Corporation of the City of Quinte West

Trenton Wastewater Treatment Plant

2021 Annual Performance Report

A Natural Attraction

Executive Summary

The Trenton Wastewater Treatment Plant (WWTP), MOE Identifier number: 110000775, is located at 25 Couch Crescent in the City of Quinte West. It is rated as a Class III facility and has a rated Average Daily Flow (ADF) capacity of 15,900 m^3/d, and a Peak Flow Rate capacity of 51,100 m^3/d. The facility is described as a conventional activated sludge treatment plant, with Tertiary treatment consisting of two shallow-bed sand media filters. The facility and associated main Sewage Pumping Station lifecycle upgrades have been completed as of 2020. The next phase upgrade will be undertaken once, either the facility is operating in the range of its Rated Capacity, or the Ministry mandates Effluent compliance criteria the facility is not designed to meet.

The annual reporting requirements as per Environmental Compliance Approval (ECA) number 6269-BTVJ8Q, issued on October 21, 2020, have been listed below. In accordance with Condition 10, a performance report shall be prepared and submitted to the *Water Supervisor* 90 days following the end of the period being reported upon. The following is a list of the information to be included in this annual report in accordance with the applicable ECA's:

a) *A summary and interpretation of all Influent and Imported Sewage 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 any deviation from the monitoring schedule and reasons for the current reporting year and a schedule for the next reporting year;*

d) *A summary of all operating issues encountered and corrective actions taken;*

e) *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;*

f) A summary of any effluent quality assurance or control measure undertaken;

g) A summary of the calibration and maintenance carried out on all Influent, Imported Sewage 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;

h) A summary of efforts made to achieve the design objectives in this Approval, including an assessment of the issues and recommendations for proactive actions if any are required under the following situations:

a. 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;

b. When the Annual Average Daily Influent Flow reaches 80% of the Rated Capacity;

i) A tabulation of the volume of sludge generated, and outlined of anticipated volumes to be generated in the next reporting period and a summary of the locations to where the sludge was disposed;

j) A summary of any complaints received and any steps taken to address the complaints;

k) A summary of all Bypasses, Overflows, other situations outside Normal Operating Conditions and sills within the meaning of Part X of EPA and abnormal discharge events;

l) A summary of all Notices of Modifications to Sewage Works completed under Paragraph 1.d. Of Condition 10, including a report on status of implementation of all modifications;

m) 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; and

n) Any changes or updates to the schedule for the completion of construction and commissioning operation of major process(es)/equipment groups in the Proposed Works.

Summary and Interpretation of Monitoring Data

Final Effluent parameter monitoring - with Limits								
Month	**[CBOD5]** *(mg/L)*	**[TSS]** *(mg/L)*	**[TP]** *(mg/L)*	**GMD E.Coli** *(cfu/100mL)*	**Acute Lethality RBT** *(% Mortality)*	**Acute Lethality DM** *(% Mortality)*	**pH - MIN**	**pH - MAX**
	Limit: 25.0mg/L; Objective: 15.0mg/L	*Limit: 25.0mg/L; Objective: 15.0mg/L*	*Limit: 0.30mg/L; Objective: 0.15mg/L*	*Limit: 200 cfu/100mL; Object.: 100 cfu/100mL*	Non-lethal	Non-lethal	*Limit: 6.0*	*Limit: 9.5*
January	2.8	3.0	0.06	3.5	0	0	6.65	7.27
February	4.3	4.5	0.10	3.7			6.76	7.45
March	3.4	3.2	0.06	2.5			6.86	7.32
April	2.5	2.5	0.07	2.0	0	0	6.55	7.06
May	2.5	3.0	0.07	2.0			6.61	7.00
June	2.2	4.0	0.13	2.0			6.41	6.88
July	2.0	2.4	0.13	2.0	0	0	6.59	7.05
August	2.0	2.8	0.08	4.4			6.62	6.93
September	2.5	4.3	0.10	2.7			6.66	6.95
October	2.0	2.0	0.04	2.0	0	0	6.67	6.93
November	2.0	2.0	0.04	4.8			6.87	7.19
December	2.2	2.5	0.03	4.9			6.70	6.97

Final Effluent parameter monitoring - without Limits			
	Total Ammonia Nitrogen (TAN) (mg/L)	**Unionized Ammonia** (mg/L)	**Temperature - Avg** (deg.C)
January	0.20	0.001	13.38
February	1.68	0.003	12.45
March	10.08	0.033	12.79
April	0.53	0.002	14.00
May	0.18	0.001	16.26
June	0.30	0.001	19.85
July	0.35	0.001	21.49
August	0.58	0.002	22.60
September	0.10	0.001	22.27
October	0.10	0.001	20.33
November	0.10	0.001	17.38
December	1.30	0.003	13.83

Monthly Average Effluent Waste Loadings			
Month	**CBOD5** *(kg/d)*	**Total Suspended Solids** *(kg/d)*	**Total Phosphorus** *(kg/d)*
	Limit: 397.5 kg/d	*Limit: 397.5 kg/d*	*Limit: 4.77 kg/d*
January	30.9	33.7	0.65
February	36.2	38.3	0.87
March	36.7	34.6	0.63
April	25.3	25.3	0.68
May	23.5	28.2	0.66
June	18.5	33.7	1.08
July	18.6	22.3	1.25
August	17.1	23.5	0.66
September	28.1	47.8	1.10
October	23.3	23.3	0.44
November	24.7	24.7	0.46
December	29.1	33.6	0.40

Raw Sewage Monthly Average Concentrations						
	Monthly Average BOD5 Concentration *(mg/L)*	**Monthly Average Total Suspended Solids Concentration** *(mg/L)*	**Monthly Average Total Phosphorus Concentration** *(mg/L)*	**Monthly Average Total Kjeldahl Nitrogen Concentration** *(mg/L)*	**Total Ammonia Nitrogen** *(mg/L)*	**pH**
January	180.5	228.8	4.2	23.5	17.4	7.2
February	219.0	309.8	4.7	25.7	22.3	7.6
March	227.0	290.2	3.8	23.1	18.8	7.2
April	174.8	231.0	1.9	13.9	10.9	7.7
May	229.5	291.5	4.5	29.3	23.1	8.2
June	235.0	371.4	4.7	35.6	23.0	8.2
July	166.8	246.3	2.9	19.0	16.8	7.8
August	159.5	361.0	3.4	25.3	18.8	7.9
September	206.6	364.0	2.6	19.4	16.7	7.2
October	187.8	294.0	2.8	24.4	16.4	7.3
November	109.0	204.3	2.3	16.8	12.8	7.3
December	180.6	164.2	1.8	16.1	13.2	7.2

