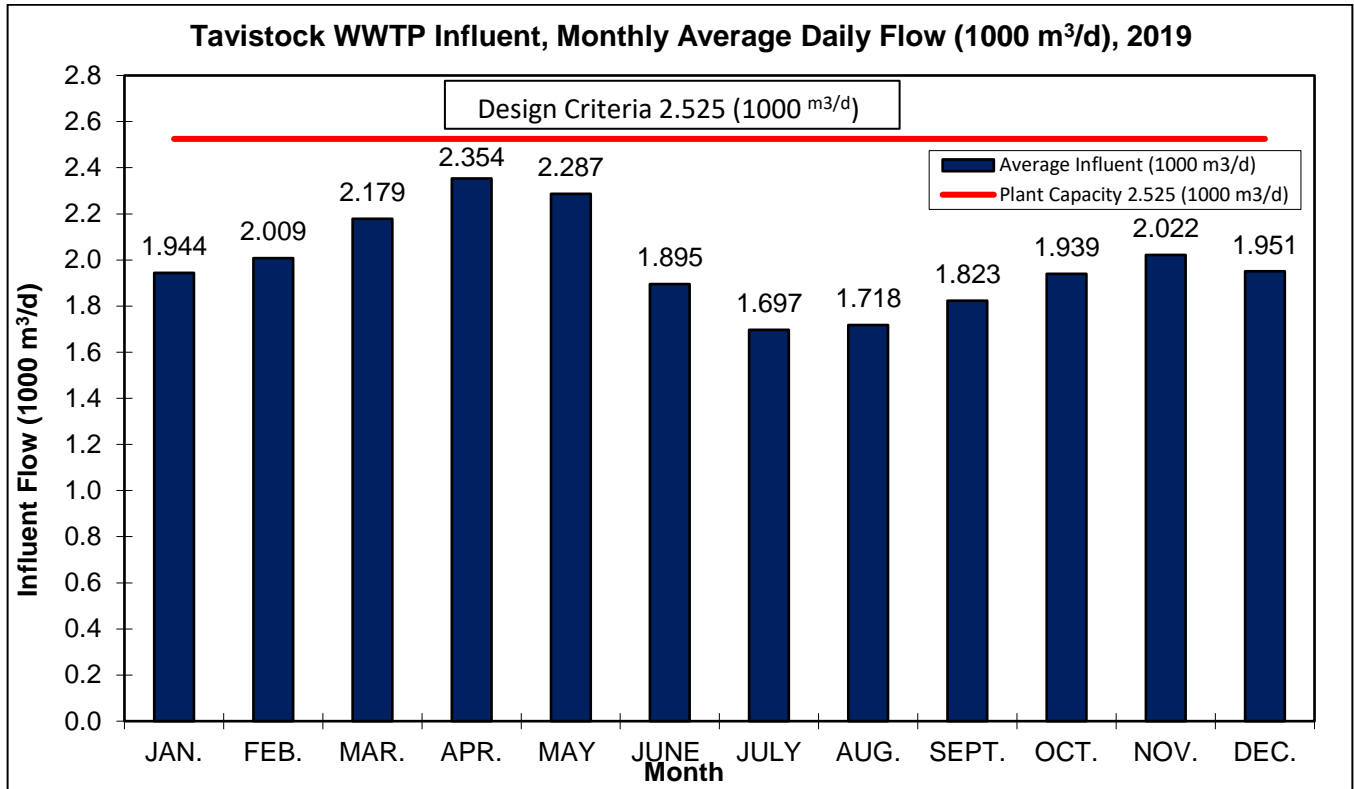
The William St. pump house log book contains entries for both the Tavistock sewage collection system and the Tavistock drinking water system.

Recommendation:

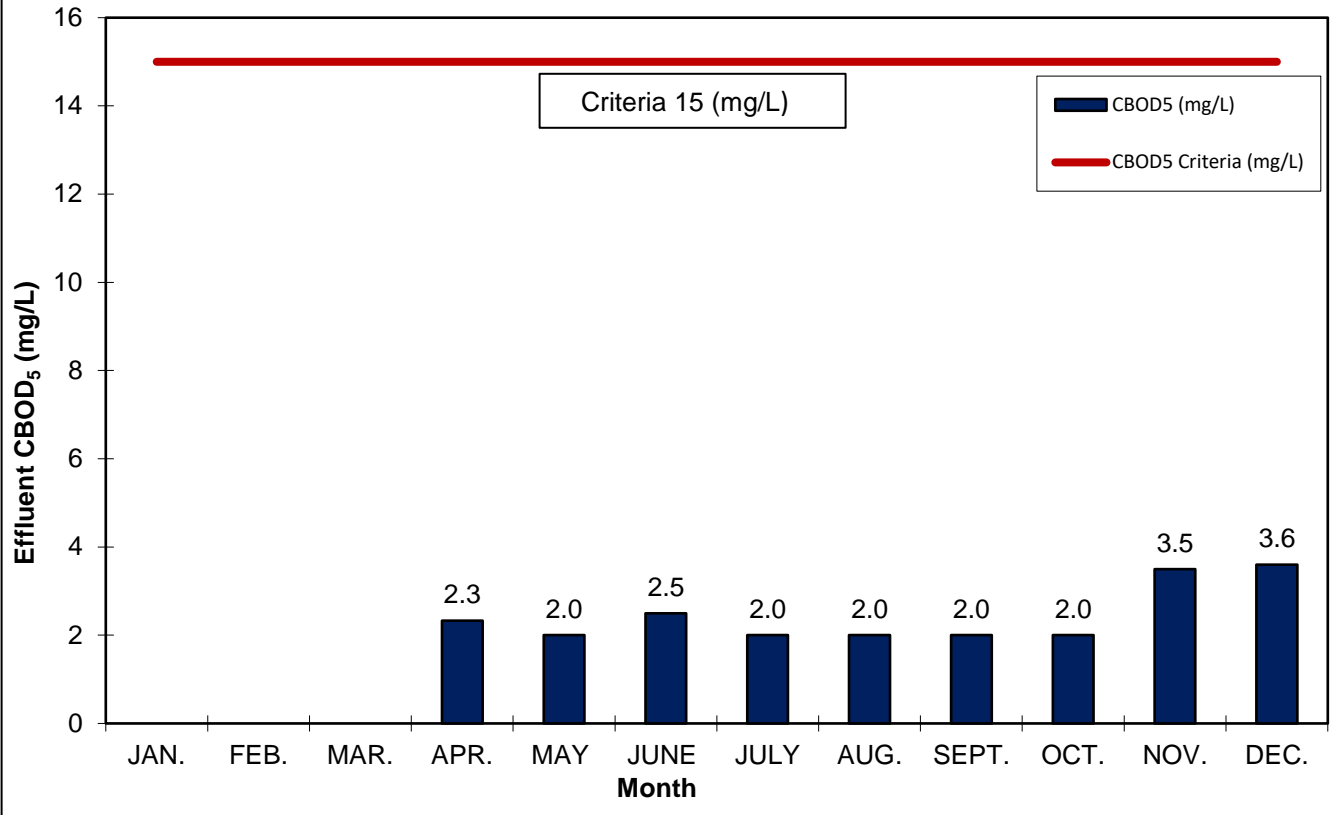
It is strongly recommended that the Owner/Operating Authority utilize separate logbooks for each individual system with the associated waterworks number.

A company was hired to complete a biosolids profiling of cell 1 in early 2019. The results of the study indicated that cell 1 required biosolids removal. An upgrade to the aeration equipment in cell 1 was also planned with a new Environmental Compliance Approval (ECA) from the MECP. The work is to commence in the late spring of 2020.

