

# Fenelon Falls Water Pollution Control Plant

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Works # 110001612

## Annual Wastewater Performance Report

Prepared For: The City of Kawartha Lakes

Reporting Period of January 1<sup>st</sup> – December 31<sup>st</sup>, 2021

Issued: March 23, 2022

Operating Authorities:



**OCWA**



## **2021 Performance Report for the Fenelon Falls Water Pollution Control Plant**

In 2021, the Fenelon Falls Water Pollution Control Plant (WPCP) operated under Amended Environmental Compliance Approval (ECA) No. 2419-BKSLEX issued on July 26<sup>th</sup>, 2020 until it was revoked and replaced by Amended Environmental Compliance Approval (ECA) No. 3688-BW3RGB issued on January 15<sup>th</sup>, 2021. Condition 11.4 in ECA No. 3688-BW3RGB satisfies the requirements of Condition 11.4 of ECA No. 2419-BKSLEX. The Environmental Compliance Approval (ECA) No. 3688-BW3RGB, for the Fenelon Falls WPCP, Condition 11.4. states, *"The Owner shall prepare performance reports on a calendar year basis and submit to the District Manager by March 31 of the calendar year following the period being reported upon. The reports shall contain, but shall not be limited to, the following information pertaining to the reporting period:*

- a) *a summary and interpretation of all Influent monitoring data, and a review of the historical trend of the sewage characteristics and flow rates;*
- b) *a summary and interpretation of all Final Effluent monitoring data, including concentration, flow rates, loading and a comparison to the design objectives and compliance limits in this Approval, including an overview of the success and adequacy of the Works;*
- c) *a summary of all operating issues encountered and corrective actions taken;*
- d) *a summary of all normal and emergency repairs and maintenance activities carried out on any major structure, equipment, apparatus or mechanism forming part of the Works;*
- e) *a summary of any effluent quality assurance or control measures undertaken;*
- f) *a summary of the calibration and maintenance carried out on all Influent and Final Effluent monitoring equipment to ensure that the accuracy is within the tolerance of that equipment as required in this Approval or recommended by the manufacturer;*
- g) *a summary of efforts made to achieve the design objectives in this Approval, including an assessment of the issues and recommendations for pro-active actions if any are required under the following situations:*
  - i. *when any of the design objectives is not achieved more than 50% of the time in a year, or there is an increasing trend in deterioration of Final Effluent quality;*
  - ii. *when the Annual Average Daily Influent Flow reaches 80% of the Rated Capacity;*
- h) *a tabulation of the volume of sludge generated, an outline of anticipated volumes to be generated in the next reporting period and a summary of the locations to*

*where the sludge was disposed;*

- i) a summary of any complaints received and any steps taken to address the complaints;*
- j) a summary of all Bypasses, Overflows, other situations outside Normal Operating Conditions and spills within the meaning of Part X of EPA and abnormal discharge events;*
- k) a summary of all Notice of Modifications to Sewage Works completed under Paragraph 1.d. of Condition 10, including a report on status of implementation of all modification.*
- l) a summary of efforts made to achieve conformance with Procedure F-5-1 including but not limited to projects undertaken and completed in the sanitary sewer system that result in overall Bypass/Overflow elimination including expenditures and proposed projects to eliminate Bypass/Overflows with estimated budget forecast for the year following that for which the report is submitted.*
- m) a summary of any deviation from the monitoring schedule and reasons for the current reporting year and a schedule for the next reporting year.*

The above information is incorporated in the following report format and submitted to the District Manager of the Peterborough District Office of the Ministry of the Environment, Conservation and Parks as per the requirements of ECA No. 3688-BW3RGB.

The final effluent limits and objectives required by ECA No. 3688-BW3RGB are the same as ECA No. 2419-BKSLEX; therefore, the report will only reference the current ECA No. 3688-BW3RGB.

During the period of 2021, the Ontario Clean Water Agency (OCWA) operated the Fenelon Falls WPCP, Francis Street Pumping Station (SPS), Colborne Street SPS and Ellice Street SPS on behalf of the Corporation of the City of Kawartha Lakes. OCWA's goals have remained consistent during this period and remain consistent with the following priorities:

- provide quality assurance, safety and environmental compliance of facility operations;
- assist our clients in achieving compliance;
- provide advice on up-to-date technology in Operations and Maintenance service delivery.

This report will show that the Ontario Clean Water Agency has made every attempt to achieve its goals through its operational performance. This performance was enhanced through the use of an electronic process data collection database, an electronic maintenance and work order database, an electronic operational excellence database,

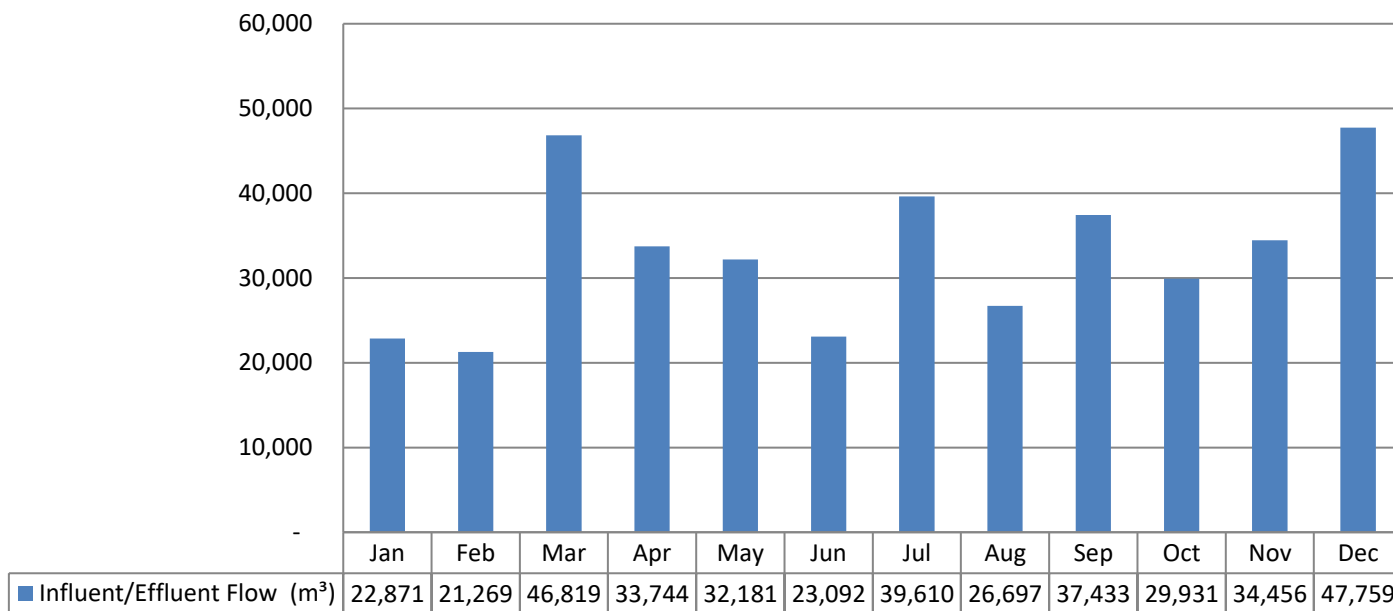
a training program focused on providing the right skills to staff - also captured and tracked by the use of an electronic database and a multi-skilled, flexible workforce.