	Facility Influent Flow Monitoring			**Facility Effluent Flow Monitoring**		
Month	**Average Daily Influent Flow** *(cu.m/day)*	**Month Max Daily Influent Flow** *(cu.m/day)*	**Total Influent Flow** *(cu.m/month)*	**Average Daily Effluent Flow** *(cu.m./day)*	**Month Max Daily Effluent Flow** *(cu.m./day)*	**Total Effluent Flow** *(cu.m./month)*
	Rated Capacity: 15,900 cu.m./day	*Peak Rated Capacity: 51,100 cu.m./day*				
January	10,537.4	12,340.4	326,660.1	11,230.3	13,562.0	348,139.2
February	8,140.5	10,170.0	227,934.7	8,514.6	10,466.0	238,409.3
March	10,406.3	14,200.0	322,596.1	10,797.0	14,670.0	334,708.0
April	9,817.2	11,551.7	294,514.5	10,126.0	11,709.0	303,780.4
May	8,673.6	10,789.5	268,881.6	9,392.6	11,732.0	291,170.6
June	7,625.1	8,616.5	228,754.2	8,427.4	9,463.0	252,820.6
July	8,771.6	11,291.3	271,918.9	9,309.3	12,491.0	288,587.9
August	7,716.9	9,536.8	239,224,3	8,534.8	9,938.0	264,577.9
September	10,610.4	31,465.8	318,312.2	11,250.3	29,394.0	337,509.9
October	11,112.6	18,053.3	344,492.0	11,639.0	18,016.0	360,808.1
November	12,069.3	15,542.1	362,079.2	12,361.2	15,344.0	370,835.7
December	12,624.2	19,203.5	391,349.1	13,432.7	19,899.0	416,414.0
	Annual Avg Daily Influent Flow = 9,854.0 cu.m./day	**Max Daily Influent Flow = 31,465.8 cu.m./day**	**Total Annual Influent Flow = 3,596,716.8 cu.m.**	**Annual Avg Daily Effluent Flow = 10,432.2 cu.m./day**	**Max Daily Effluent Flow = 29,394.0 cu.m./day**	**Total Annual Effluent Flow = 3,807,761.6 cu.m.**

Summary of Bypass, Spill, or Abnormal Discharge Event(s)

Month	Date	Duration	Event Type	Volume (cu.m)
January	Jan 11	2.25 hrs	Thickened Digested Sludge Spill - overfilling of haulage truck	0.4
February	Feb 26	9 min.	Abnormal Discharge Event - Low UV Dose	N/A
March	Mar 22	1 hr	Spill of Raw Sewage - Sewer Main Blockage Backup	N/A
May	May 11	10 hrs, 20 min.	Digester Gas Spill	3.14
June	Jun 15	221 hrs	Digester Gas Spill - Scheduled - Maintenance	Cannot be quantified accurately, natural vent to atmosphere
August	Aug 10	72 hrs	Digester Gas Spill - Scheduled - Maintenance	Cannot be quantified accurately, natural vent to atmosphere
	Aug 26	2 hr, 40 min.	Digester Gas Spill - Scheduled - Maintenance	58.9
September	Sep 7	508.5 hrs	Digester Gas Spill - Scheduled - Maintenance	Cannot be quantified accurately, natural vent to atmosphere
	Sep 8	3 hrs	Unplanned partial Tertiary Bypass as a result of wet weather event	582
	Sep 23	20 hrs	Unplanned partial Tertiary Bypass as a result of wet weather event	5532.5
October	Oct 18	96.5 hrs	Digester Gas Spill - Scheduled - Maintenance	Cannot be quantified accurately, natural vent to atmosphere
November	Nov 21	1 hr	Spill of Raw Sewage - Sewer Main Blockage Backup	Approx. 10

Summary of Operating Problems throughout Monitoring Period

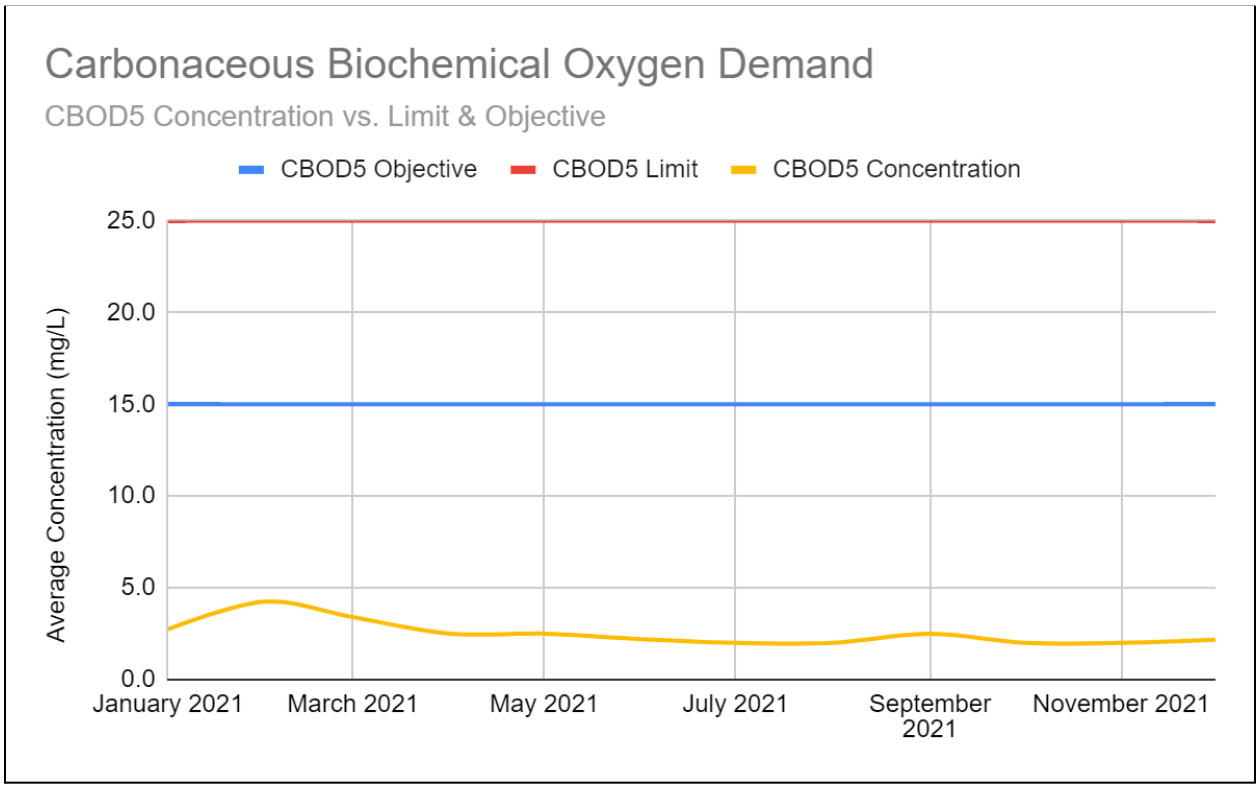
Outside of those reportable events identified above, no substantial operating problems presented themselves throughout the reporting period. Two (2) sampling events were facilitated to satisfy Condition 9(2) of the ECA. In each event, sample results measured below the Effluent Objective.