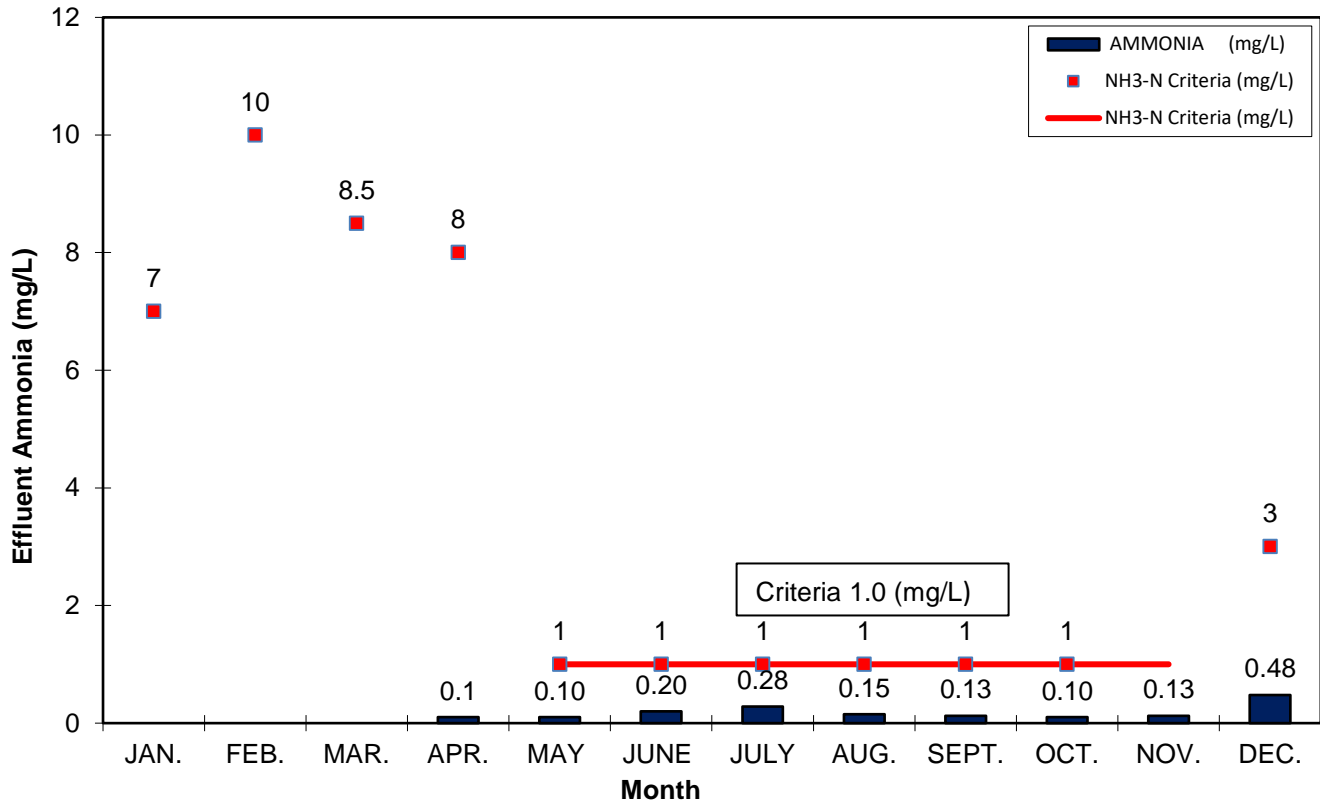
APPENDIX A: GRAPHS OF 2019 DISCHARGE PARAMETERS VS. EFFLUENT DISCHARGE LIMITS



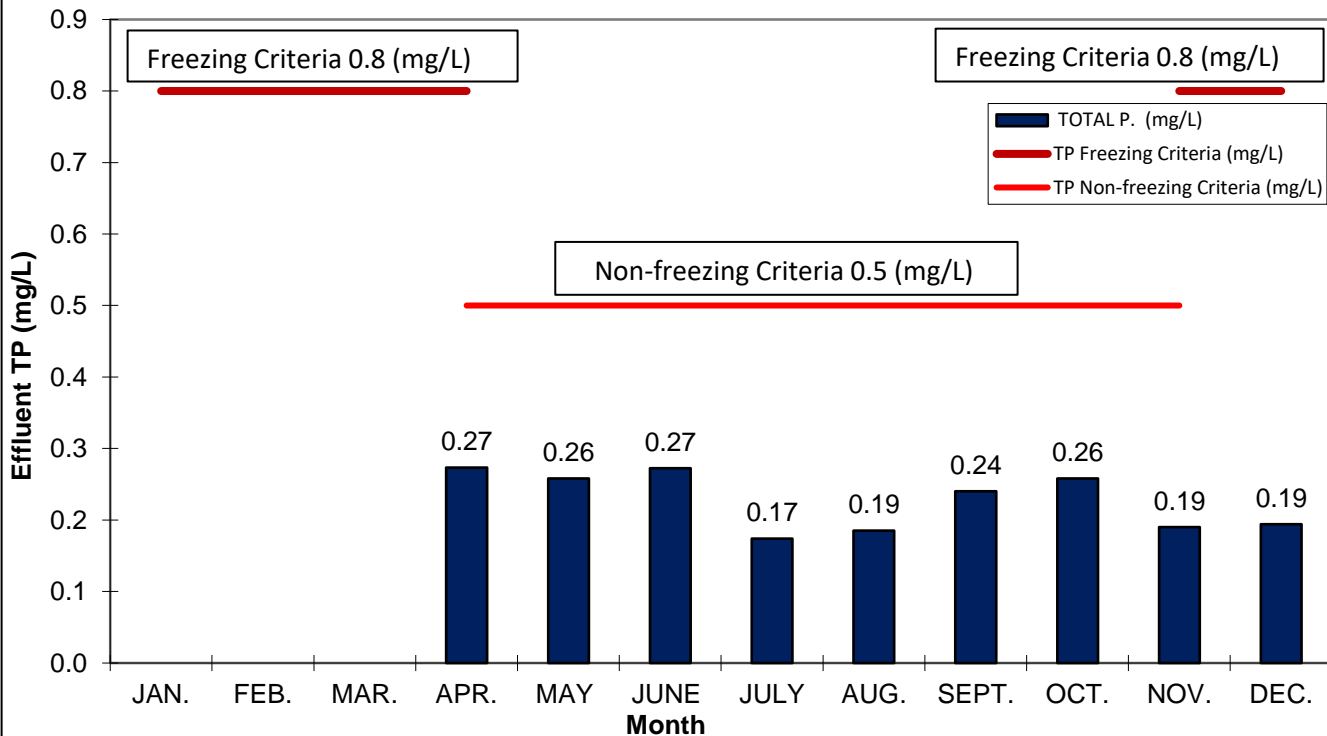
Tavistock Wastewater Effluent, Monthly Average CBOD₅ (mg/L), 2019



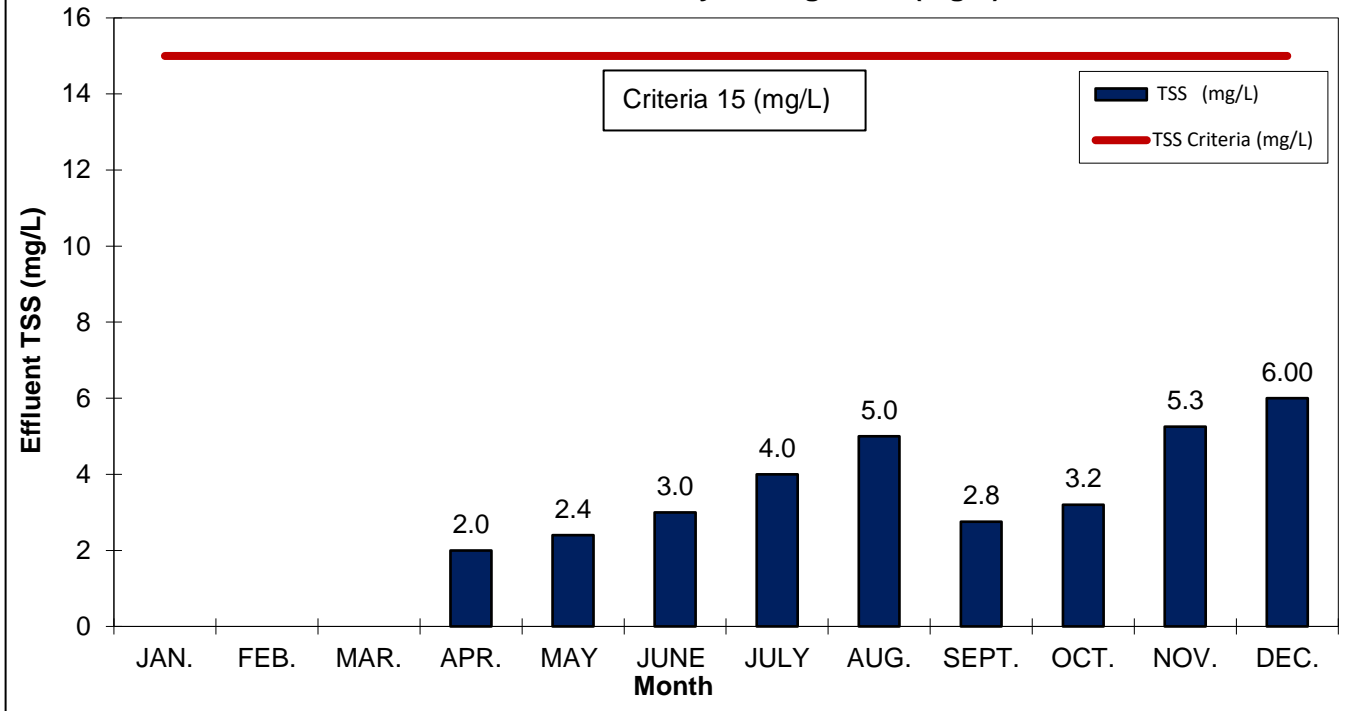
Tavistock WWTP Effluent, Monthly Average Ammonia (mg/L), 2019



Tavistock WWTP Effluent, Monthly Average TP (mg/L), 2019



Tavistock WWTP Effluent, Monthly Average TSS (mg/L), 2019





2019 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, 2019 – December 31, 2019

1.1. System Description

Thamesford is an extended air activated sludge plant equipped with tertiary sand filters.

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 held on-site in a storage tank for eventual removal. Biosolids are 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
2019 Average Daily Flow	547 m ³ /d
2019 Maximum Daily Flow	1,029 m ³ /d
2019 Total Volume of Wastewater	199,502 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 2019, 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 daily 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, 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 2019 meeting all its regulatory limits for all parameters in the effluent, achieving 100% compliance.

There was no single laboratory pH result for the effluent outside the discharge limit of 6 - 9.5 in 2019.

Staff tests Total Residual Chlorine (TRC) in the treated effluent on a daily basis; well in excess of the required weekly testing frequency. In 2019, 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	202	111
Total Suspended Solids	234	128
Total Phosphorus	4.4	2.4
Total Kjeldahl Nitrogen	42.6	23
Oil and Grease	33	18

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	98.7 – 98.9
CBOD ₅ (December 01 to April 30)	weekly	15	2.0 – 4.5	98.7 – 98.9
Total Suspended Solids (May 01 to November 30)	weekly	10	2.8 – 6.2	98.5 – 99.1
Total Suspended Solids (December 01 to April 30)	weekly	15	3.8 – 8.8	98.8 – 99.1
Total Phosphorus (May 01 to November 30)	weekly	0.20	0.03 – 0.09	98.8 – 99.3
Total Phosphorus (December 01 to April 30)	weekly	0.50	0.05 – 0.09	98.3 – 98.8
Total Ammonia Nitrogen (May 1 to November 30)	weekly	2.0	0.1 - 0.2	--
Total Ammonia Nitrogen (Dec. 1 to April 30)	weekly	5.0	0.1 – 2.1	--
Total Chlorine Residual	weekly	0.02	0.00	--
E. coli	weekly	200 organisms/100 mL (monthly Geometric Mean Density)	3 – 180 organisms/100 mL (monthly Geometric Mean Density)	--
pH any single sample	weekly	6.0 - 9.5	6.69 – 7.49	--
Dissolved Oxygen	weekly	5 and above	6.4 – 8	--

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 twelve single sample results for Total Suspended Solids, three single sample results for CBOD, five single sample results for Total Phosphorus and one single sample result for Ammonia.

In mid-March it was discovered that the mixing pump in the aeration tank was plugged, and there was incomplete mixing. The solids concentration jumped dramatically after the pump was cleaned out and reinstalled, as all the settled out solids were put back into suspension. It took several weeks to decrease the solids concentration, which had an impact on meeting effluent objectives for total suspended solids, CBOD and phosphorous. 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 – 4.5
Total Suspended Solids	weekly	5	2. – 8.8
Total Phosphorus	weekly	0.10	0.03 – 0.09
Total Ammonia Nitrogen (May 1 to November 30)	weekly	1.2	0.1 - 0.2
Total Ammonia Nitrogen (Dec. 1 to April 30)	weekly	4.0	0.1 – 2.1
Total Chlorine Residual	weekly	non-detect	0.00

E. coli (May 1 – October 31)	weekly	200 organisms/100 mL (monthly Geometric Mean Density)	3 – 180 organisms/100 mL (monthly Geometric Mean Density)
pH any single sample	weekly	6.5 – 8.5	6.69 – 7.49

Thamesford single sample effluent objective exceedance in 2019 included the following:

Month	Parameter	Objective mg/L	Result mg/L
Jan. 2 2019	TSS	5	6
Apr. 3 2019	TSS	5	8
Apr. 10 2019	TSS	5	9
Apr. 17 2019	TSS	5	11
Apr. 24 2019	TSS	5	7
May 1 2019	TSS	5	9
May 8 2019	TSS	5	6
May 29 2019	TSS	5	8
June 5 2019	TSS	5	7
June 12 2019	TSS	5	7
Nov. 13 2019	TSS	5	8
Dec. 18 2019	TSS	5	13
Apr. 10 2019	CBOD	5	8
May 1 2019	CBOD	5	6
Nov. 20 2019	CBOD	5	6
Apr. 10 2019	TP	0.1	0.11
Apr. 17 2019	TP	0.1	0.16
May 29 2019	TP	0.1	0.12
June 5 2019	TP	0.1	0.11
Sept. 11 2019	TP	0.1	0.16
Apr. 3 2019	Ammonia	4	5.6

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

There were no overflows, bypassing, upsets, spills, or abnormal conditions at the Thamesford WWTP in 2019.