**a) Environmental Compliance Approval (ECA) No. 3688-BW3RGB requires a summary and interpretation of all Influent monitoring data, and a review of the historical trend of the sewage characteristics and flow rates;**

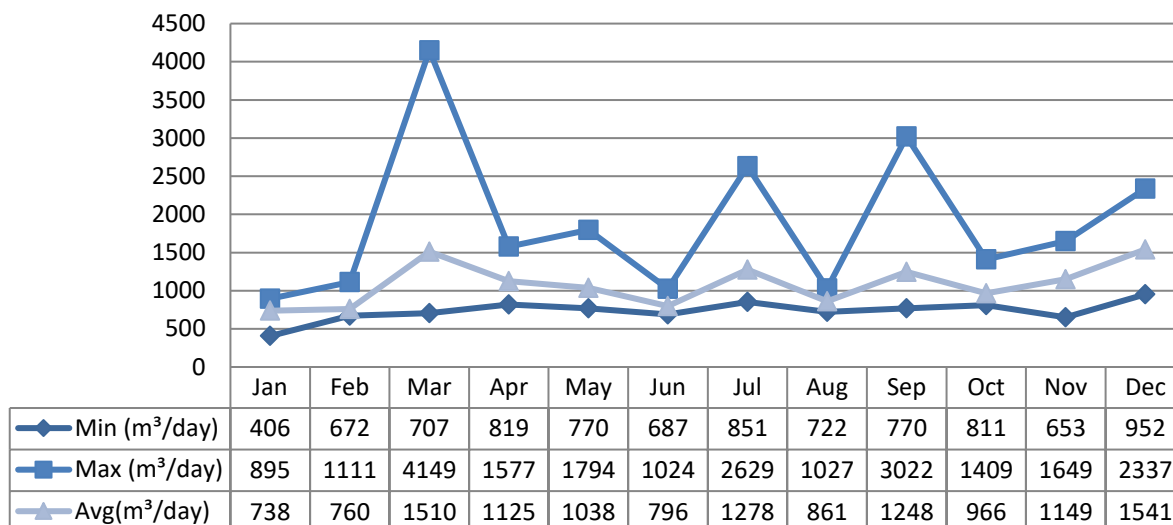
The Fenelon Falls WPCP has a Rated Capacity of 1,800m<sup>3</sup>/day. Flows are continuously measured through the plant effluent flow meter located upstream of the sand filters. The influent and effluent streams are considered not significantly different in flow rates and quantities so the effluent flow measurements are also used for influent flow measurements. ECA No. 3688-BW3RGB requires everything practicable be undertaken to operate the STP so that the annual average daily influent is within the Rated Capacity. The 2021 annual average daily influent flow was 1,084.02 m<sup>3</sup>/day or 60% of the Rated Capacity.

The total influent/effluent flow in 2021 was 395,861 m<sup>3</sup>.

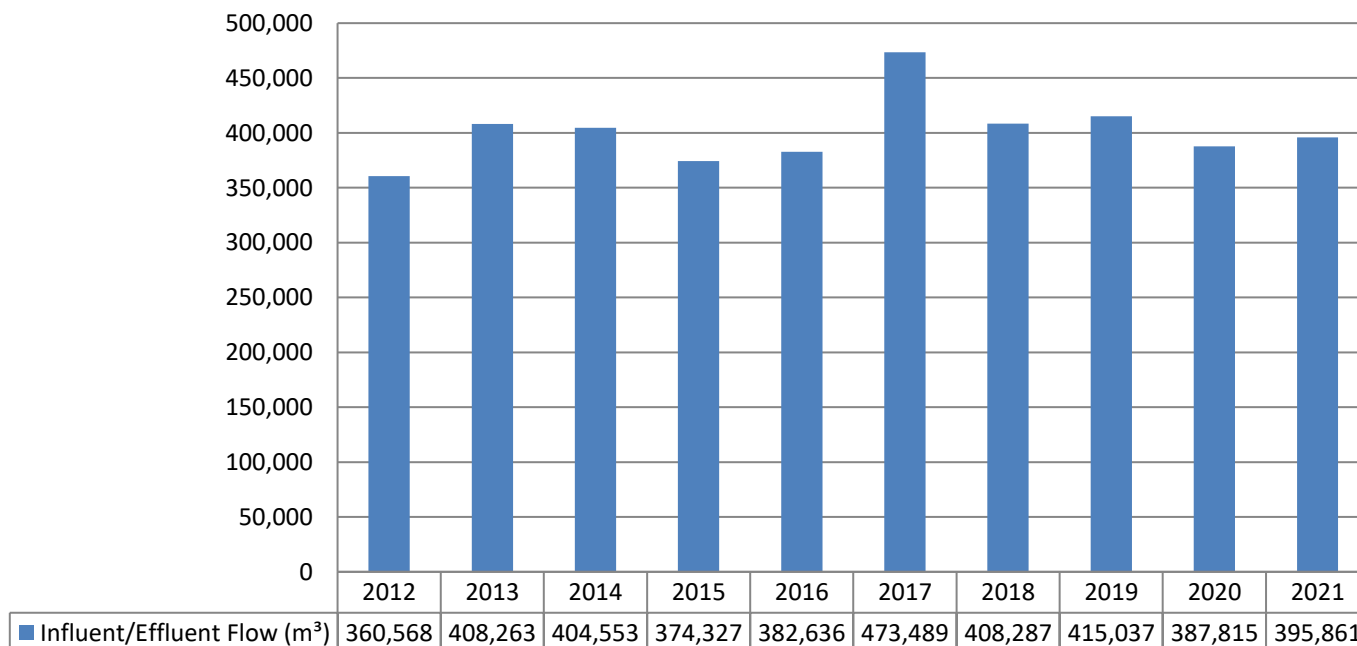
**Graph 1: 2021 Influent/Effluent Flow Monthly Totals**



**Graph 2: Influent/Effluent Daily Minimum, Maximum and Average Flows**



**Graph 3: Historical Influent/Effluent Flows from 2012 to 2021**

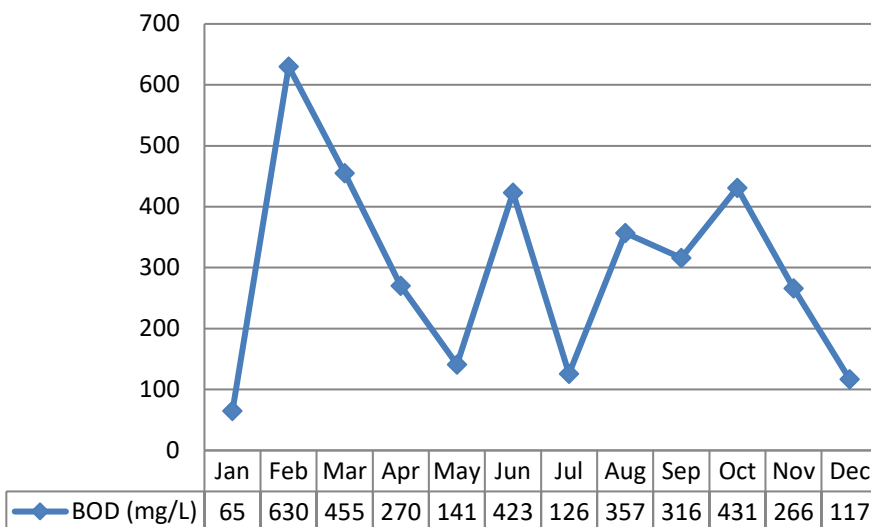


**Influent Monitoring - Sewage Characteristics**

**Biochemical Oxygen Demand (BOD5)**

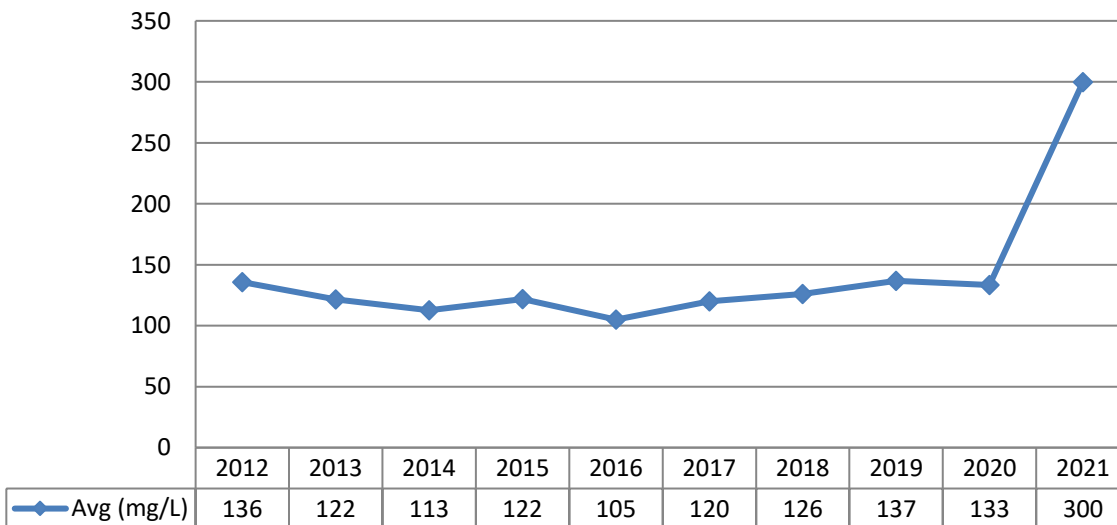
ECA No. 3688-BW3RGB requires at least one composite sample be collected and analyzed monthly for Biochemical Oxygen Demand (BOD5). The Biochemical Oxygen Demand (BOD5) monthly average results ranged from 65 mg/L to 630 mg/L.