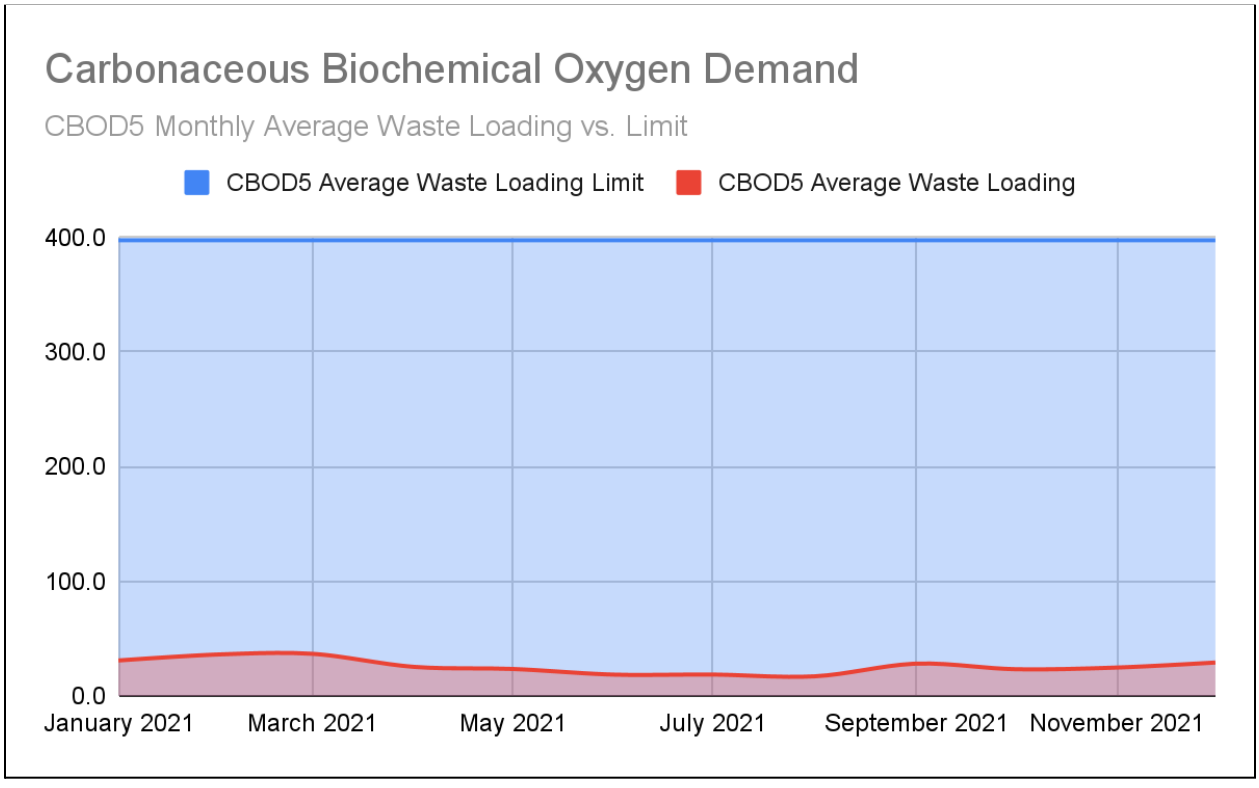
- On May 11, the pilot light for the waste gas flare failed as a result of a blown fuse. This caused a spill of digester gas to the atmosphere. The alarm, indicating this failure, did not dial out to the monitoring company due to a communication failure between the PLC and the alarm dialer. These issues were addressed by repairing the blown fuse and having a SCADA integrator check and repair the communication protocol between hardware.
- On September 3rd the UV disinfection system lost its UVT sensor. This system defaults to all UVs at 100% so no disinfection was lost. While waiting for the replacement sensor to arrive the UV banks were both run in manual at 100% to ensure we had adequate disinfection.

Analysis of Final Effluent Monitoring Dataset

Carbonaceous Biochemical Oxygen Demand (CBOD5) / Biochemical Oxygen Demand (BOD5)

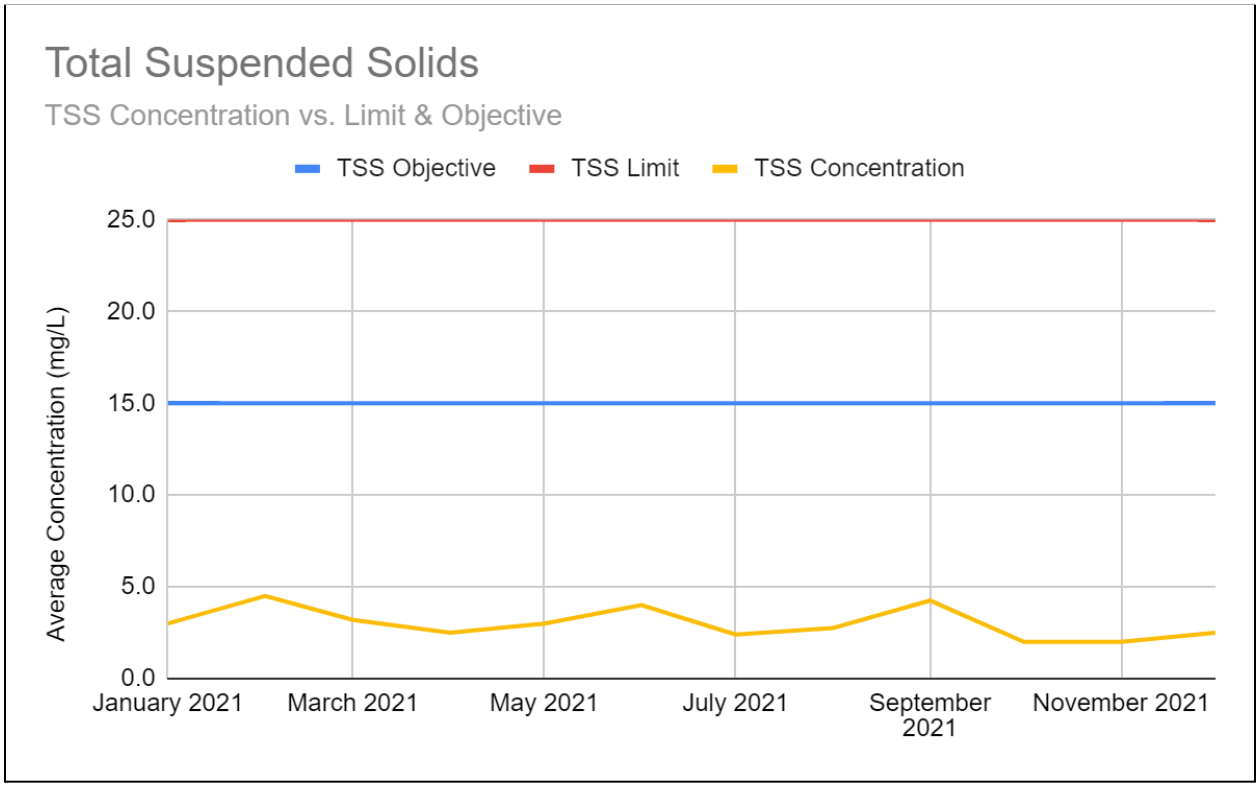
It is apparent in the following Figures that the facility operated well to remove BOD in the wastewater stream throughout the reporting period. The highest monthly average concentration of CBOD5 in the Final Effluent was measured in February, with a calculated monthly average concentration of 4.3 mg/L; 29 % lower than the Effluent Objective.