The Limited Operational Flexibility for modifications to the wastewater plant was not used in 2019.

There were no complaints received in 2019.

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.

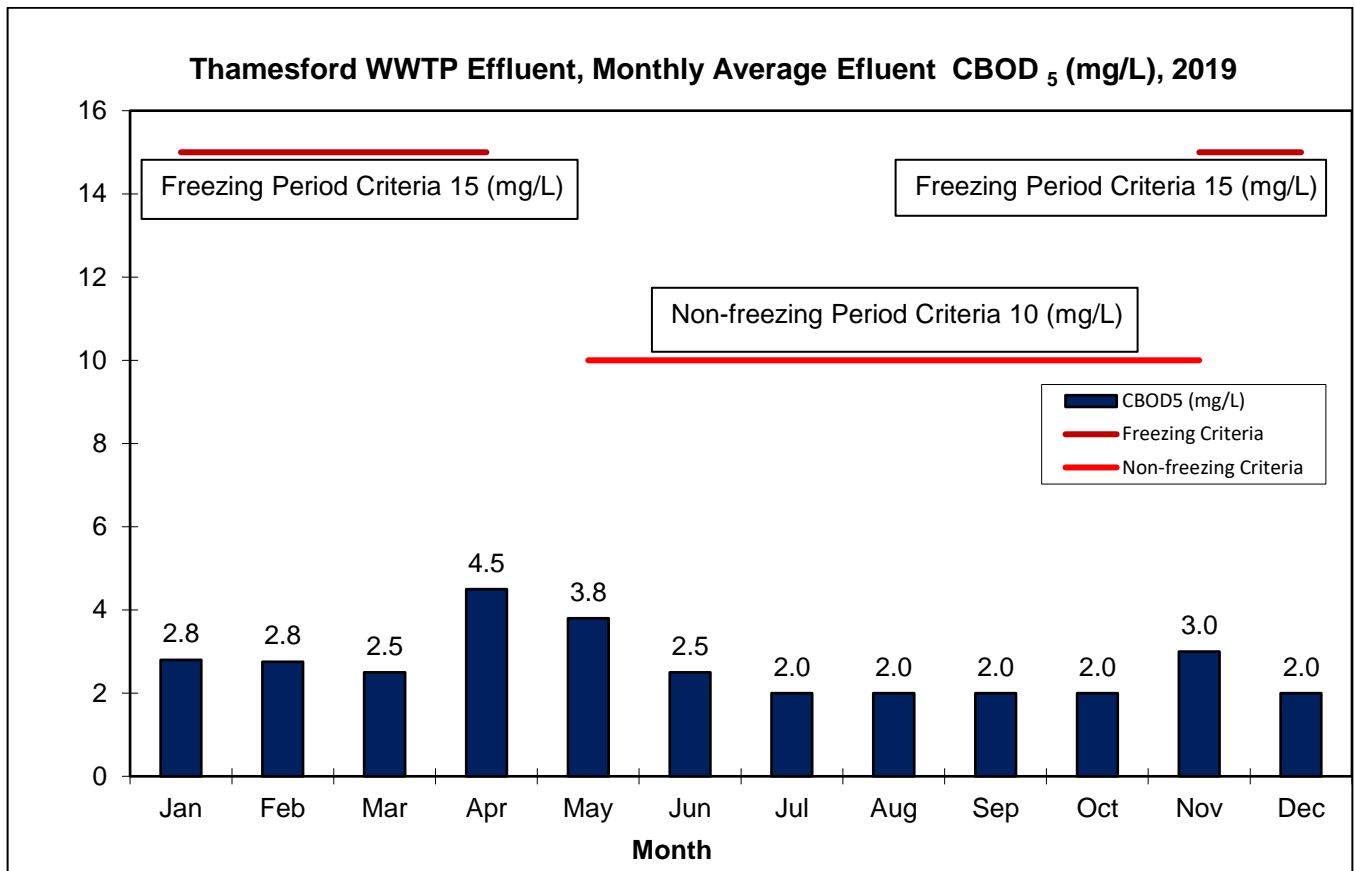
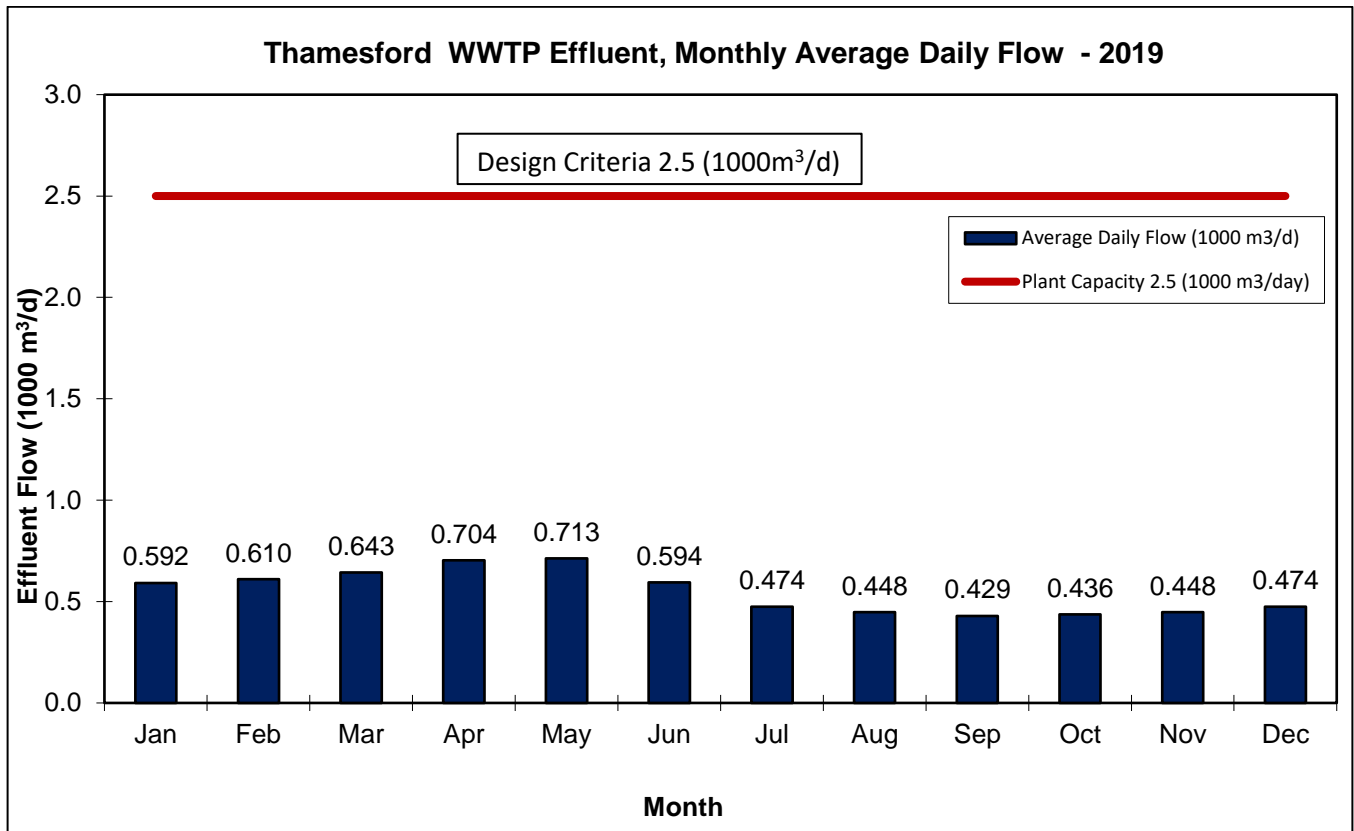
6. 2019 Biosolids Program

Biosolids are aerobically digested and stored as liquid at the Thamesford WWTP. 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.

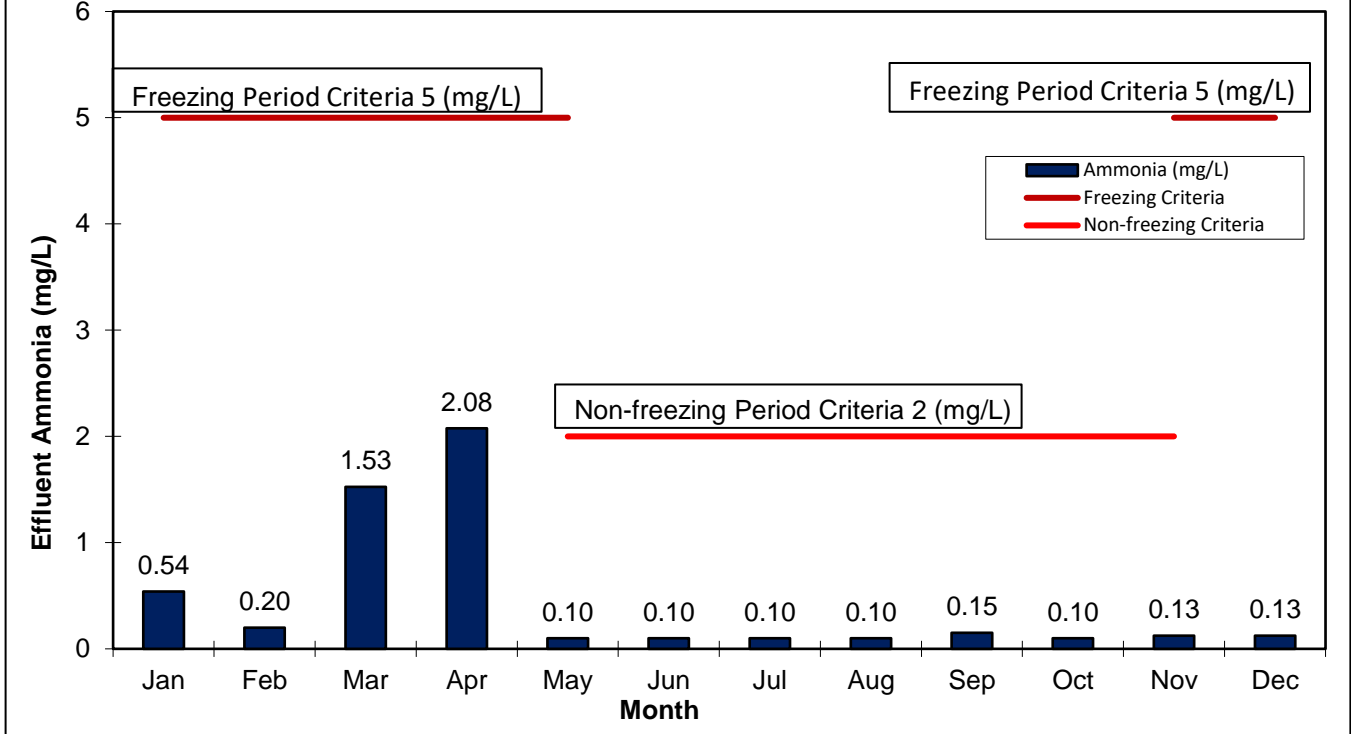
7. Audits, Pilots, and Trials

There was no MECP audit in 2019.