**Graph 4: 2021 Monthly BOD5 Influent Concentration Comparisons**



**Biochemical Oxygen Demand Historical Trends**

**Graph 5: Historical Influent Biochemical Oxygen Demand Concentration Comparisons**

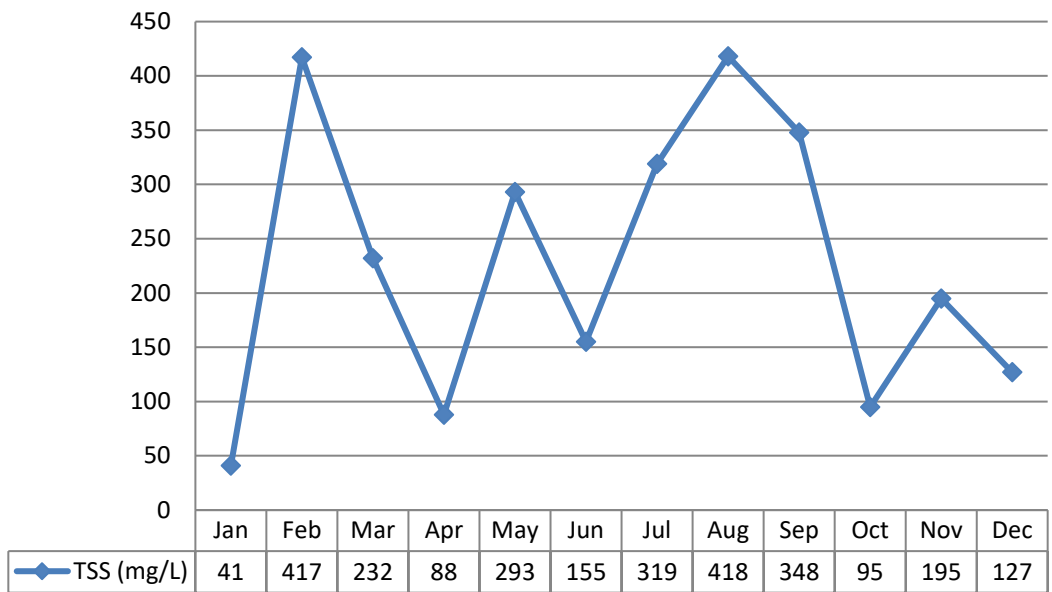


The Biochemical Oxygen Demand (BOD5) annual average has been relatively consistent for the past ten years but experienced an increase in 2021.

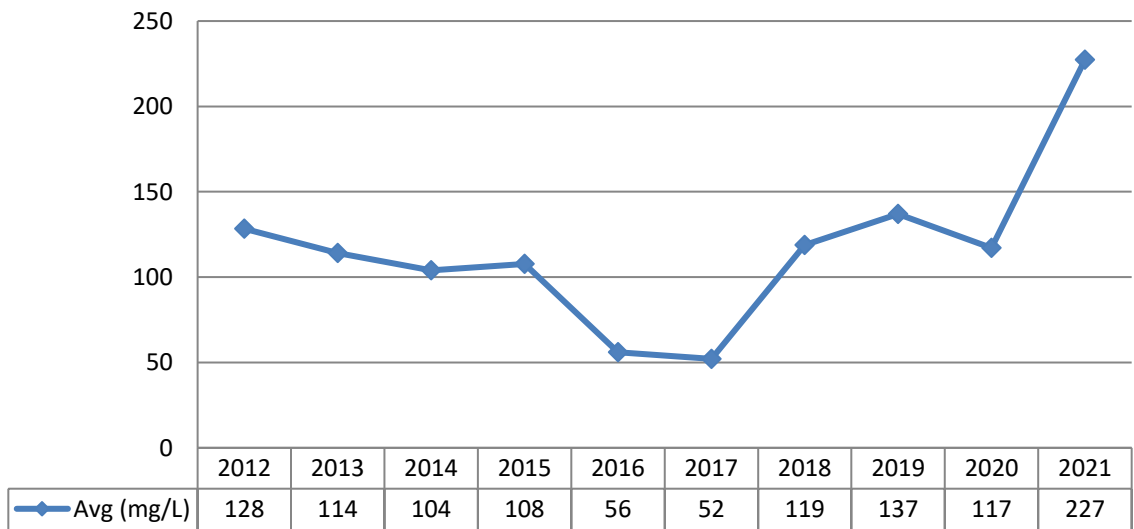
**Total Suspended Solids**

ECA No. 3688-BW3RGB requires at least one composite sample be collected and analyzed monthly for Total Suspended Solids. The monthly results ranged from 41mg/L to 418mg/L.

**Graph 6: 2021 Monthly Total Suspended Solids Influent Concentration Comparisons**



**Graph 7: Historical Influent Total Suspended Solids Concentration Comparisons**



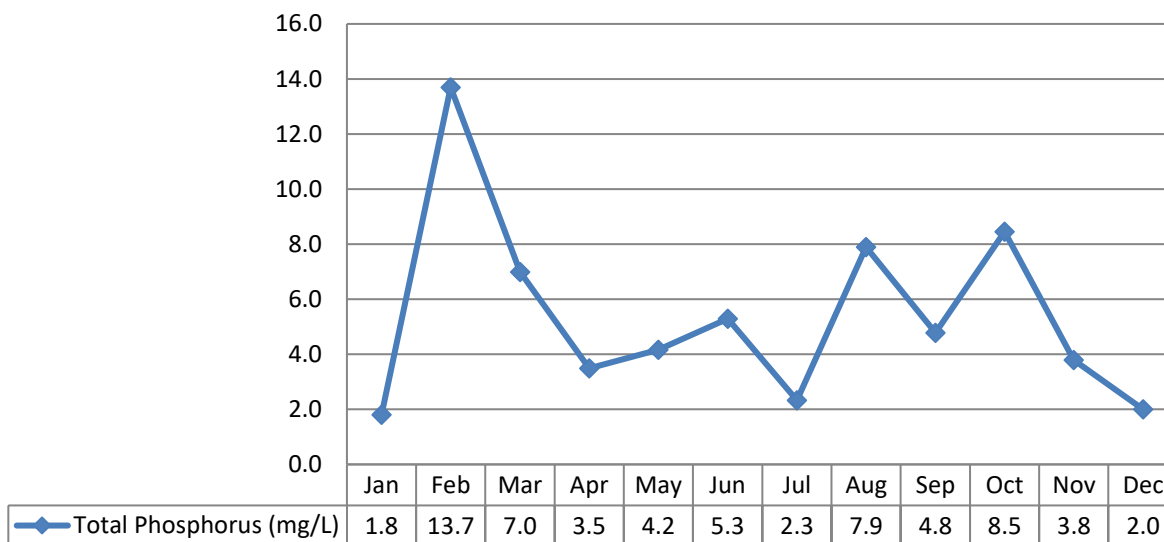
**Total Suspended Solids Historical Review**

The Total Suspended Solids annual average has been between 52mg/L and 227mg/L showing a slight decrease in 2016 -2017, and an increase in 2021.

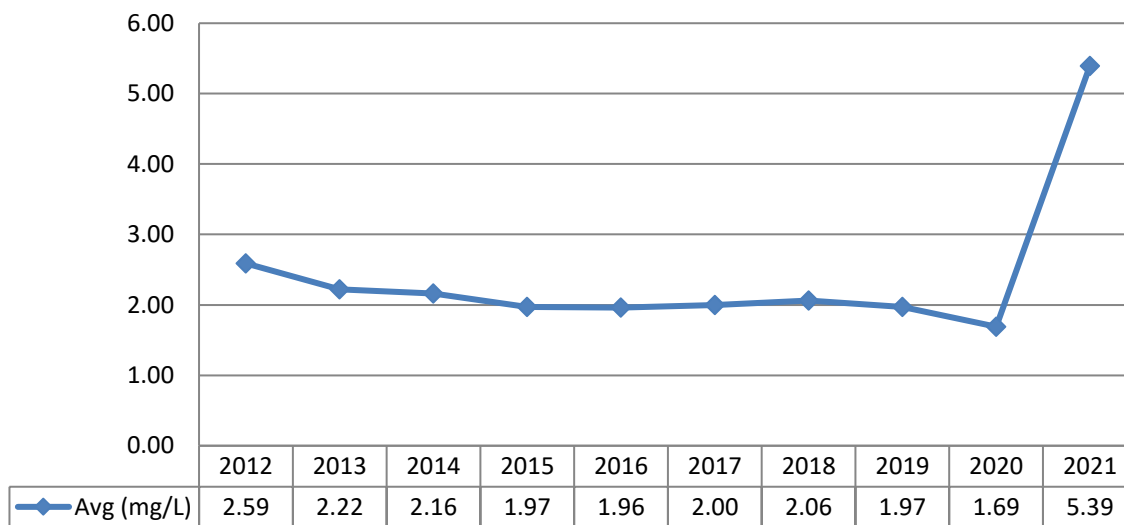
**Total Phosphorus**

ECA No. 3688-BW3RGB requires at least one composite sample be collected and analyzed monthly for Total Phosphorus. The monthly results ranged from 48mg/L to 144mg/L.