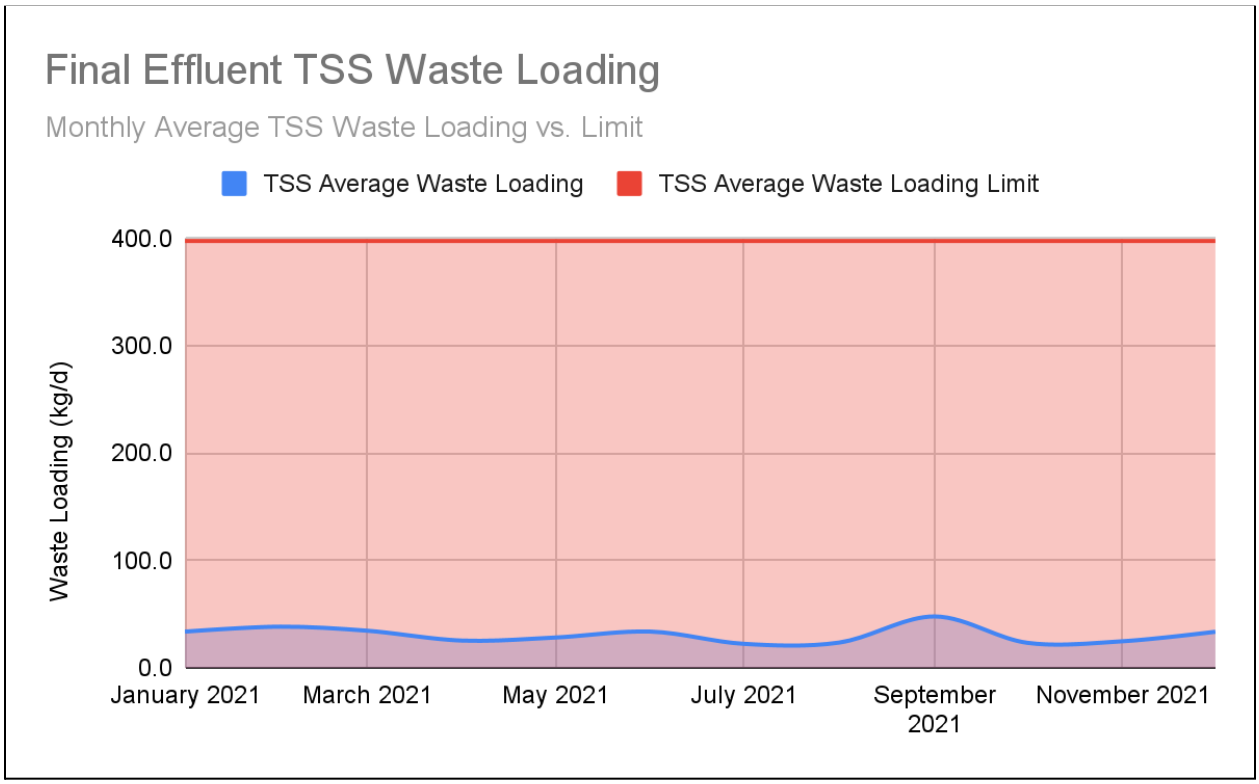

Carbonaceous Biochemical Oxygen Demand
CBOD5 Concentration vs. Limit & Objective
CBOD5 Objective
CBOD5 Limit
CBOD5 Concentration
Average Concentration (mg/L)
25.0
20.0
15.0
10.0
5.0
0.0
January 2021
March 2021
May 2021
July 2021
September 2021
November 2021


Carbonaceous Biochemical Oxygen Demand
CBOD5 Monthly Average Waste Loading vs. Limit
CBOD5 Average Waste Loading Limit
CBOD5 Average Waste Loading
400.0
300.0
200.0
100.0
0.0
January 2021
March 2021
May 2021
July 2021
September 2021
November 2021

Total Suspended Solids (TSS)

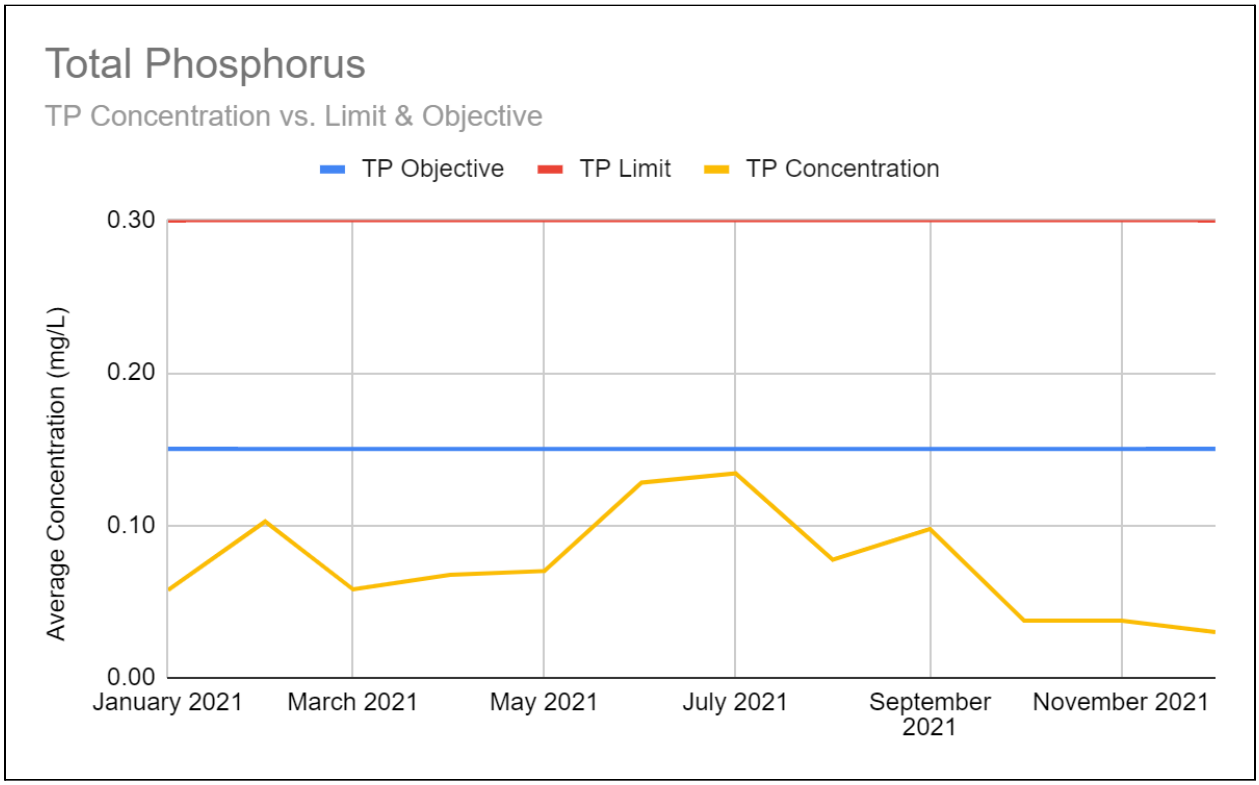
The following figures depict monthly average TSS concentrations and loadings in relation to their respective Objectives and Limits. It is clear from the charts below that the facility performed quite well over the reporting period.