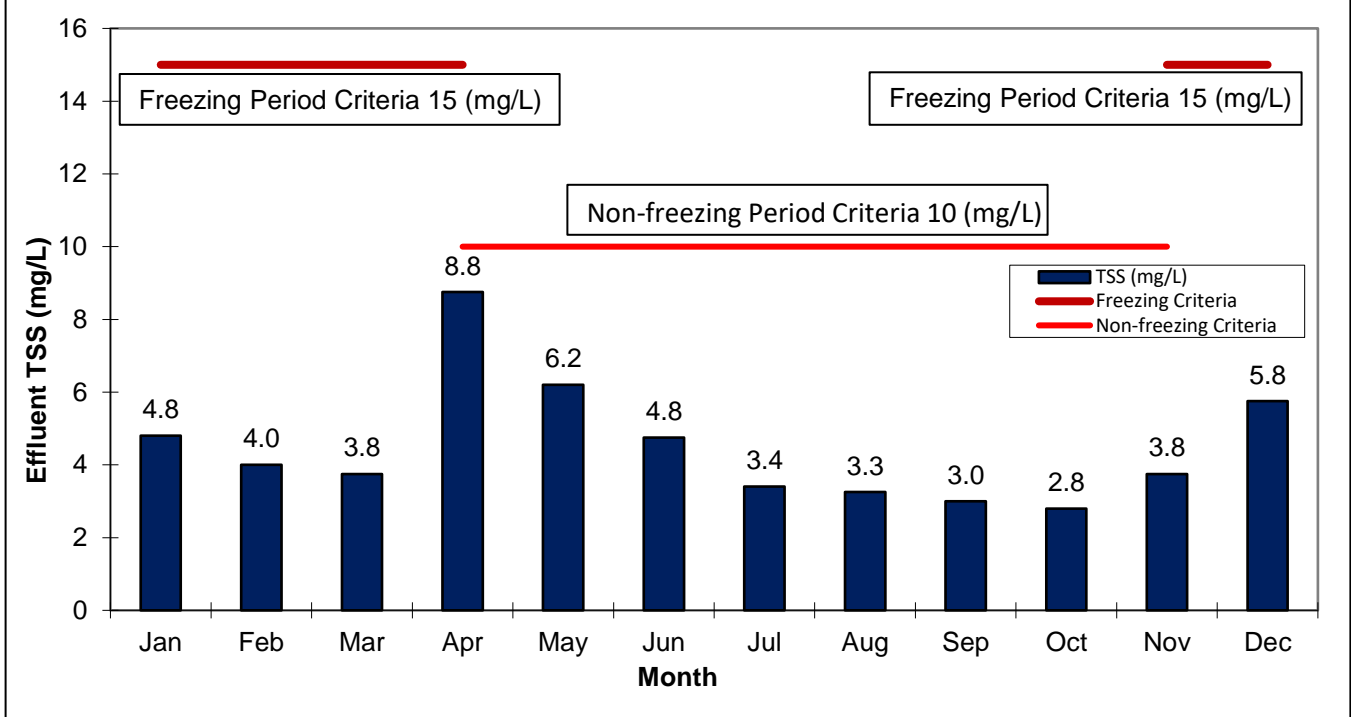
APPENDIX A: GRAPHS OF 2019 DISCHARGE PARAMETERS VS. EFFLUENT DISCHARGE LIMITS



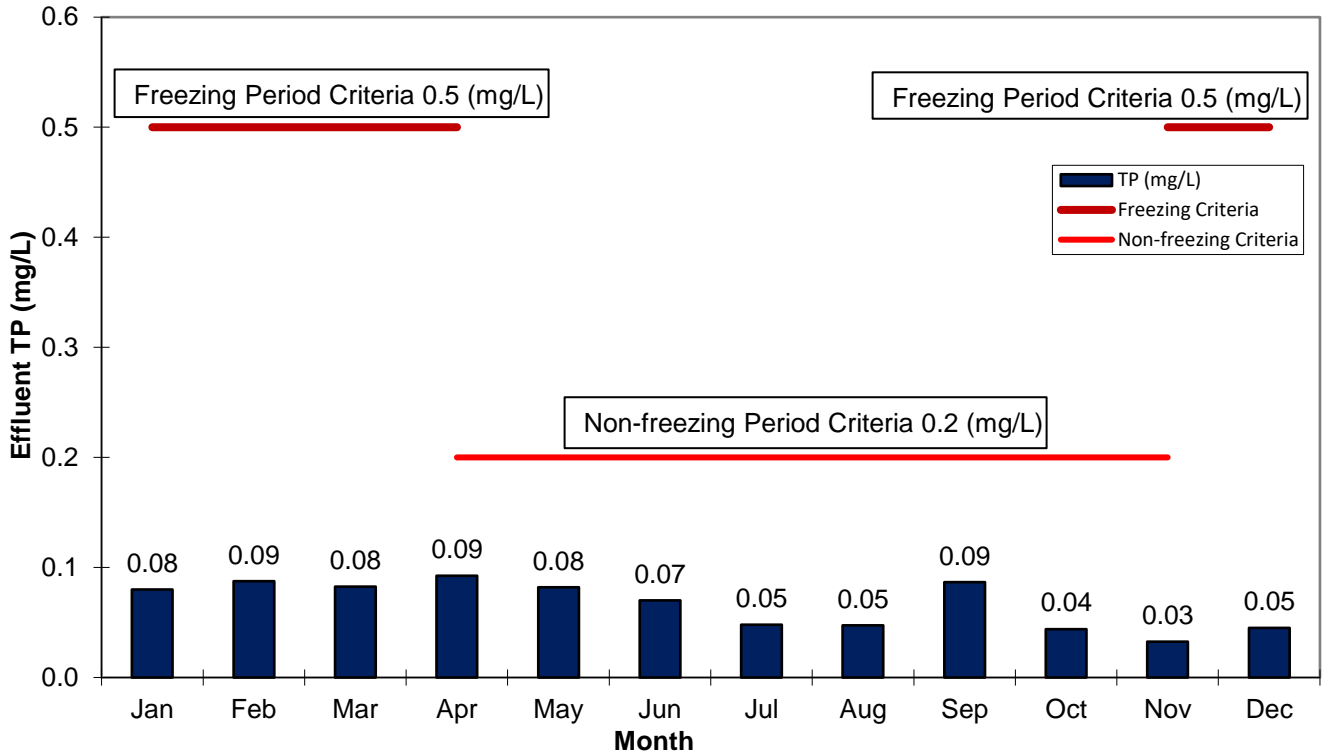
Thamesford WWTP Effluent, Monthly Average Effluent Ammonia (mg/L), 2019



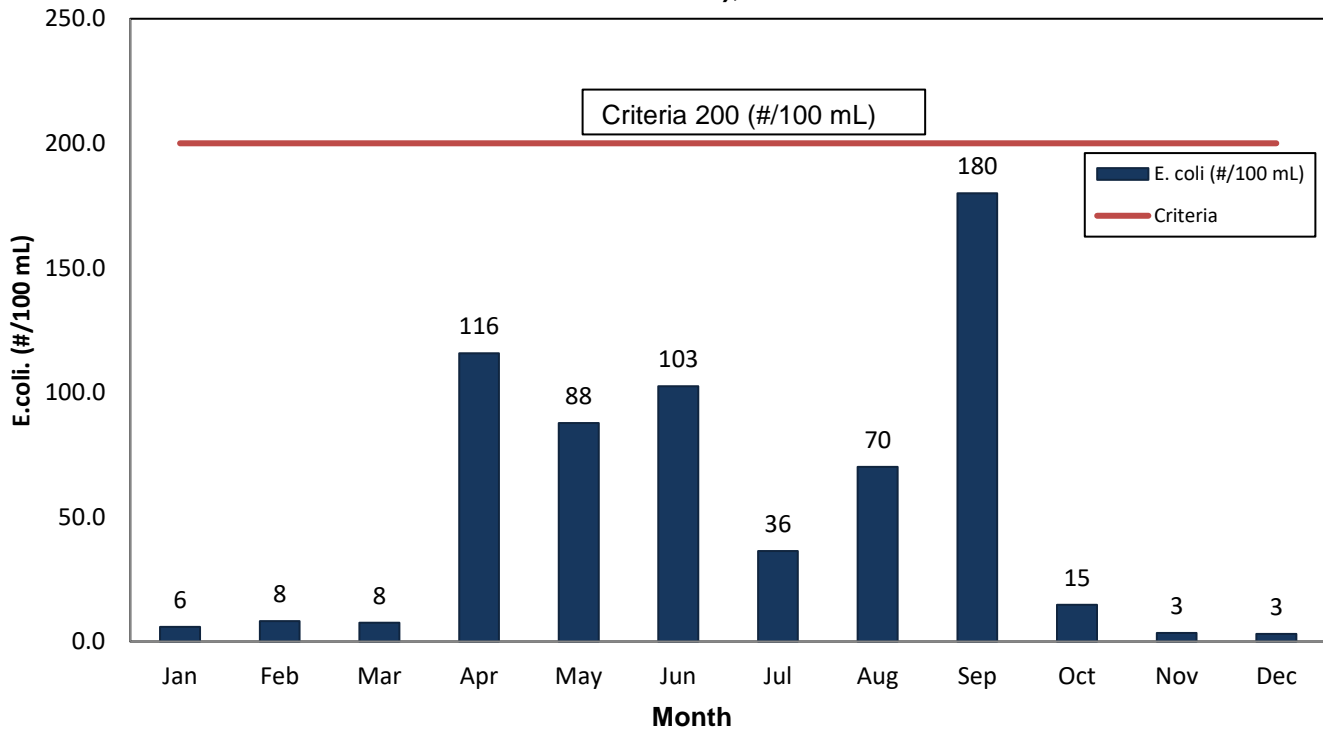
Thamesford WWTP Effluent, Monthly Average Effluent TSS (mg/L), 2019



Thamesford WWTP Effluent, Monthly Average Effluent TP (mg/L), 2019



Thamesford WWTP Effluent, Monthly Geometric Mean Effluent E. coli. (#/100 mL), 2019



2019 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)	#9997-82RS5A Updated November 30 2018 #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, 2019 – December 31, 2019

1.1. System Description

The Tillsonburg WWTP is a Class III facility with a nominally separate wastewater collection system that provides wastewater treatment for residential, commercial, and industrial users in the Town of Tillsonburg. 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
2019 Average Daily Flow	6,147 m ³ /d
2019 Maximum Daily Flow	9,966 m ³ /d
2019 Total Volume of Wastewater	2,243,002 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 compliant with all its regulatory limits in 2019, achieving 100% compliance.