**Graph 8: 2021 Monthly Total Phosphorus Influent Concentration Comparisons**



**Graph 9: Historical Influent Total Phosphorus Concentration Comparisons**



**Total Phosphorus Historical Trends**

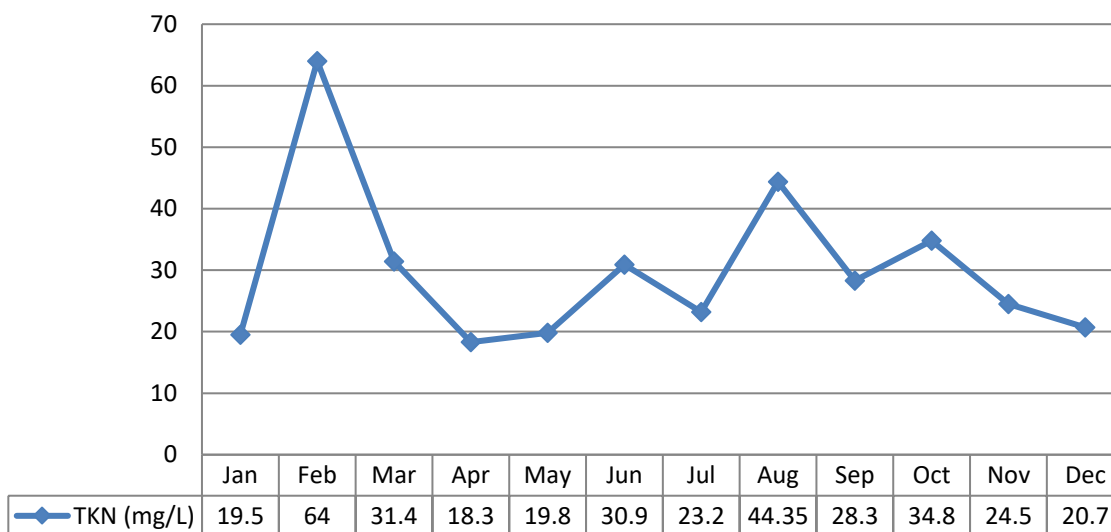
The Total Phosphorus annual average in the raw has trended downward since 2012 decreasing from 2.59 mg/L to 1.69mg/L; however, experienced an increase in 2021 with an average of 5.39mg/L.

**Total Kjeldahl Nitrogen (TKN)**

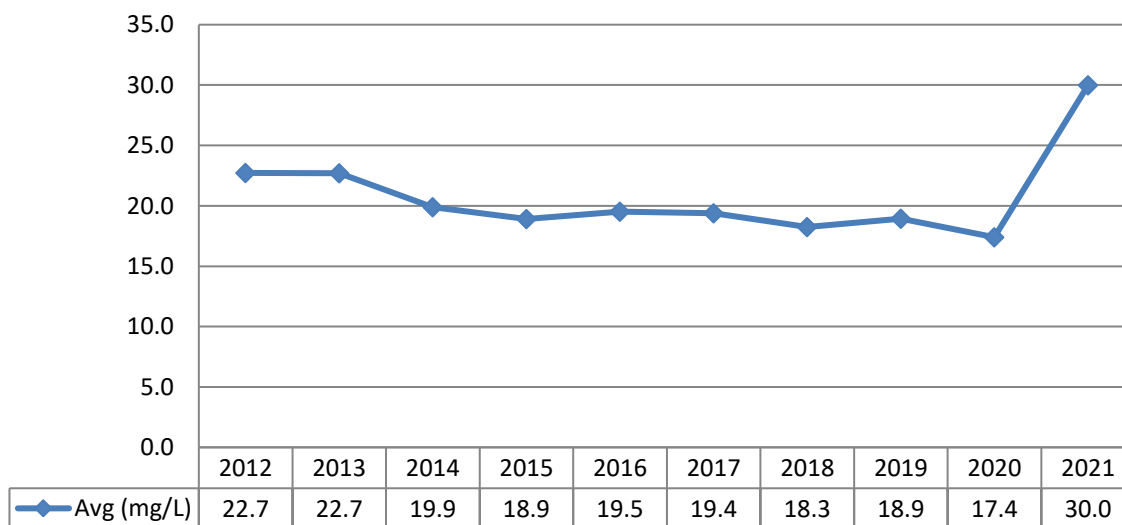
ECA No. 3688-BW3RGB requires at least one composite sample be collected and analyzed monthly for Total Kjeldahl Nitrogen. The monthly Total Kjeldahl Nitrogen results ranged from 18.3mg/L to 64mg/L.



**Graph 10: 2021 Monthly Total Kjeldahl Nitrogen Influent Concentration Comparisons**



**Graph 11: Historical Influent Total Kjeldahl Nitrogen Concentration Comparisons**



**Total Kjeldahl Nitrogen Historical Review**

The Total Kjeldahl Nitrogen annual average was fairly consistent with a decreasing trend from above 22.7mg/L to a low of 17.4 mg/L in 2020; however, experienced an increase in 2021 with an average of 30.0mg/L.

Refer to Appendix I for Performance Assessment Report which summarizes Influent (raw) BOD5, TSS, TP, and TKN Results.

***b. Environmental Compliance Approval (ECA) No. 3688-BW3RGB requires a summary and interpretation of all Final Effluent monitoring data, including concentration, flow rates, loading and a comparison to the design objectives and compliance limits in this Approval, including an overview of the success and adequacy of the Works.***

The Final Effluent Monitoring Data for 2021 is summarized below and compared to ECA No. 3688-BW3RGB.

Flows are continuous measured through the plant effluent flow meter. The influent and effluent streams are considered not significantly different in flow rates and quantities so the effluent flow measurements are also used for influent flow measurements.

The total influent/effluent flow in 2021 was 395,861m<sup>3</sup>. The effluent flow summary and interpretation are included in a. above with the influent flow summary and interpretation.

### **Carbonaceous Biochemical Oxygen Demand (CBOD5) and Total Suspended Solids (TSS)**

ECA No. 2419-BKSLEX has an annual average concentration limit of 25mg/L for CBOD5 and TSS. The annual average results for 2021 were calculated as required for each approval and are presented in the following table.

<b>Table 1: CBOD5 and Suspended Solids 2021 Effluent Concentration Results Comparison to Limit</b>			
<b>Effluent Parameter</b>	<b>Annual Average Limit (mg/L)</b>	<b>Annual Average (mg/L)</b>	<b>Compliant Y/N</b>
<b>CBOD5</b>	25	<2.9	Y
<b>Total Suspended Solids</b>	25	<6.3	Y

ECA No. 3688-BW3RGB has an annual average concentration objective of 15 mg/L for CBOD5 and TSS. The annual average results for 2021 were calculated as required for each approval and are presented in the following table.

<b>Table 2: CBOD5 and Suspended Solids 2021 Effluent Concentration Results Comparison to Objectives</b>			
<b>Effluent Parameter</b>	<b>Annual Average Objective (mg/L)</b>	<b>Annual Average (mg/L)</b>	<b>Objective Met Y/N</b>
<b>CBOD5</b>	15	<2.9	Y

<b>Table 2: CBOD5 and Suspended Solids 2021 Effluent Concentration Results Comparison to Objectives</b>			
<b>Effluent Parameter</b>	<b>Annual Average Objective (mg/L)</b>	<b>Annual Average (mg/L)</b>	<b>Objective Met Y/N</b>
<b>Total Suspended Solids</b>	15	<6.3	Y

ECA No. 3688-BW3RGB has an annual average daily effluent loading limit of 45.0 kg/day for CBOD5 and TSS. The annual average daily loading results for 2021 were calculated as required for each approval and are presented in the following table.