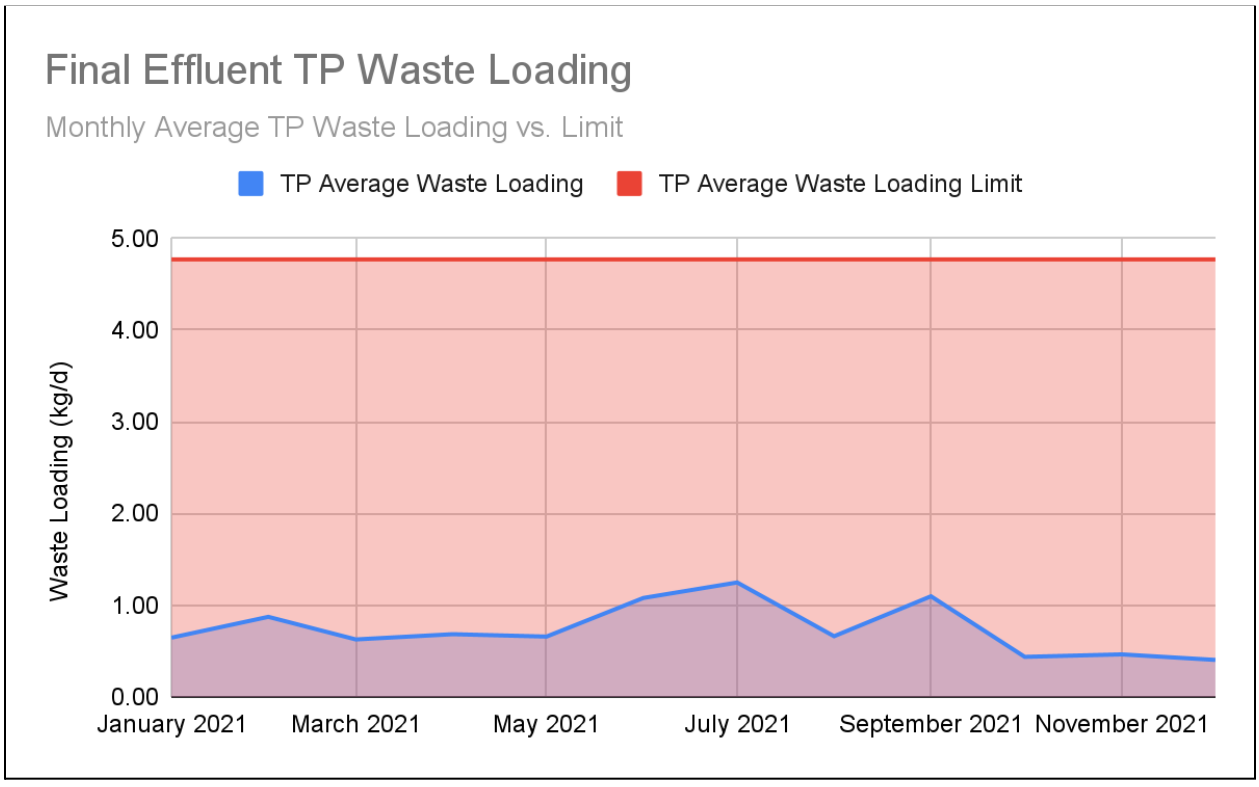




Total Phosphorus (TP)

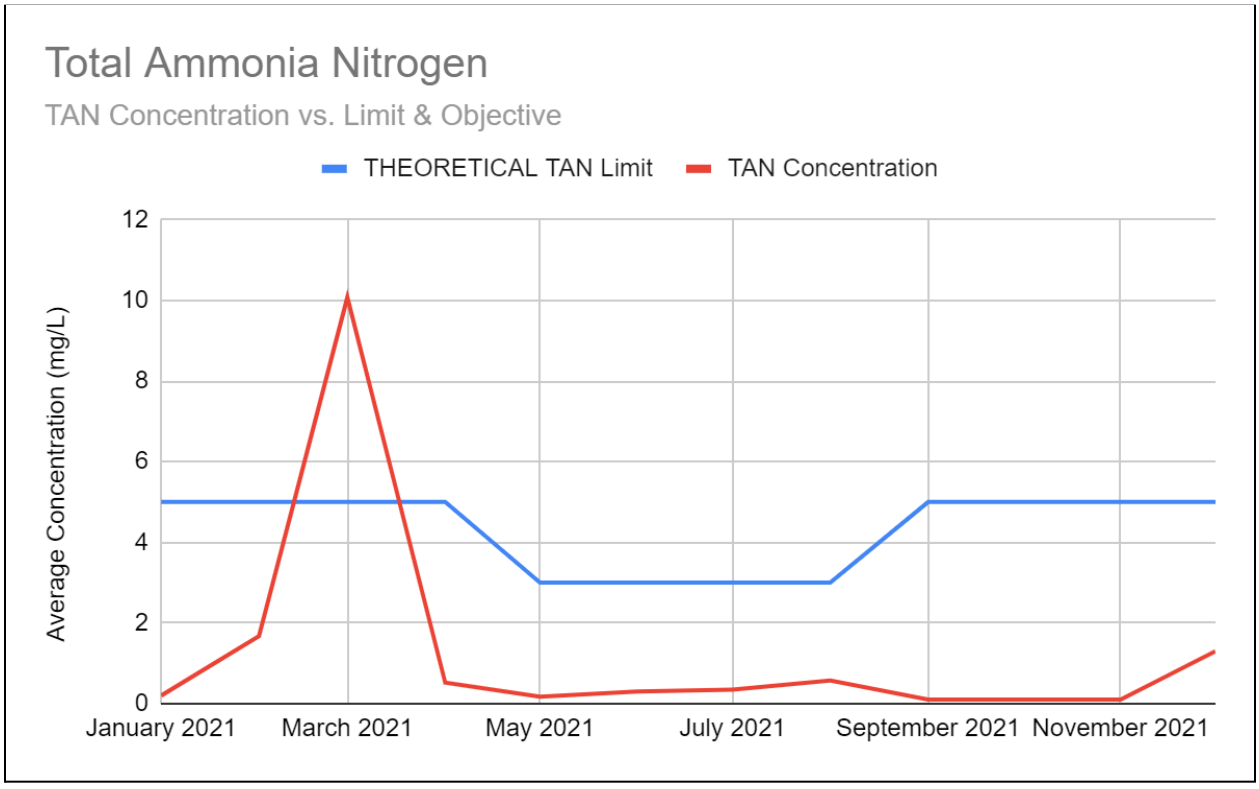
The following two figures depict monthly average TP concentrations and loadings in relation to their respective effluent Limits and Objectives. The annual average coagulant dosage in 2021 was calculated to be 52.7 mg/L, and the 2020 average was 47.3mg/L equating to a 10.25% increase in chemical dosage in 2021. Had there been an Objective established for the monthly average loading, the facility would have operated within performance criteria due to the low monthly average effluent flows.


Total Phosphorus
TP Concentration vs. Limit & Objective
TP Objective
TP Limit
TP Concentration
Average Concentration (mg/L)
0.30
0.20
0.10
0.00
January 2021
March 2021
May 2021
July 2021
September 2021
November 2021


Final Effluent TP Waste Loading
Monthly Average TP Waste Loading vs. Limit
TP Average Waste Loading
TP Average Waste Loading Limit
Waste Loading (kg/d)
5.00
4.00
3.00
2.00
1.00
0.00
January 2021
March 2021
May 2021
July 2021
September 2021
November 2021