Treatment at the facility in 2019 was complicated by periodic receipt of high strength wastewater from a local industry associated with late night cleaning activities. Sewer Use Bylaw staff have worked with the customer over the year to address the concerns and to avoid further exceedances. The Industry purchased and installed neutralizing pretreatment equipment, completing the work in the late fall of 2019. Flow and pH monitor was installed at the property line of the industry, and towards the end of November the industry had become compliant.

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 2019.

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	217	1331
Total Suspended Solids	204	1255
Total Phosphorus	3.7	23
Total Kjeldahl Nitrogen	30	184

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	2.3 – 11.2	94.8 – 98.9
Total Suspended Solids	weekly	25	8.5 – 18.4	91.0 – 95.8
Total Phosphorus	weekly	1	0.38 – 0.79	78.6 – 89.7
E. coli (May 1 – October 31)	weekly	200 organisms/100 mL (monthly Geometric Mean Density)	11.5 – 57.5 organisms/100 mL (monthly Geometric Mean Density)	--

pH any single sample	weekly	6.0 - 9.5	6.12 – 8.03	--
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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	6.3	6.147	38.7	206
Total Suspended Solids	13.40	6.147	82.4	206
Total Phosphorus	0.52	6.147	3.2	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 2019, namely;

- The monthly average concentration objective for TSS of 15 mg/L for the months of January (16.6 mg/L), July (18.4 mg/L), September (16.8 mg/L) and October (18.4 mg/L).
- Several single sample objective exceedances occurred throughout 2019 and are listed below.

During the months of January, July, September and October 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.

The secondary digester was also taken out of service for cleaning from June to October, which placed additional constraints on operations.

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	2.3 – 11.2
Total Suspended Solids	weekly	15	8.5 – 18.4
Total Phosphorus	weekly	0.8	0.38 – 0.79
E. coli (May 1 – October 31)	weekly	150 organisms/100 mL (monthly Geometric Mean Density)	11.5 – 57.5 organisms/100 mL (monthly Geometric Mean Density)
pH any single sample	weekly	6.5 - 8.0	6.12 – 8.03

Tillsonburg single sample effluent objective exceedances in 2019 included the following:

Date	Parameter	Objective mg/L	Result mg/L
Jan. 2 2019	CBOD	15.0	19
Jan. 2 2019	TSS	15.0	17
Jan. 16 2019	TSS	15.0	20
Jan. 23 2019	TSS	15.0	22
Feb. 12 2019	TSS	15.0	20

Apr. 23 2019	TSS	15.0	23
Apr 30 2019	TSS	15.0	22
June 18 2019	TSS	15.0	16
July 24 2019	TSS	15.0	22
July 30 2019	TSS	15.0	31
Sept. 3 2019	TSS	15.0	17
Sept. 10 2019	TSS	15.0	18
Sept. 24 2019	TSS	15.0	20
Oct. 8 2019	TSS	15.0	23
Oct. 29 2019	TSS	15.0	42
Jan. 2 2019	Phosphorus	0.8	0.89
Jan. 9 2019	Phosphorus	0.8	0.88
Jan. 23 2019	Phosphorus	0.8	0.88
Feb. 12 2019	Phosphorus	0.8	0.97
July 30 2019	E. coli	150 #/100 mL	460 #/100 mL
Jan. 6 2019	pH	6.5 - 8.0	6.41
Jan. 29 2019	pH	6.5 - 8.0	8.03
Feb. 5 2019	pH	6.5 - 8.0	6.12
Feb. 11 2019	pH	6.5 - 8.0	8.03

Operations staff have monitored the pH variations at the plant and adjusted return activated sludge rates, MLSS concentrations, waste activated sludge quantities, and reseeded 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 2019 was complicated by periodic receipt of high strength wastewater from a local industry associated with late night cleaning activities. Sewer Use Bylaw staff have worked with the customer over the year to address the concerns and to avoid further exceedances. The Industry purchased and installed neutralizing pretreatment equipment, completing the work in the late fall of 2019. Flow and pH monitor was installed at the property line of the industry, and towards the end of November the industry had become compliant.

There was a spill on February 19, 2019 at the Tillsonburg Treatment Plant. A Return Activated Sludge pipe had fractured and spilled approximately 500 liters of sludge onto the ground and walkway around the aeration tank. The spill was contained and no sludge left the site. The pipe was dug up and repaired, and the walkway and ground cleaned up. This event was reported to the MECP.

The Limited Operational Flexibility for modifications to the wastewater plant was not used in 2019.

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. 2019 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 2019.

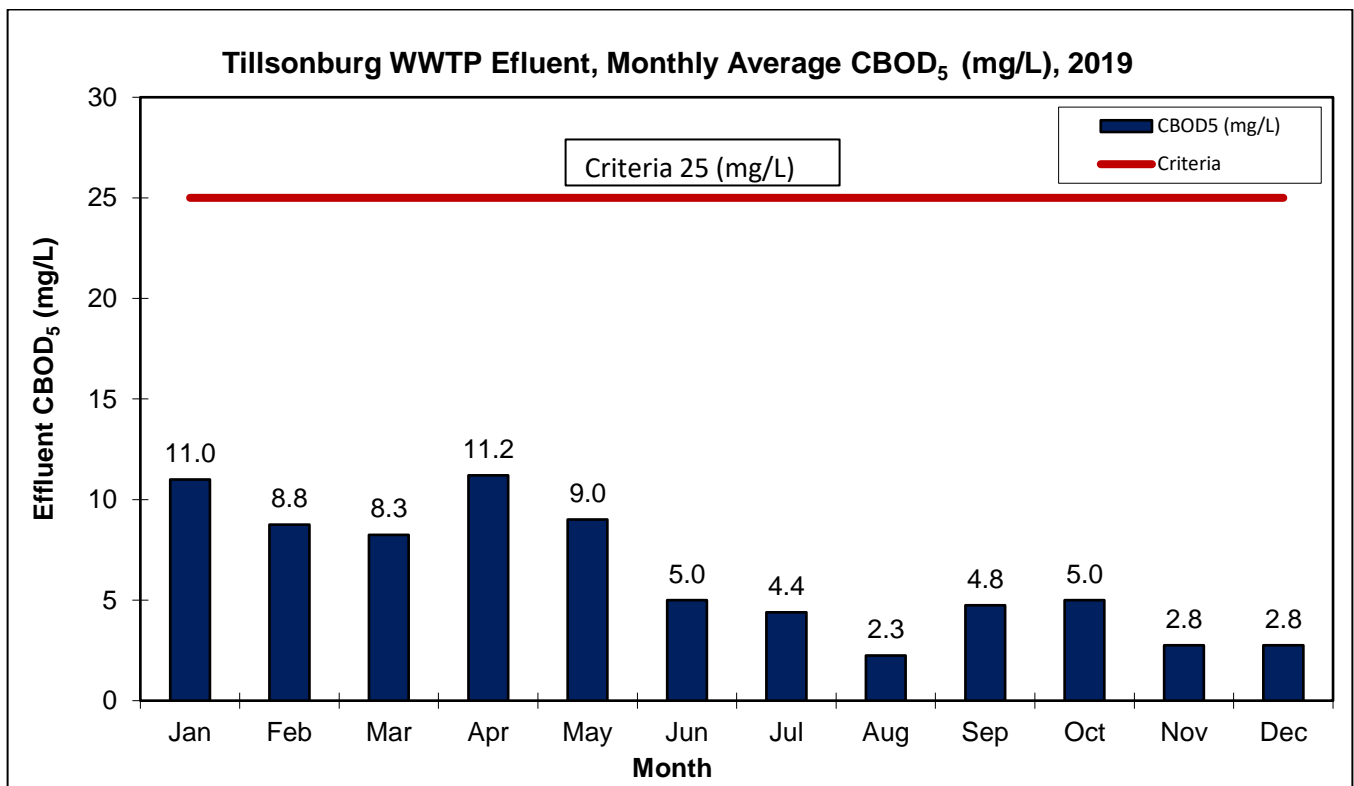
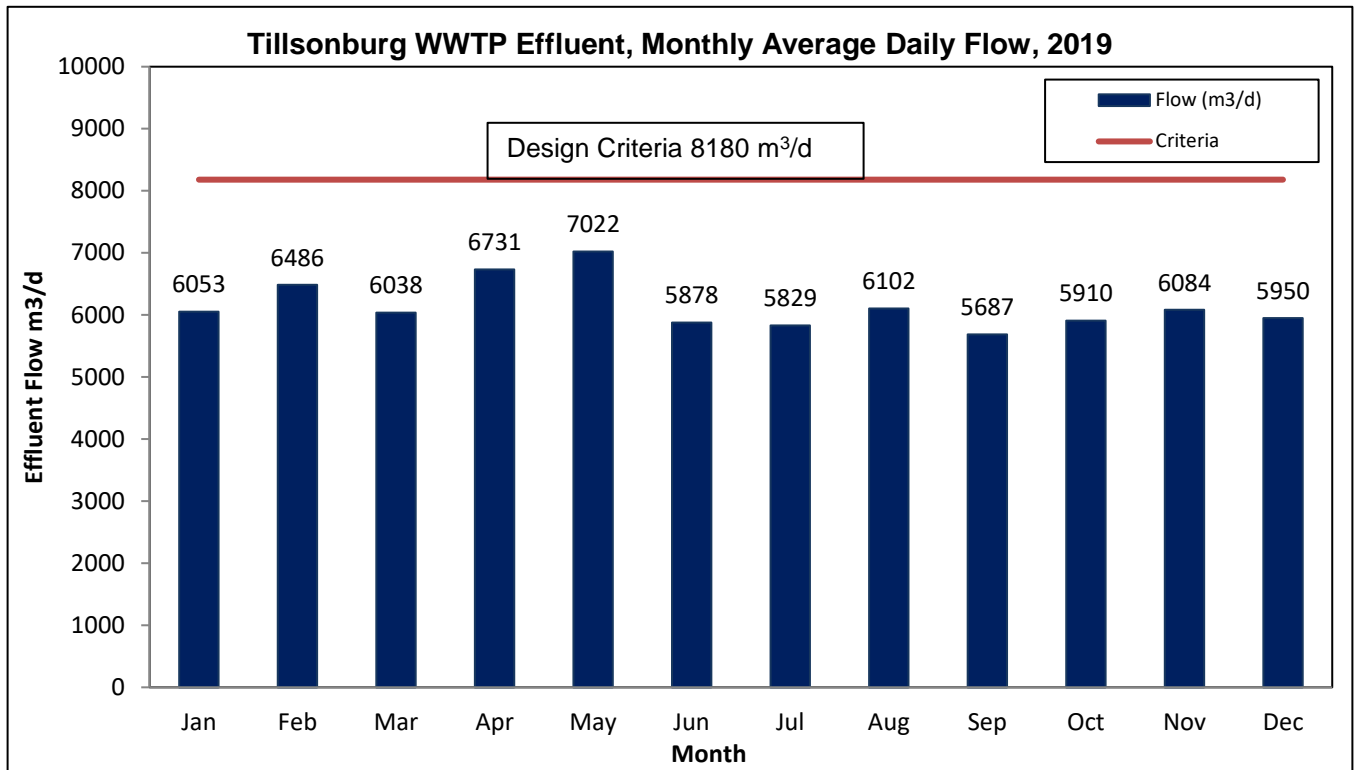
Optimization

The County again participated with the MECP innovations branch in optimization training and the staff applied that knowledge to specific processes at the plant. The Operators investigated Total Mass Control, plant loading and performance and primary clarifier sludge accountability. This work is part of Performance Based Training, that aides Operators in the understanding of techniques and concepts to optimize plant performance. A year long study will be performed in 2020 at Tillsonburg plant, dealing with solids control, phosphorous reduction and secondary treatment nitrification.