<b>Table 3: CBOD5 and Suspended Solids 2021 Effluent Loading Results Comparison to Limits</b>			
<b>Effluent Parameter</b>	<b>Annual Average Daily Loading Limit (mg/L)</b>	<b>Annual Average Daily Loading (mg/L)</b>	<b>Compliant Y/N</b>
<b>CBOD5</b>	45	<3.6	Y
<b>Total Suspended Solids</b>	45	<7.5	Y

### **Total Phosphorus (TP)**

ECA No. 3688-BW3RGB has a monthly average concentration limit of 0.5 mg/L for Total Phosphorus. The monthly average results for 2021 were calculated as required. The plant experienced an emergency partial bypass of the sand filters on September 23 and 24, 2021 due to heavy rains and this impacted the Total Phosphorus results. The TP monthly average concentration was determined using the ECA's Schedule F Methodology for Calculating and Reporting Monthly Average Effluent Concentration which applies a flow-weighted calculation. Results are presented in the following table.

<b>Table 4: Total Phosphorus 2021 Monthly Average Concentrations Comparison to Limit</b>			
<b>Month</b>	<b>Monthly Average Limit (mg/L)</b>	<b>Effluent Monthly Average (mg/L)</b>	<b>Compliant Y/N</b>
<b>January</b>	0.5	0.11	Y
<b>February</b>	0.5	0.12	Y
<b>March</b>	0.5	0.17	Y
<b>April</b>	0.5	0.13	Y

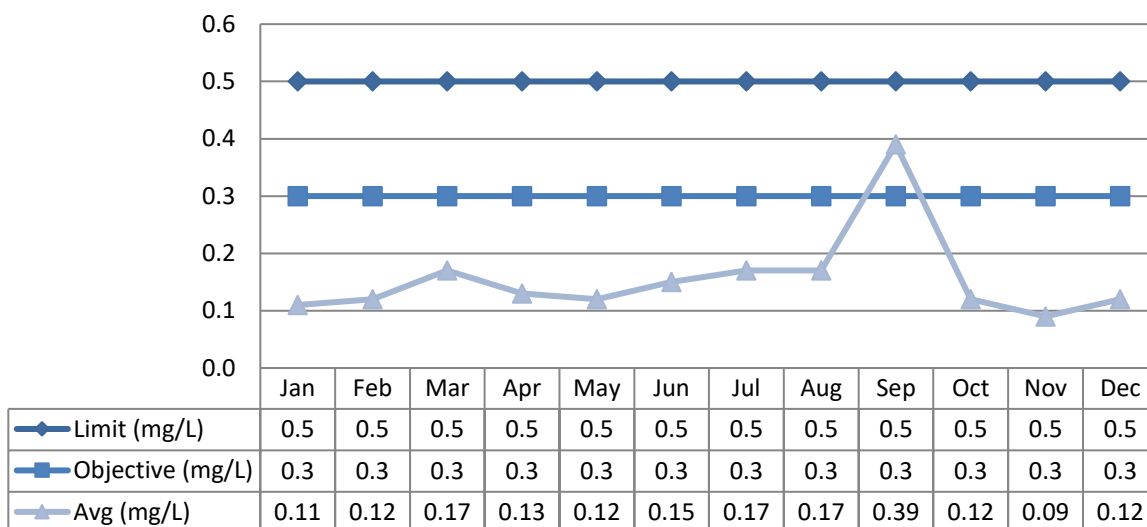
<b>Table 4: Total Phosphorus 2021 Monthly Average Concentrations Comparison to Limit</b>			
<b>Month</b>	<b>Monthly Average Limit (mg/L)</b>	<b>Effluent Monthly Average (mg/L)</b>	<b>Compliant Y/N</b>
<b>May</b>	0.5	0.12	Y
<b>June</b>	0.5	0.15	Y
<b>July</b>	0.5	0.17	Y
<b>August</b>	0.5	0.17	Y
<b>September</b>	0.5	0.39	Y
<b>October</b>	0.5	0.12	Y
<b>November</b>	0.5	0.09	Y
<b>December</b>	0.5	0.12	Y

ECA No. 3688-BW3RGB has a monthly average concentration objective of 0.3 mg/L for Total Phosphorus. The monthly average results for 2021 were calculated as required and are presented in the following table.

<b>Table 5: Total Phosphorus 2021 Monthly Average Concentrations Comparison to Objective</b>			
<b>Month</b>	<b>Monthly Average Objective (mg/L)</b>	<b>Effluent Monthly Average (mg/L)</b>	<b>Objective Met Y/N</b>
<b>January</b>	0.3	0.11	Y
<b>February</b>	0.3	0.12	Y
<b>March</b>	0.3	0.17	Y
<b>April</b>	0.3	0.13	Y
<b>May</b>	0.3	0.12	Y
<b>June</b>	0.3	0.15	Y
<b>July</b>	0.3	0.17	Y
<b>August</b>	0.3	0.17	Y
<b>September</b>	0.3	0.39	N
<b>October</b>	0.3	0.12	Y
<b>November</b>	0.3	0.09	Y
<b>December</b>	0.3	0.12	Y

The Total Phosphorus average for September did not meet the Objective. As previously noted, the plant experienced an emergency partial bypass of the sand filters on September 23 and 24, 2021 due to heavy rains which impacted the TP results. Bypass information is included in item j of this report.

**Graph 12: 2021 Monthly Final Effluent Total Phosphorus Concentration Comparisons**



ECA No. 3688-BW3RGB has a monthly average daily loading limit of 0.9 kg/d for Total Phosphorus. The monthly average results for 2021 were calculated as required for each approval and are presented in the following table.

Month	Monthly Average Daily Loading Limit (kg/d)	Effluent Monthly Average Daily Loading (kg/d)	Compliant Y/N
January	0.9	0.06	Y
February	0.9	0.09	Y
March	0.9	0.26	Y
April	0.9	0.15	Y
May	0.9	0.12	Y
June	0.9	0.12	Y
July	0.9	0.22	Y
August	0.9	0.14	Y
September	0.9	0.49	Y
October	0.9	0.11	Y
November	0.9	0.11	Y
December	0.9	0.19	Y

**Total Ammonia Nitrogen (TAN)**

ECA No. 3688-BW3RGB has monthly Total Ammonia Nitrogen (TAN) concentration limits a based on seasonal periods within the annual year. The following table

compares monthly results to the limits for seasonal concentrations. All effluent results were below the concentration limits for TAN.

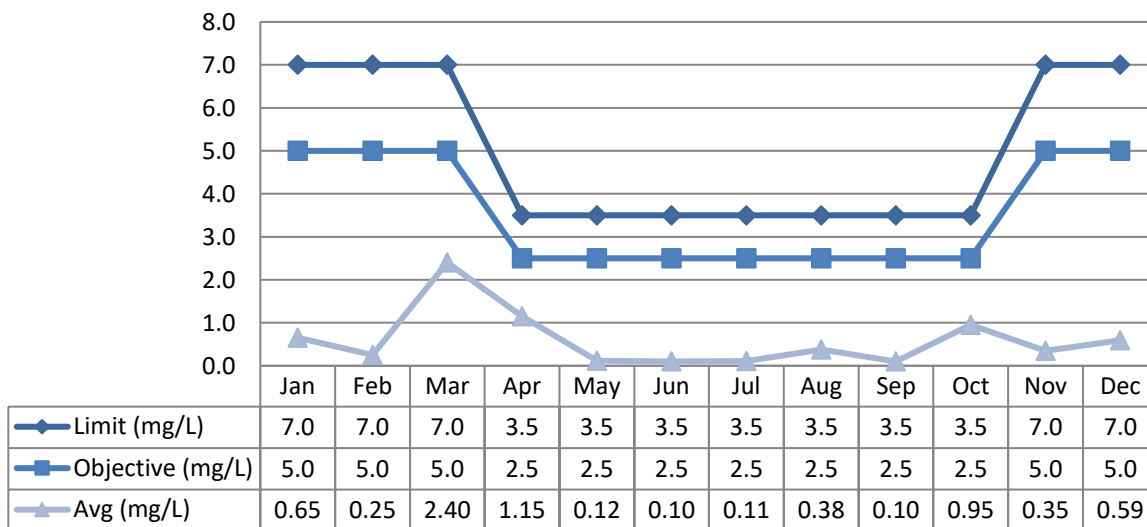
<b>Table 7: Total Ammonia Nitrogen 2021 Monthly Average Concentration Comparison to Limits</b>			
<b>Month</b>	<b>Monthly Average Concentration Limit (mg/L)</b>	<b>Effluent Monthly Average (mg/L)</b>	<b>Compliant Y/N</b>
<b>January</b>	7.0	<0.65	Y
<b>February</b>	7.0	0.25	Y
<b>March</b>	7.0	2.4	Y
<b>April</b>	3.5	<1.15	Y
<b>May</b>	3.5	<0.12	Y
<b>June</b>	3.5	<0.10	Y
<b>July</b>	3.5	<0.11	Y
<b>August</b>	3.5	<0.38	Y
<b>September</b>	3.5	<0.10	Y
<b>October</b>	3.5	<0.95	Y
<b>November</b>	7.0	<0.35	Y
<b>December</b>	7.0	<0.59	Y