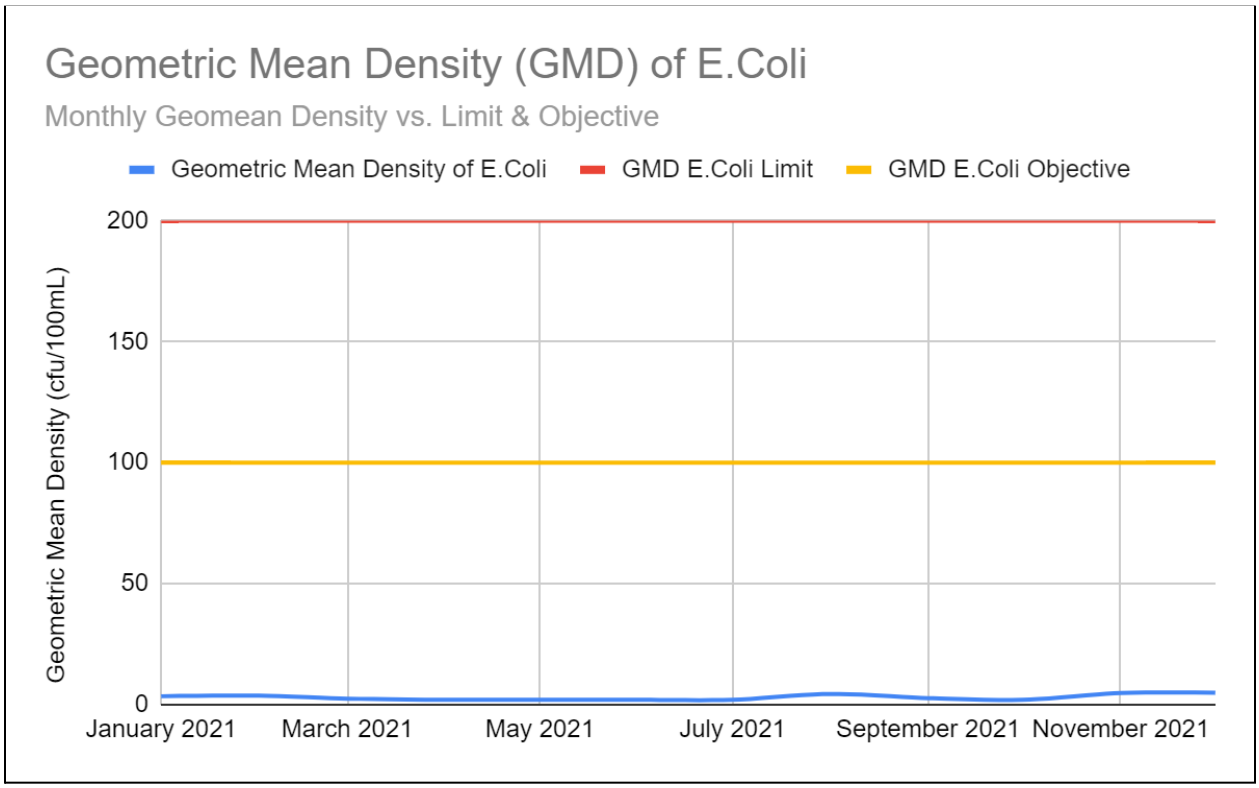
Total Ammonia Nitrogen (TAN) - Ammonia (NH_3) / Ammonium (NH_4^+)

As the facility is not designed to nitrify, there are no Effluent Limits established by the ECA. The annual average Un-ionized ammonia concentration is calculated to be 0.004 mg/L with a maximum calculated concentration of 0.046 mg/L on March 17, 2021 when nitrification process was inhibited by colder temperatures.



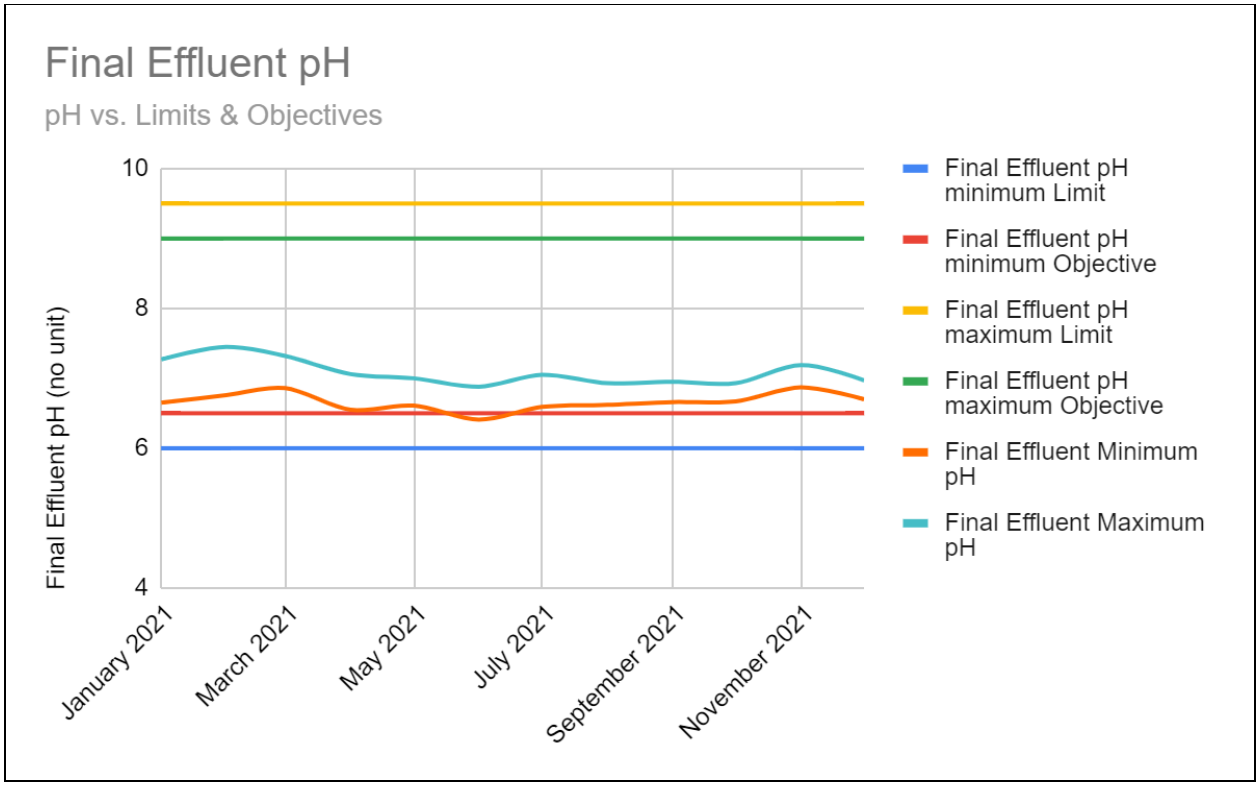
Geometric Mean Density of E. Coli

The facility UV irradiation disinfection system is capable of treating a Peak Hydraulic Flow of 79,000 cu.m/day, and an Average Daily Flow of 23,200 cu.m/day. There are two banks of lamps set up to operate in a duty/standby configuration, and power will ramp up as flows increase or effluent UV transmittance drops. Apparent in the figure below is that this system continues to perform quite well by providing reliable disinfection.



Final Effluent pH

Approximately 251 samples were collected of the Final Effluent throughout the reporting period, and pH measurement taken. As illustrated in the following figure, the Final Effluent pH was consistently measured between the allowable Limits identified in Schedule B and C of the ECA. Effluent pH measurements are performed by the Operators on a Daily basis, normally Monday to Friday. It is important to note that pH measurements used to determine compliance with the ECA have no QA/QC measures in place, other than routine calibration procedures of the pH probe.