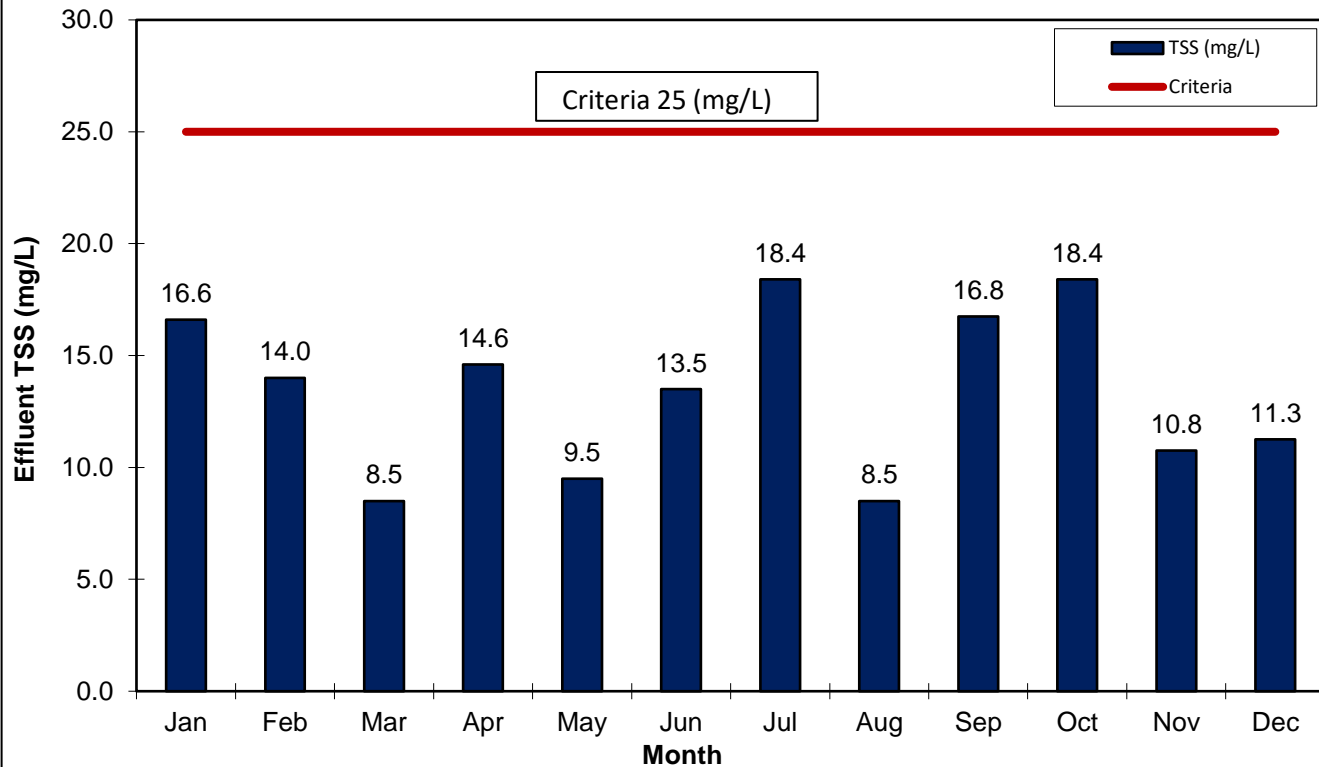
Plant Upgrade

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

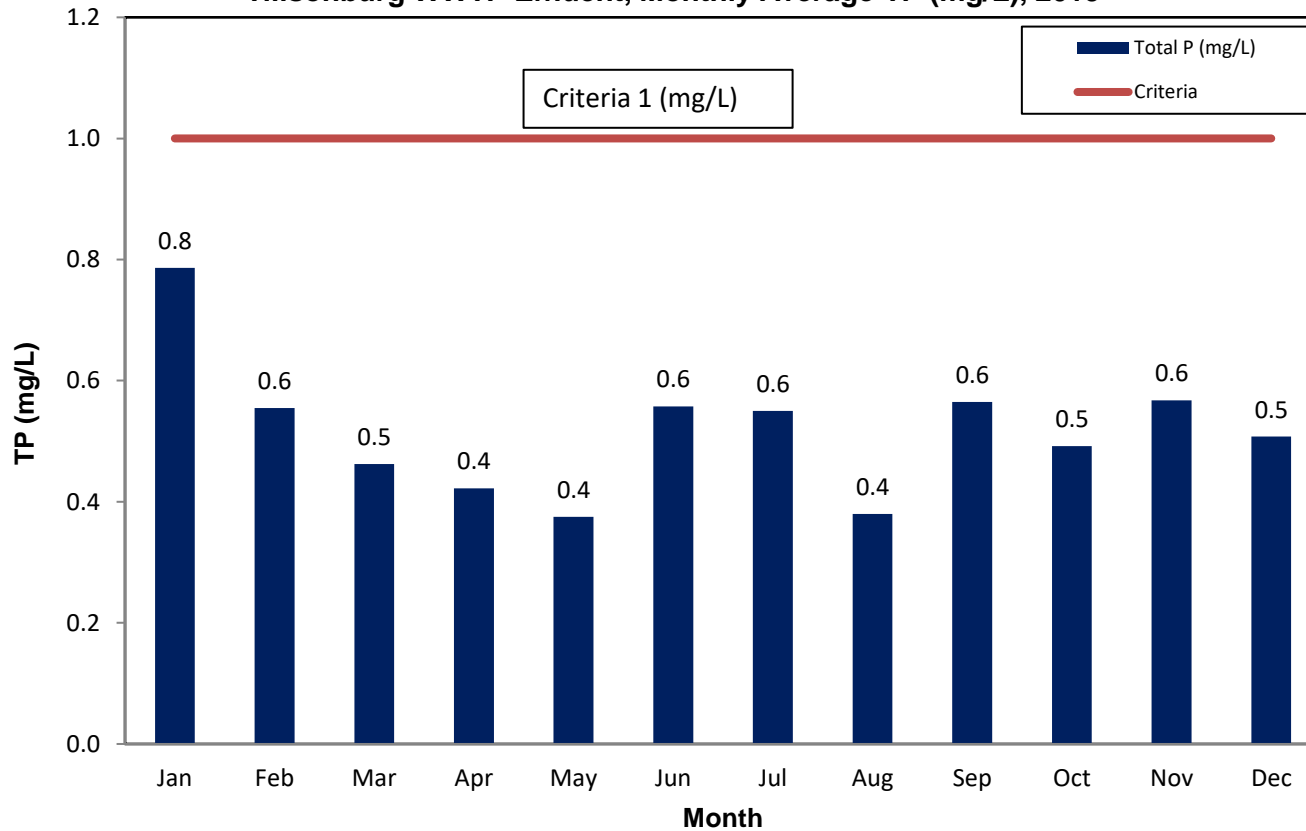
APPENDIX A: GRAPHS OF 2019 DISCHARGE PARAMETERS VERSUS EFFLUENT DISCHARGE LIMITS



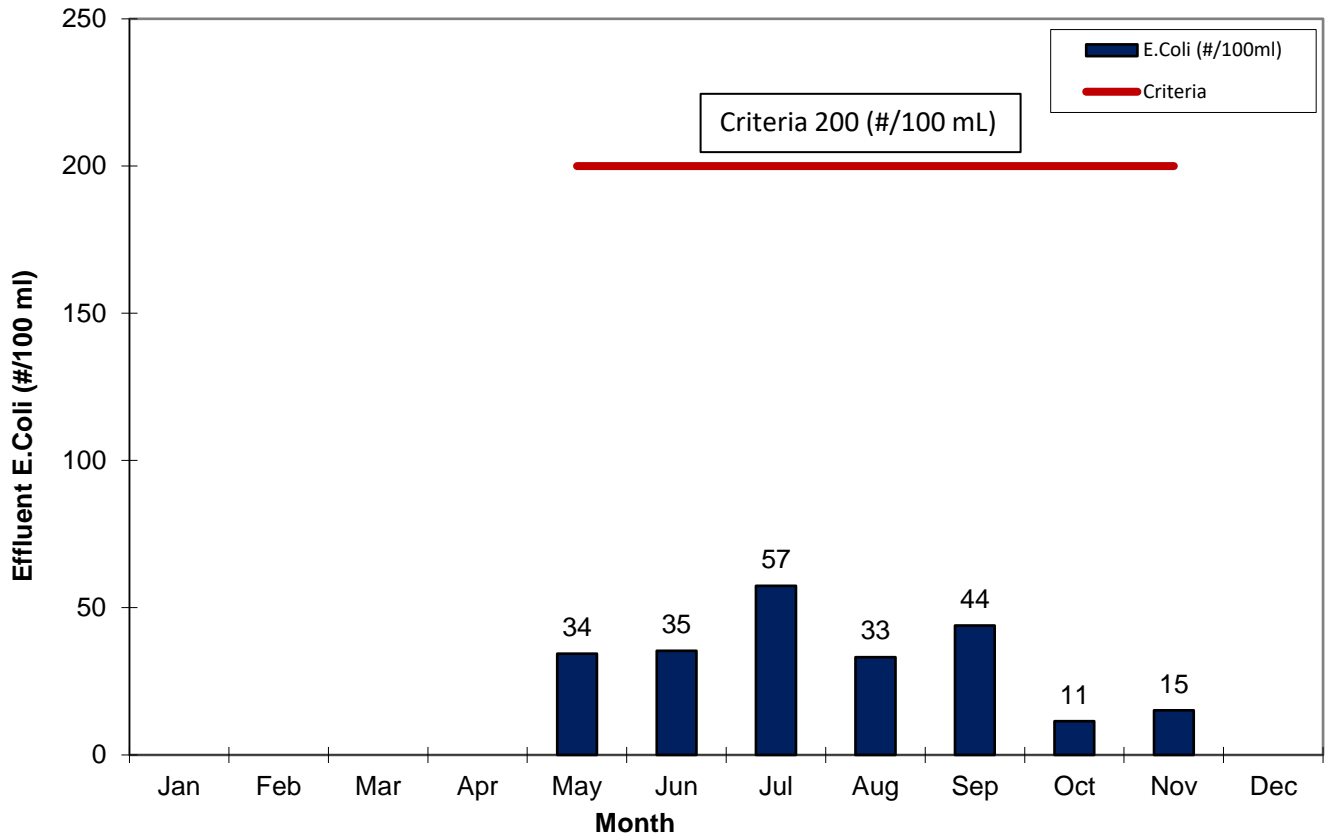
Tillsonburg WWTP Effluent, Monthly Average TSS (mg/L), 2019



Tillsonburg WWTP Effluent, Monthly Average TP (mg/L), 2019



Tillsonburg WWTP Effluent, Monthly Geometric Mean Density E. Coli (#/100 ml), 2019



2019 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, 2019 – December 31, 2019

1.1. System Description

The Woodstock WWTP is a Class IV rated treatment facility with a nominally separate wastewater collection system 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 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 new 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 2019, 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
2019 Average Daily Flow	23,582 m ³ /d

2019 Maximum Daily Flow	62,865 m ³ /d
2019 Total Volume of Wastewater	8,603,654 m ³ /year
2019 Total Received Hauled Waste	34,648 m ³ /year

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 2019 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 2019.