Total Ammonia Nitrogen (TAN) concentration objectives are calculated monthly based on seasonal periods within the annual year for ECA No. 3688-BW3RGB. The following table compares all results to the objectives for seasonal concentrations. All effluent results were below the concentration objectives for TAN.

<b>Table 8: Total Ammonia Nitrogen 2021 Monthly Average Concentration Comparison to Objectives</b>			
<b>Month</b>	<b>Monthly Average Concentration Objective (mg/L)</b>	<b>Effluent Monthly Average (mg/L)</b>	<b>Objective Met Y/N</b>
<b>January</b>	5.0	<0.65	Y
<b>February</b>	5.0	0.25	Y
<b>March</b>	5.0	2.4	Y
<b>April</b>	2.5	<1.15	Y
<b>May</b>	2.5	<0.12	Y
<b>June</b>	2.5	<0.10	Y
<b>July</b>	2.5	<0.11	Y
<b>August</b>	2.5	<0.38	Y

Month	Monthly Average Concentration Objective (mg/L)	Effluent Monthly Average (mg/L)	Objective Met Y/N
September	2.5	<0.10	Y
October	2.5	<0.95	Y
November	5.0	<0.35	Y
December	5.0	<0.59	Y

**Graph 13: 2021 Monthly Final Effluent Total Ammonia Nitrogen Concentration Comparisons**



Total Ammonia Nitrogen (TAN) monthly average daily loading limits are calculated based on seasonal periods within the annual year for ECA No. 3688-BW3RGB. The following table compares all results to the limits for monthly average daily loading results. All effluent results were below the monthly average daily loading limits for TAN.

Month	Monthly Average Daily Loading Limit (kg/d)	Effluent Monthly Average Daily Loading (kg/d)	Compliant Y/N
January	12.6	<0.48	Y
February	12.6	0.19	Y
March	12.6	3.6	Y





ECA No. 3688-BW3RGB has a monthly geometric mean E. Coli objective of 150 cfu/100mL. The following provides monthly geometric mean density values of E. Coli in effluent for each month in 2021 compared to the objective.

<b>Table 11: E. Coli 2021 Results Comparison to Objective</b>												
<b>Month</b>	<b>Jan</b>	<b>Feb</b>	<b>Mar</b>	<b>Apr</b>	<b>May</b>	<b>Jun</b>	<b>Jul</b>	<b>Aug</b>	<b>Sep</b>	<b>Oct</b>	<b>Nov</b>	<b>Dec</b>
<b>Monthly Geometric Mean Density of E. Coli (org/100mL)</b>	2	3	26	2	2	2	2	9	4	2	4	34
<b>Met Objective of 150 cfu/100 mL (Y/N)</b>	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

## pH

ECA No. 3688-BW3RGB has a pH compliance limit within the range of 6.0 to 9.5, inclusive, for every single sample result. Every pH reading in 2021 was within the compliance limits. A summary of effluent pH measurements recorded in 2021 is provided in Appendix I.

<b>Table 12: pH 2021 Results Comparison to Limit</b>	
<b>Limit 6.0 – 9.5</b>	<b>ECA No. 3688-BW3RGB Every Single Sample Result</b>
	<b>Compliant Y/N</b>
Results range: 6.13 – 8.54	Y

ECA No. 3688-BW3RGB has a pH objective within the range of 6.0 to 9.5, inclusive, for every single sample result.

<b>Table 13: pH 2021 Results Comparison to Objective</b>	
<b>Objective 6.5 – 9.0</b>	<b>ECA No. 3688-BW3RGB Every Single Sample Result</b>
	<b>Compliant Y/N</b>
Results range: 6.13 – 8.54	N

Four pH results were below the lower objective of 6.5 as follows:

May 12 – 6.13

Sep 1 – 6.45

Sep 2 – 6.33

Sep 7 – 6.47

### **Un-Ionized Ammonia**

The concentration of un-ionized ammonia is calculated using the TAN concentration, field pH and field temperature using the methodology stipulated in “Ontario’s Provincial Water Quality Objectives” dated July 1994, as amended. Un-ionized ammonia calculated results are provided in Appendix I.

The results in the preceding tables show the limits for concentrations and loadings of the final effluent CBOD5, Total Suspended Solids, and Total Ammonia Nitrogen were in compliance ECA No. 3688-BW3RGB in 2021 and CBOD5, Total Suspended Solids and Total Ammonia Nitrogen objectives were met. Total Phosphorus monthly concentration limits were met; however, the objective was not met in September as an extreme rainfall event occurred which hydraulically overloaded the sand filters resulting in an emergency partial bypass (details included under condition j.). Total Phosphorus monthly loading limits and objectives were met in 2021. E. Coli results met the limits and objectives of ECA No. 3688-BW3RGB. All results for pH met the limits required by ECA No. 3688-BW3RGB; however, four field pH results were below the lower objective of 6.5 as noted earlier in this report.

Refer to Appendix I for Performance Assessment Report and Summaries of Effluent CBOD5, TSS, TP, TAN, TKN, E. Coli, and pH Results. Also included in Appendix I are the un-ionized ammonia calculations for 2021.

#### ***c. a summary of all operating issues encountered and corrective actions taken;***

The following table describes all operating problems encountered during the reporting period and the corrective actions taken.

<b>Date</b>	<b>Challenges</b>	<b>Corrective Actions</b>
<b>Mar 12 – 15</b>	Warm temperatures and snowmelt caused the plant to become hydraulically overloaded - secondary treatment provided and disinfection; however, sand filters hydraulically overloaded and required partial bypassing.	Flows, process monitored throughout event – samples collected and analyzed as per ECA requirements. Detention tank utilized. Notifications made to MOH and SAC.
<b>Sep 23 - 24</b>	Heavy rain event 70-100mm resulted in high flows – secondary treatment and disinfection	Flows, process monitored throughout event – samples collected and analyzed as per ECA requirements.

<b>Date</b>	<b>Challenges</b>	<b>Corrective Actions</b>
	provided; however, sand filters hydraulically overloaded and required partial bypassing.	Notifications made to MOH and SAC. Detention tank utilized, additional hauling by licensed sewage hauler from Ellice St SPS to plant on Sep 23, 2021.
<b>Dec 11 - 13</b>	Heavy rain/storm event resulted in high flows – secondary treatment and disinfection provided; however, sand filters hydraulically overloaded and required partial Bypassing.	Flows, process monitored throughout event – samples collected and analyzed as per ECA requirements. Notifications made to MOH and SAC.

***d. a summary of all normal and emergency repairs and maintenance activities carried out on any major structure, equipment, apparatus or mechanism forming part of the Works;***

OCWA uses a Work Maintenance System (WMS) to schedule normal maintenance activities and track repairs. WMS is a maintenance tracking system that can generate work orders as well as give summaries of completed and scheduled work. During the year, the operating authority at the facility generates scheduled work orders on a weekly, monthly and annual basis. The service work is recorded in the work order history. This ensures routine and preventive maintenance is carried out and assets are maintained to manufacturer's and/or industry standards. Emergency and capital repair maintenance is completed and added to the system.

Refer to Appendix II for work order and maintenance summary.

***e. a summary of any effluent quality assurance or control measures undertaken;***

Effluent quality assurance is maintained in several ways. Laboratory samples are sent to accredited laboratory (SGS Lakefield) for analysis of all effluent parameters. Sampling calendars issued to the operator denote frequency of sampling and these calendars are submitted to the Process Compliance Technician at the end of each month. Raw and effluent samples are collected as per ECA No. 3688-BW3RGB and the results are reviewed on a regular basis to ensure compliance with the site's objectives and limits.