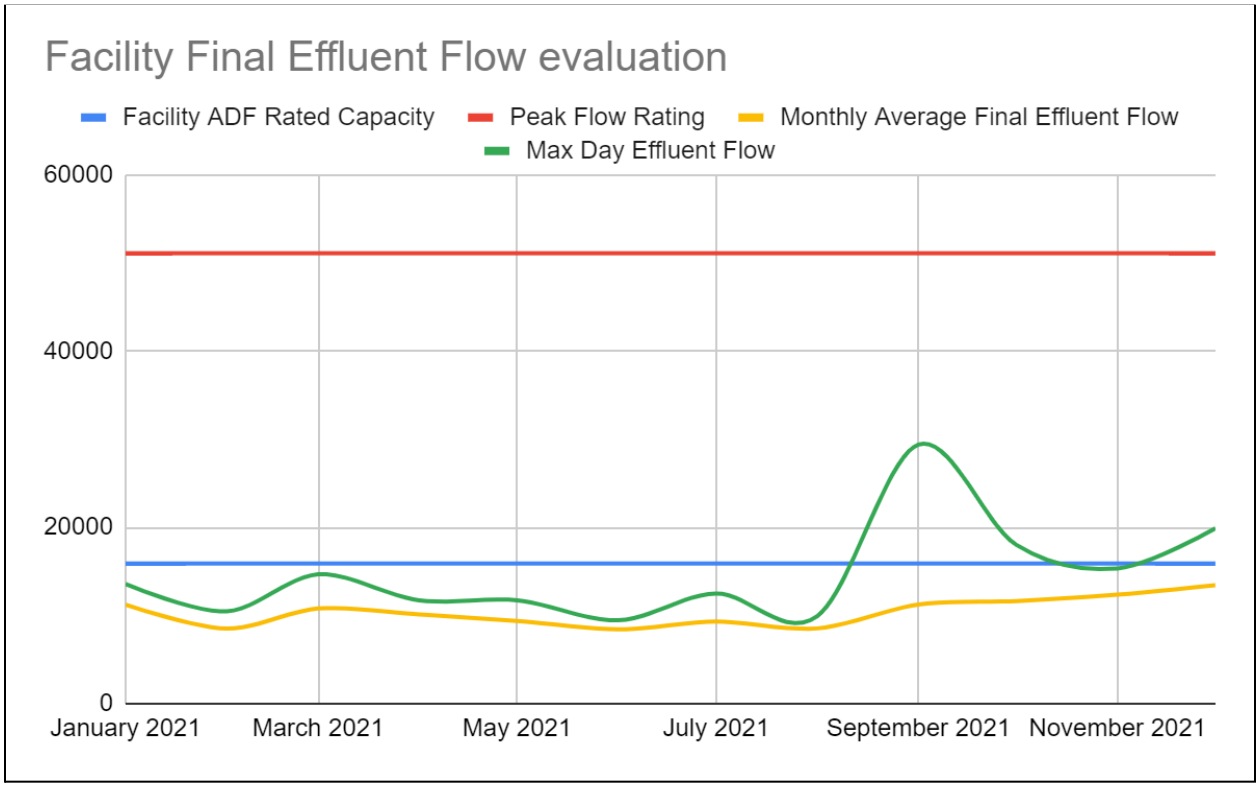
Acute Lethality to Rainbow Trout and Daphnia Magna

The City contracts all Acute Lethality testing to *Aquatox Testing and Consulting Inc*. Quarterly sample results yield 0% Mortality at 100% Effluent concentration tested in accordance with Procedure for pH stabilization during the Testing of Acute Lethality of Wastewater Effluent to Rainbow Trout.

Final Effluent Flows

In 2021, an estimated 770 mm of total precipitation was measured at the Environment Canada Belleville, ON monitoring station. In those months where rainfall totals exceeded the monthly average rainfall total of approximately 64 mm of rain, the facility measured a corresponding increase in Influent flows, and consequently Effluent Flows.

The 3-year average daily flow is 11,818 m^3/d and the 5-year average daily flow is 12,389 m^3/d indicating that the flows are lower in 2021. This is a result of ongoing capital replacement projects and the reduction of industrial operations in the community.



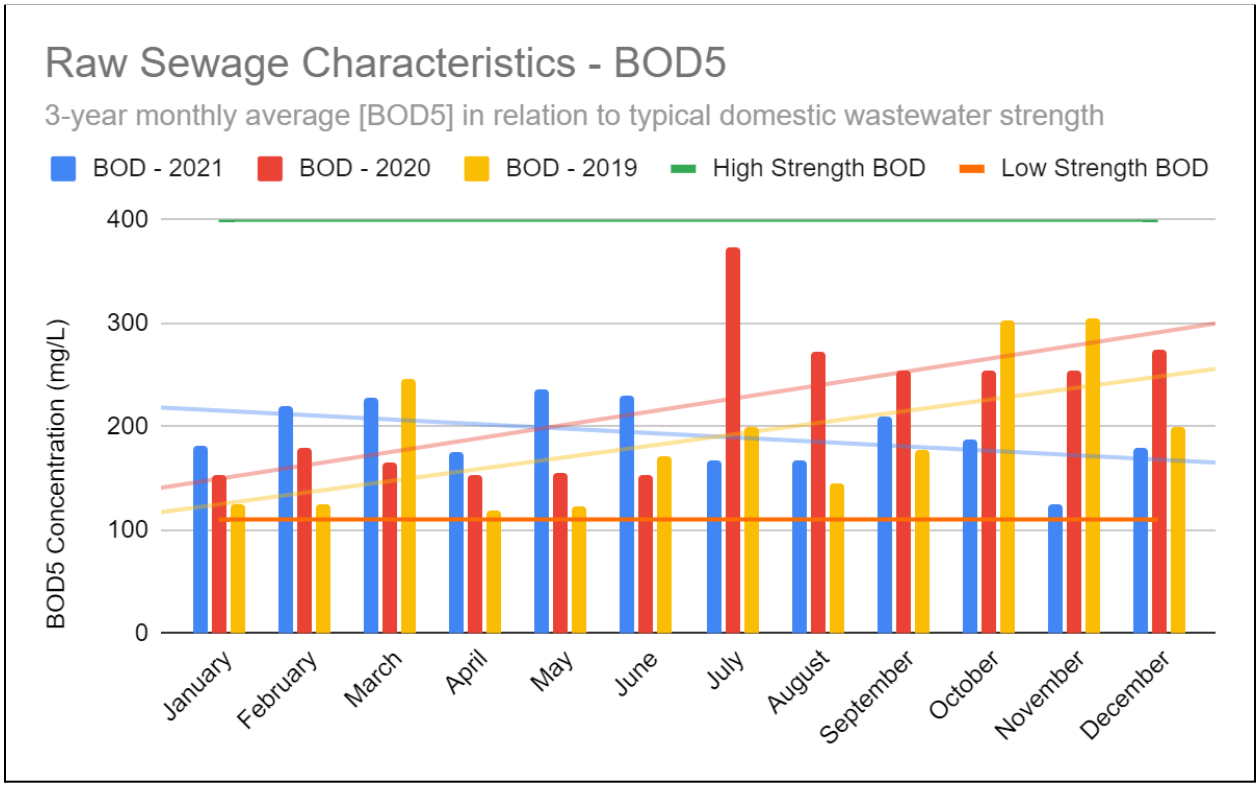
Raw Sewage Characterization

Raw sewage concentrations tend to share an inverse relationship with influent flows, meaning that when influent flows are low (during drought conditions), raw sewage concentrations of measured contaminants, tend to be higher. Outlined in the chart below are monthly average concentrations measured in raw sewage over the last three years along with associated trendlines. Also plotted on the chart are the typical high and low strengths for the associated contaminants in raw wastewater, as measured in a sample of untreated domestic wastewater. The author of this report referenced an online publication that refers to the Metcalf and Eddy Inc. *Wastewater Engineering and Treatment Reuse* manual for these figures (Metcalf and Eddy Inc. 20). Further, it is important to note that the Trenton WWTP receives a significant amount of its raw sewage supply from an Industrial source, therefore the strengths identified in the charts should only be used as a general reference point.