Staff tests Total Residual Chlorine (TRC) in the treated effluent on a daily basis; well in excess of the required weekly testing frequency. In 2019, 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 2019.

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	132	3,113
Total Suspended Solids	196	4,622
Total Phosphorus	2.7	64
Total Kjeldahl Nitrogen	21.1	498

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	3.0 – 4.8	96.6 – 97.9
CBOD ₅ (December 01 to April 30)	weekly	20	3.2 – 8.3	94.2 – 97.8
Total Suspended Solids	weekly	15	5.0 – 10.0	94.9 – 97.4

Total Phosphorus	weekly	0.75	0.19 – 0.33	87.8 – 93.0
Total Ammonia Nitrogen (May 1 to November 30)	weekly	3	0.1 – 0.6	96.3 – 99.4
Total Ammonia Nitrogen (Dec. 1 to April 30)	weekly	5.0	0.1 – 2.6	84.0 – 99.4
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)	5.3 – 94.0 organisms/100 mL (monthly Geometric Mean Density)	N/A
pH any single sample	weekly	6.0 - 9.5	6.8 – 7.7	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 2019, with the exception of the influent average monthly flow objective (33,000 m³/d) for the months of April and May.

The higher flows in April and May are due to inflow and infiltration during the spring season. An inflow and infiltration study is commencing in 2020 to investigate this issue within the collection system.

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	3.0 – 8.3
Total Suspended Solids	weekly	12	5.0 – 10.0
Total Phosphorus	weekly	0.5	0.19 – 0.33
Total Ammonia Nitrogen (May 1 to November 30)	weekly	2.0	0.1 – 0.6
Total Ammonia Nitrogen (Dec. 1 to April 30)	weekly	3.0	0.1 – 2.6
E. coli (May 1 – October 31)	weekly	200 organisms/100 mL (monthly Geometric Mean Density)	5.3 – 94.0 organisms/100 mL (monthly Geometric Mean Density)
pH any single sample	weekly	6.0 - 8.5	6.8 – 7.7

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

There were no overflows, bypassing, upsets, spills, or abnormal conditions at the Woodstock WWTP in 2019.

There were no complaints received regarding the plant for 2019.

On June 2, 2019 there was an overflow of approximately 40 m³ of wastewater from the Trillium Woods Sewage Pumping Station. A lightning storm passed through the area and knocked out the site controls and alarms. The SPS was restarted when the Operator doing routine site checks arrived that morning.

This event was reported to the MECP at the time it occurred.

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. 2019 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 2019. The MECP inspections typically occur on a 3-year schedule.

Electrical Infrastructure Upgrade

A new substation was installed in 2019 to provide safe, consistent power to the Woodstock Wastewater Treatment Plant for years to come. In addition, a new generator was installed with the capacity to power the entire treatment plant and onsite pumping station in case of power interruptions or emergencies.

Optimization

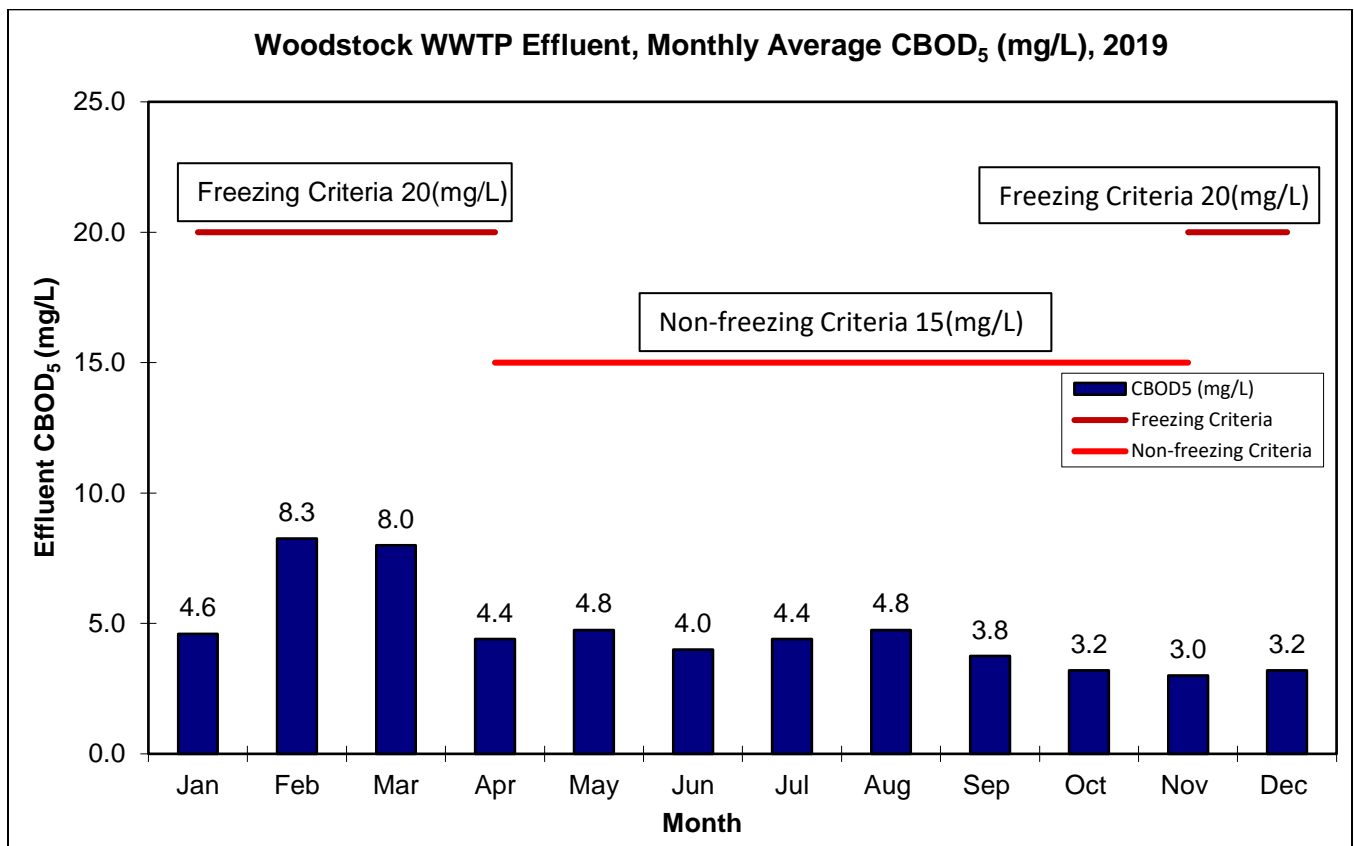
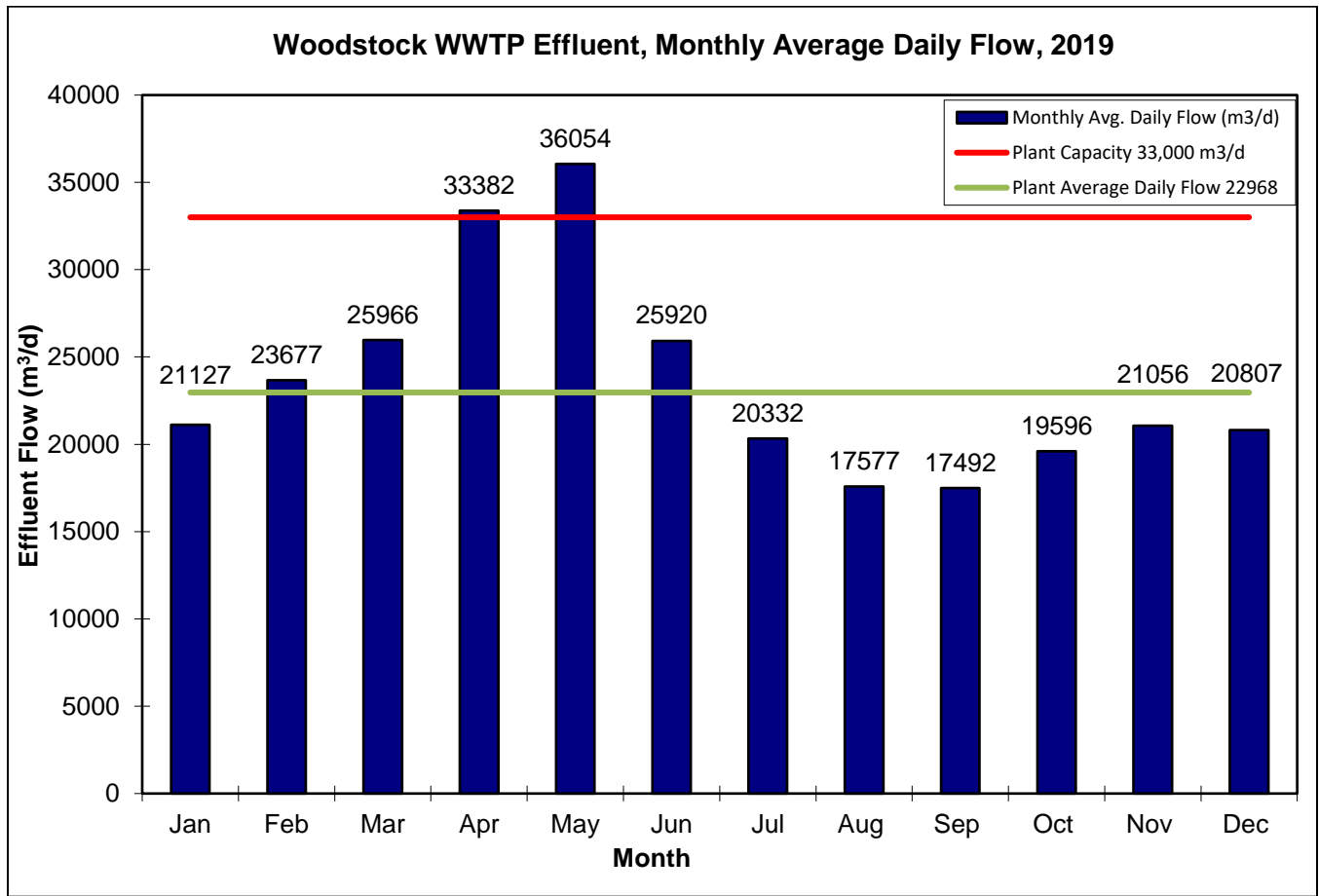
The County again participated with the MECP innovations branch in optimization training and the staff applied that knowledge to specific processes at the plant. The Operators investigated Total Mass Control, plant loading and performance and primary clarifier sludge accountability. This work is part of Performance Based Training, that aides Operators in the understanding of techniques and concepts to optimize plant performance.