Effluent control measures include in-house sampling and testing for operational parameters such as pH, temperature, phosphorus, dissolved oxygen, 30 minute settling and Mixed Liquor Suspended Solids (MLSS). In-house testing provides real time results which are then evaluated to determine if process changes are necessary to enhance operational performance. All in-house sampling and analysis are performed by certified operations staff utilizing approved methods and protocols for sampling, analysis and recording as specified in the Ministry’s Procedure F-10-1, “Procedures for Sampling and Analysis Requirements for Municipal and Private Sewage Treatment Works”, the Ministry’s publication, “Protocol for the Sampling and Analysis of Industrial/Municipal Wastewater” and the publication, “Standard Methods for the Examination of Water and Wastewater”.

Work orders are scheduled through our asset maintenance management system to ensure preventative and corrective maintenance is completed and recorded by operations staff. A summary is attached as Appendix II. Flow meters are calibrated annually and the 2021 calibration report is provided in Appendix III.

OCWA conducts internal audits of facilities and develops Action Plans to ensure deficiencies are identified and corrected. OCWA has developed comprehensive manuals detailing operations, maintenance, instrumentation and emergency procedures. To ensure facilities are operated in compliance with applicable legal requirements, facility staff has access to a network of compliance and support professionals at the hub, region and corporate level.

Continuous phosphorus removal is achieved with the dosing of aluminum sulphate. A summary of its use and dosing rates for 2021 is provided in the following table.

<b>Table 15: Coagulant Use and Dosing 2021</b>		
<b>Month</b>	<b>Aluminum Sulphate (kg)</b>	<b>Aluminum Sulphate Average Dosage (mg/L)</b>
<b>January</b>	1761.68	42.74
<b>February</b>	1631.4	65.09
<b>March</b>	1757.9	33.58
<b>April</b>	1700.3	48.38
<b>May</b>	1751.3	65.53
<b>June</b>	1669.6	75.05
<b>July</b>	1726.7	76.55
<b>August</b>	1730.8	63.02
<b>September</b>	1665.9	59.07

<b>Month</b>	<b>Aluminum Sulphate (kg)</b>	<b>Aluminum Sulphate Average Dosage (mg/L)</b>
<b>October</b>	1693.6	62.35
<b>November</b>	1603.33	63.39
<b>December</b>	1807.2	55.41

**f. a summary of the calibration and maintenance carried out on all Influent and Final Effluent monitoring equipment to ensure that the accuracy is within the tolerance of that equipment as required in this Approval or recommended by the manufacturer;**

Refer to Appendix III for 2021 calibration reports.

**g. a summary of efforts made to achieve the design objectives in this Approval, including an assessment of the issues and recommendations for pro-active actions if any are required under the following situations:**

**i when any of the design objectives is not achieved more than 50% of the time in a year, or there is an increasing trend in deterioration of Final Effluent quality;**

**ii when the Annual Average Daily Influent Flow reaches 80% of the Rated Capacity;**

Continuous efforts were made to meet the Effluent Objectives in 2021:

1. Development of the sampling plan which meets or exceeds the minimum sample requirements as required in the ECA;
2. Visual Inspection of the entire process while performing rounds including visual inspection of effluent to ensure it did not contain oil or other substance in amounts sufficient to create a visible film or sheen on the surface of the receiving waters, and which was essentially free of any floating material;
3. Influent monitoring;
4. Ensuring that chemicals are being dosed as required;
5. Calibration of lab equipment;
6. Annual calibration of flow meters;
7. Oxidation ditch increased DO monitoring;

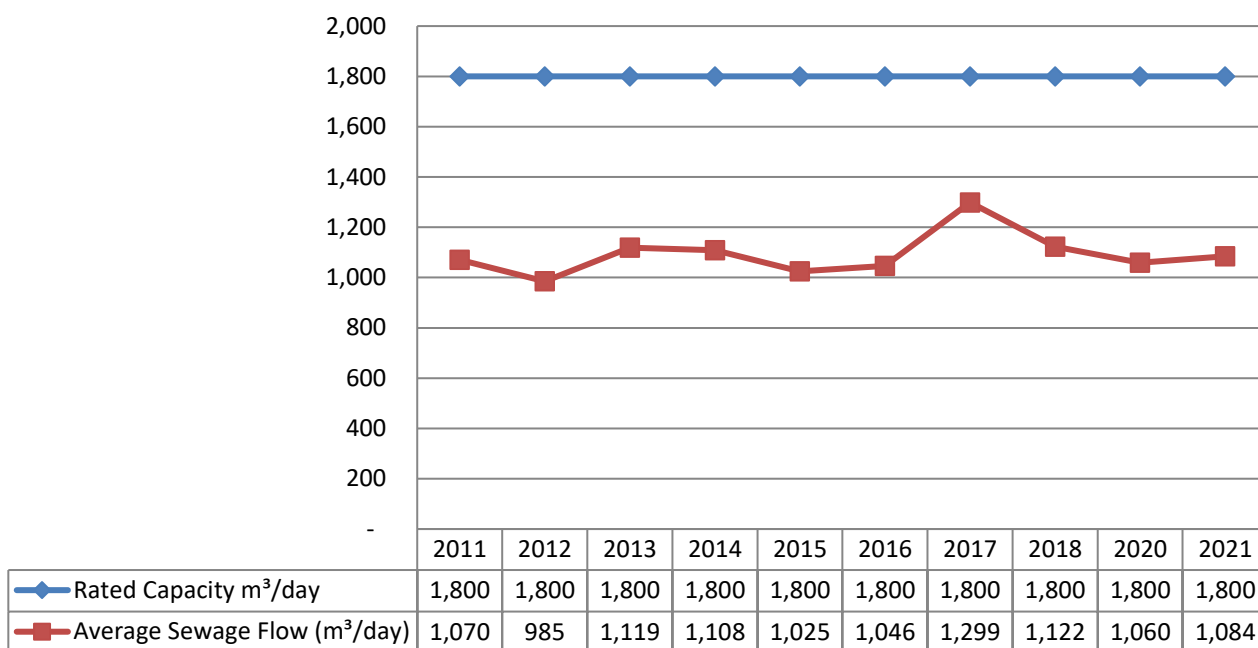
8. Ensure UV is providing disinfection, both banks on regardless of flow rates;
9. Performing preventative maintenance activities in accordance with work order schedules;
10. Performing in-house lab tests;
11. Monitoring treatment processes by performing regular laboratory analysis and reviewing of lab results;
12. Biosolids monitoring

Effluent design objectives were met 100% of the time for CBOD, Total Suspended Solids, TAN and E. Coli. Total Phosphorus monthly concentration design objective was met 92.7% in 2021 and pH objective was met 97.7% in 2021. The three partial sand filter bypasses that occurred in March, September and December were sampled as required by ECA No. 3688-BW3RGB. Details of the bypasses and sampling results are included under Condition j.

The ECA states the plant has a Rated Capacity of 1,800m<sup>3</sup>/day. The Rated Capacity means the Average Daily Flow for which the plant is approved to treat. The Average Daily Flow is determined by the cumulative total sewage flow into the plant during a calendar year, which is then divided by the number of days during which sewage flowed into the plant. The annual average daily influent flow for 2021 is 1,084.02 m<sup>3</sup>/day or 60% of the Rated Capacity.

The following graph shows the plant has been operating within the Rated Capacity for the past ten years.

**Graph 14: Average Sewage Flow and Rated Capacity Comparisons**



**h. a tabulation of the volume of sludge generated, an outline of anticipated volumes to be generated in the next reporting period and a summary of the locations to where the sludge was disposed;**

Attached is Appendix IV: Sludge/Biosolids Summary that contains quantities of organics, inorganics, e-coli and volumes of Biosolids/sludge generated for the reporting period - which was a total of 1,978.58m<sup>3</sup>. This is a decrease from 2020 when 2,737.75m<sup>3</sup> of biosolids were hauled. The anticipated volume for the next reporting period is not expected to be appreciably different from this reporting period.

Biosolids from the Fenelon Falls WPCP were hauled, stored and land applied by Shepherds Environmental in 2021 and will be again in 2022. The Biosolids are hauled to fields with a valid NASM Plan (NASM Plan 23771) or to A710160 Shepherds Environmental Storage Structure and then applied to fields with valid NASM Plans (23424, 23763).

**i. a summary of any complaints received and any steps taken to address the complaints**

Date	Issue	Actions Taken
July 6	Two sinks in an apartment backed up.	City advised resident to contact a plumber.

<b>Date</b>	<b>Issue</b>	<b>Actions Taken</b>
September 27	Sewer backup	Tree roots cleared from private portion of sewer lateral.
November 10	Sewer backup	City was flushing sewer lines and a number of residents has their toilets backup. City operators spoke with residents and issues were resolved.
December 3	Sewer connection	Resident needed assistance to get sewer connection.

**j. a summary of all Bypasses, Overflows, other situations outside Normal Operating Conditions and spills within the meaning of Part X of EPA and abnormal discharge events;**

The following table summarizes all Bypasses, Overflows and other situations outside of Normal Operating Conditions and spills and abnormal discharge events that occurred in 2021. The Operations Event Forms and sampling results for these events are provided in Appendix V. All were reported to MOH, MECP and the City.

<b>Date 2021</b>	<b>Type of Event</b>	<b>Total Volume (m<sup>3</sup>)</b>	<b>Disinfect (Y/N)</b>	<b>Samples Collected (Y/N)</b>	<b>Reason</b>
Mar 12 - 15	Partial Sand Filter Bypass	1,932	Y	Y	Wet weather event
Sep 23 - 24	Partial Sand Filter Bypass	601	Y	Y	Wet weather event
Dec 11 - 13	Partial Sand Filter Bypass	1,360	Y	Y	Wet weather event

ECA No. 3688-BW3RGB requires submission of quarterly summary reports of any Bypass Events and Overflows Events. Copies of these reports are provided in Appendix V



**k. summary of all Notice of Modifications to Sewage Works completed under Paragraph 1.d. of Condition 10, including a report on status of implementation of all modification.**

No Notice of Modifications was submitted in 2021 to the District Manager as a result of Schedule B, Section 1.

**l. a summary of efforts made to achieve conformance with Procedure F-5-1 including but not limited to projects undertaken and completed in the sanitary sewer system that result in overall Bypass/Overflow elimination including expenditures and proposed projects to eliminate Bypass/Overflows with estimated budget forecast for the year following that for which the report is submitted.**

2021 efforts included a full sanitary sewer collection system flushing maintenance program, continued monitoring of installed rain stoppers in manholes with an additional 6 installed. Manhole rehabilitation program included the frame and cover replacement of 7 manholes, manhole grouting in 4 manholes, and pressure grouting of a few laterals.

The estimated budget forecast for 2022 is:

Collection System Flushing - \$5,500 (partial)  
Manhole repairs - \$34,000

**m. a summary of any deviation from the monitoring schedule and reasons for the current reporting year and a schedule for the next reporting year**

ECA No. 3688-BW3RGB Schedule D Monitoring Program describes the requirement for sample collection at the following locations, frequencies and by means of the specified sample type and analyzed for each parameter listed and all results recorded:

<b>Table 18: Influent – Influent sampling point</b>		
<b>Parameter</b>	<b>Type of Sample</b>	<b>Minimum Sampling Frequency</b>
BOD <sub>5</sub>	24 hour composite	Monthly
Total Suspended Solids	24 hour composite	Monthly
Total Phosphorus	24 hour composite	Monthly
Total Kjeldahl Nitrogen	24 hour composite	Monthly
<b>Table 19: Final Effluent – Final Effluent sampling point</b>		
<b>Parameter</b>	<b>Type of Sample</b>	<b>Minimum Sampling Frequency</b>

CBOD <sub>5</sub>	24 hour composite	Weekly
Total Suspended Solids	24 hour composite	Weekly
Total Phosphorus	24 hour composite	Weekly
Total Ammonia Nitrogen	24 hour composite	Weekly
Total Kjeldahl Nitrogen	24 hour composite	Weekly
Nitrate as Nitrogen	24 hour composite	Weekly
Nitrite as Nitrogen	24 hour composite	Weekly
E. Coli	Grab	Weekly
pH*	Grab/Probe/Analyzer	Weekly
Temperature*	Grab/Probe/Analyzer	Weekly
Un-ionized Ammonia**	As Calculated	Weekly

\*pH and temperature of the Final Effluent shall be determined in the field at the time of sampling for Total Ammonia Nitrogen.

\*\* The concentration of un-ionized ammonia shall be calculated using the total ammonia concentration, pH and temperature using the methodology stipulated in “Ontario’s Provincial Water Quality Objectives” dated July 1994, as amended.

The following tables provide a summary of the number of samples collected each month for those parameters required for analysis.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
BOD <sub>5</sub>	1	1	1	1	1	1	1	2	1	1	1	1
TSS	1	1	1	1	1	1	1	2	1	1	1	1
Total P	1	1	1	1	1	1	1	2	1	1	1	1
TKN	1	1	1	1	1	1	1	2	1	1	1	1

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
cBOD <sub>5</sub>	4	4	13	4	5	5	7	4	7	4	4	8
TSS	4	4	13	4	5	5	7	4	7	4	4	8
Total P	4	4	13	4	5	5	7	4	7	4	4	8
Total Ammonia Nitrogen	4	4	13	4	5	5	7	4	7	4	4	8
TKN	4	4	13	4	5	5	7	4	7	4	4	7
Nitrite as N	4	4	13	4	5	5	7	4	7	4	4	7
Nitrate as N	4	4	13	4	5	5	7	4	7	4	4	7
E. Coli	4	4	13	4	5	5	4	5	7	4	4	8
pH	15	14	18	17	14	16	17	13	17	12	12	15
Temp °C	15	14	18	17	14	16	17	13	17	12	12	15

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Unionized Ammonia (calculated)	4	4	13	4	5	5	7	4	7	4	4	8

The required number of influent and final effluent samples were collected at the specified locations and frequencies during the reporting period as per ECA No. 3688-BW3RGB Schedule D. The following are deviations from the scheduled sampling calendar in 2021:

- March – additional sampling during high flows and partial sand filter bypassing
- July – additional sampling during high flows
- August – monthly influent sample for August 4 was collected August 11 due to oversight when setting samplers
- September – monthly influent sample for September 1 was collected September 8 to ensure sampling window met; additional sampling during partial sand filter bypassing
- December – additional sampling during partial sand filter bypassing

ECA No. 3688-BW3RGB Schedule D prescribes the following sampling requirements for Sludge/Biosolids as shown in the following table.

Parameter	Type of Sample	Minimum Sampling Frequency
Total Solids	Grab	Quarterly
Total Phosphorus	Grab	Quarterly
Total Ammonia Nitrogen	Grab	Quarterly
Nitrate as Nitrogen	Grab	Quarterly
Metal Scan - Arsenic - Cadmium - Cobalt - Chromium - Copper - Lead - Mercury - Molybdenum - Nickel - Potassium - Selenium - Zinc	Grab	Quarterly

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Total Solids	0	1	2	1	1	1	1	2	1	1	1	1
TP	0	1	2	1	1	1	1	2	1	1	1	1
TAN	0	1	2	1	1	1	1	2	1	1	1	1
Nitrate as Nitrogen	0	1	2	1	1	1	1	2	1	1	1	1
Arsenic	0	1	2	1	1	1	1	2	1	1	1	1
Cadmium	0	1	2	1	1	1	1	2	1	1	1	1
Cobalt	0	1	2	1	1	1	1	2	1	1	1	1
Chromium	0	1	2	1	1	1	1	2	1	1	1	1
Copper	0	1	2	1	1	1	1	2	1	1	1	1
Lead	0	1	2	1	1	1	1	2	1	1	1	1
Mercury	0	1	2	1	1	1	1	2	1	1	1	1
Molybdenum	0	1	2	1	1	1	1	2	1	1	1	1
Nickel	0	1	2	1	1	1	1	2	1	1	1	1
Potassium	0	1	2	1	1	1	1	2	1	1	1	1
Selenium	0	1	2	1	1	1	1	2	1	1	1	1
Zinc	0	1	2	1	1	1	1	2	1	1	1	1

Sludge/biosolids samples are collected typically once per month when sludge/biosolids are hauled from the facility. This meets the required minimum number samples at the specified location and frequency during the reporting period as required by ECA No. 3688-BW3RGB Schedule D.

The 2022 sample schedule for the Fenelon Falls WPCP is provided in Appendix VII.