Green Energy Production

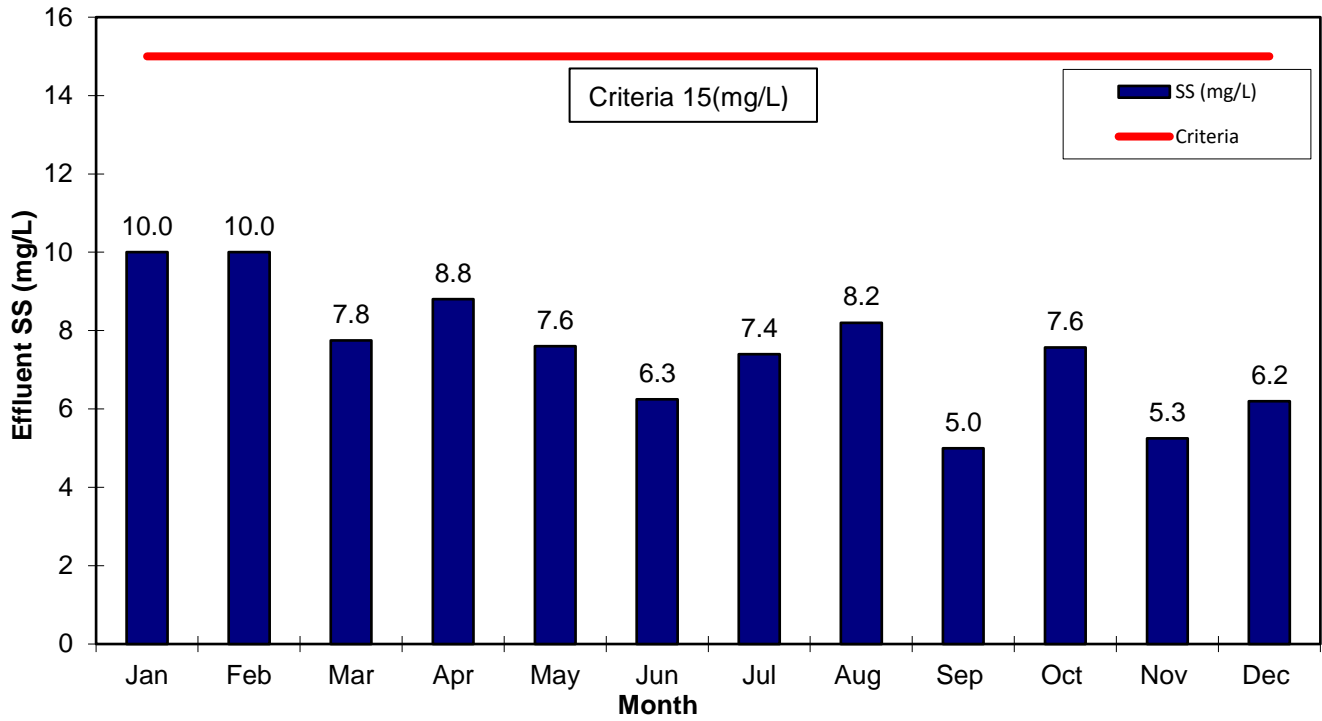
A new roof mounted 10 kW solar installation was commissioned in 2019 at the Woodstock plant. This power generation technology falls in line with the County of Oxford's direction of innovative and green technology.

A 460 kW solar farm has also been installed out front of the plant, and will be up and running sometime in 2020.

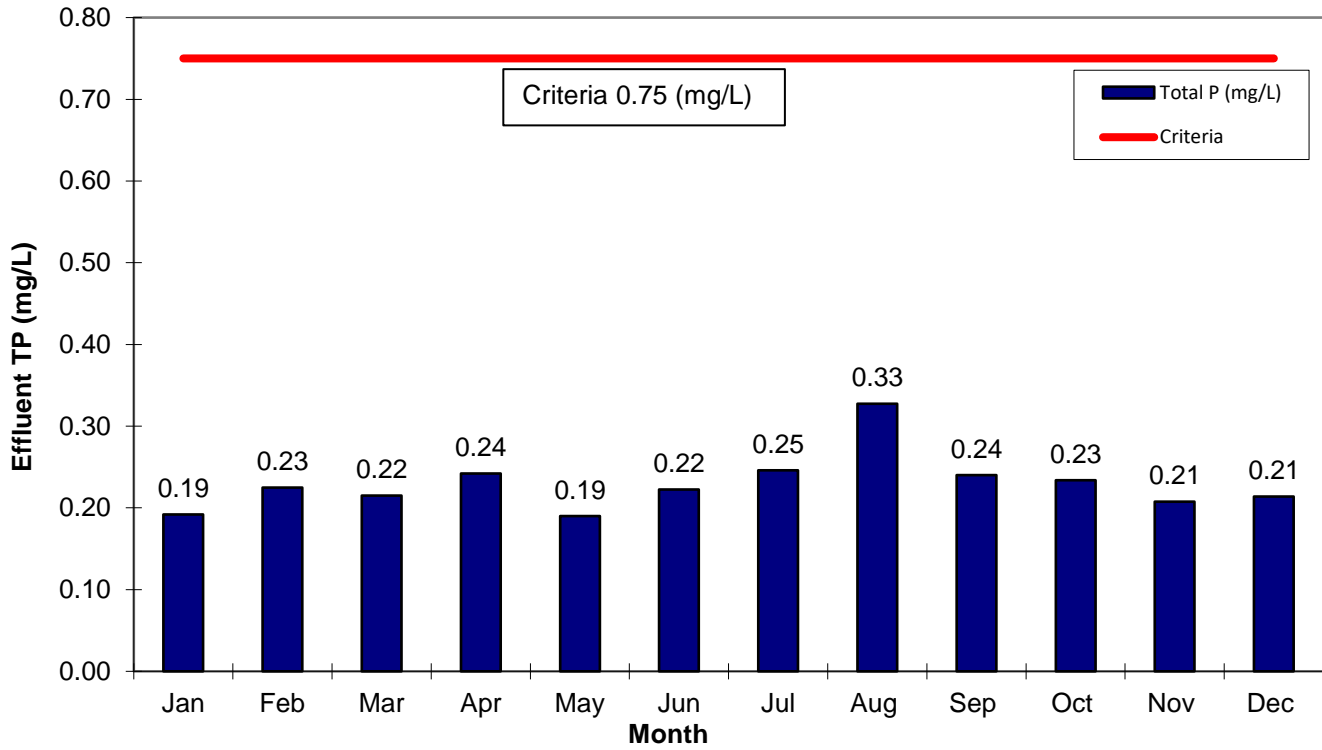
APPENDIX A: GRAPHS OF 2019 DISCHARGE PARAMETERS VS. EFFLUENT DISCHARGE LIMITS



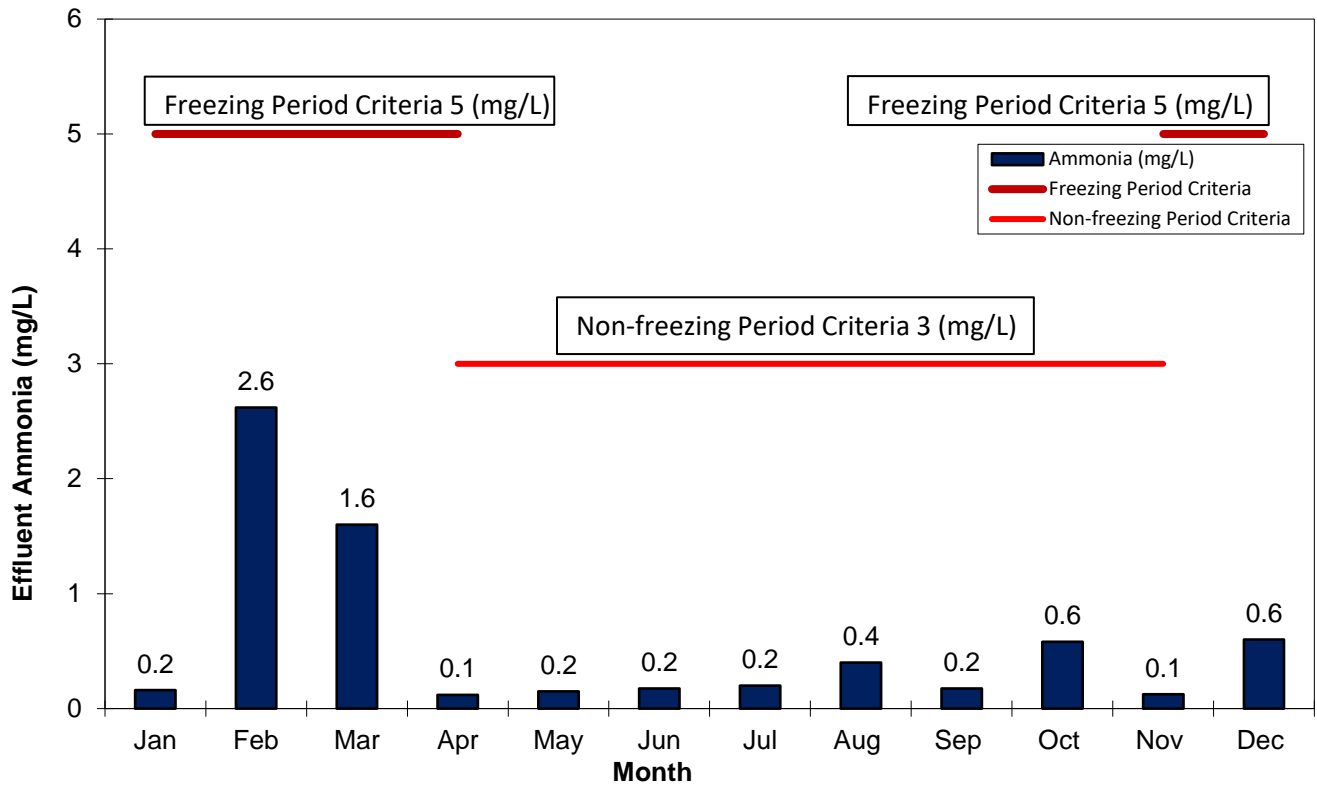
Woodstock WWTP Effluent, Monthly Average SS (mg/L), 2019



Woodstock WWTP Effluent, Monthly Average TP (mg/L), 2019



Woodstock WWTP Effluent, Monthly Average Ammonia (mg/L), 2019



Woodstock WWTP Effluent, Monthly Geomean E. Coli, 2019