The following sections and charts will provide a description of the raw sewage characteristics and flow rates.

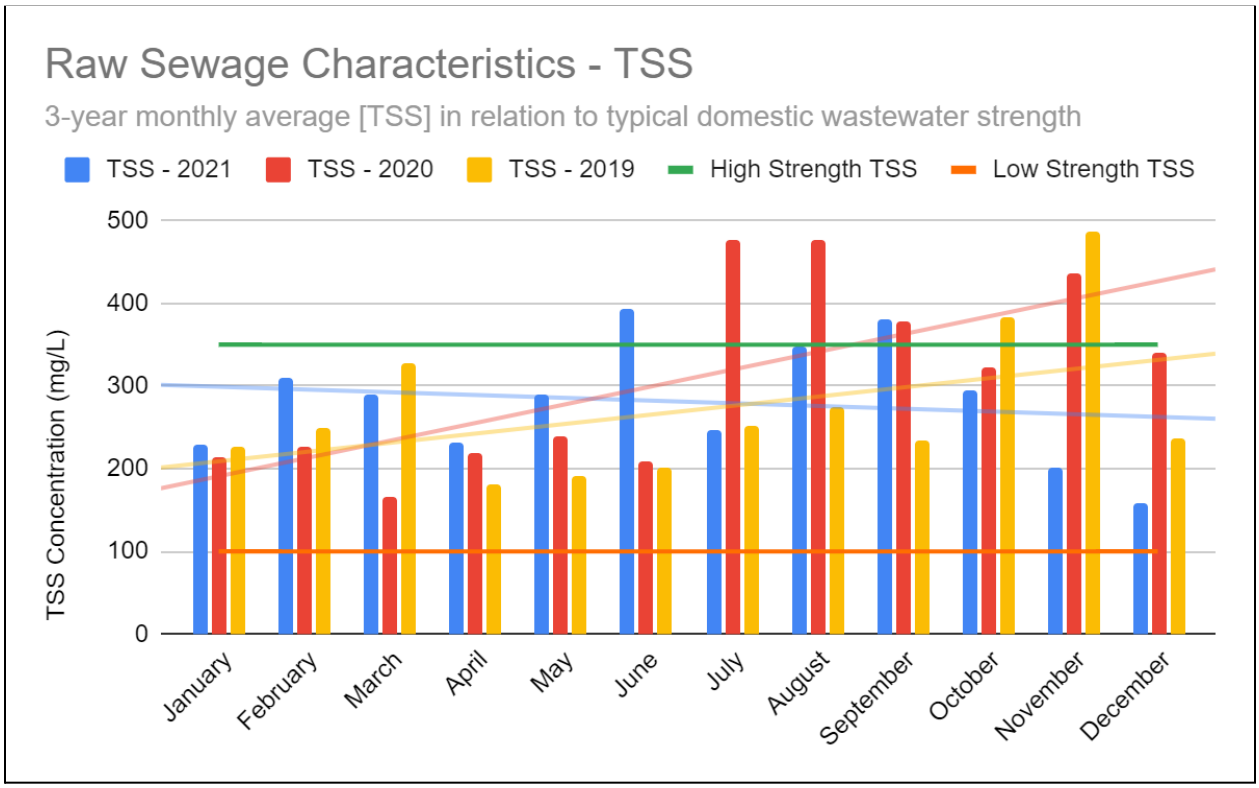
Raw Sewage Biological Oxygen Demand (BOD5)

In review of the chart below, it is apparent that raw sewage characteristics tend to trend upward in 2019 and 2020, but are trending downward in 2021. It is likely that these trends were impacted by seasonal temperatures and associated Influent flows, however, in 2021 industrial operations have decreased and two of the largest food manufacturing industries connected to the Trenton Wastewater Collection System (WWCS) have ceased operations completely. These industries may have played a role in the characteristics of BOD5 concentrations.



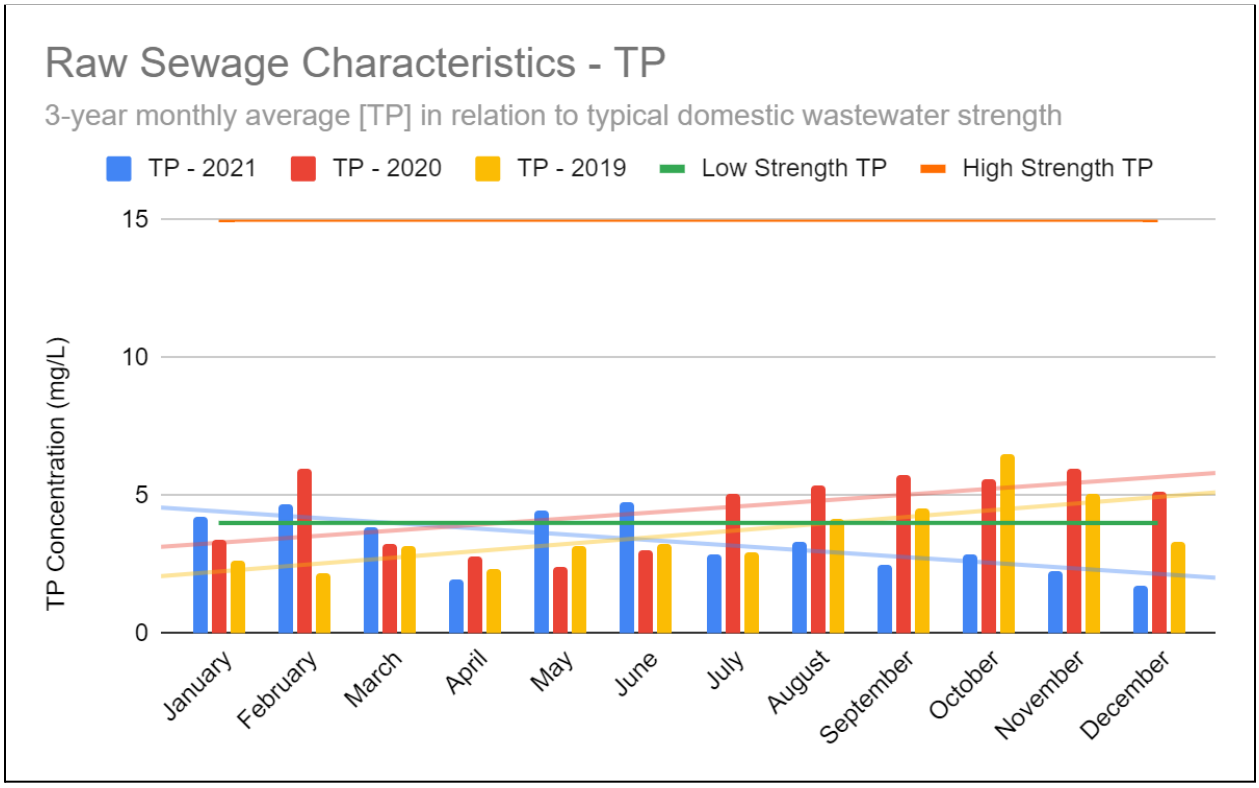
Raw Sewage Total Suspended Solids (TSS)

The characteristics for raw sewage TSS concentrations share a similar relationship with BOD5 characteristics in terms of trending. It is likely that these trends were impacted by seasonal temperatures and associated Influent flows. In 2021, industrial operations have decreased as previously described in the raw sewage BOD5 characteristics. These industries may have played a role in the characteristics of TSS concentrations.



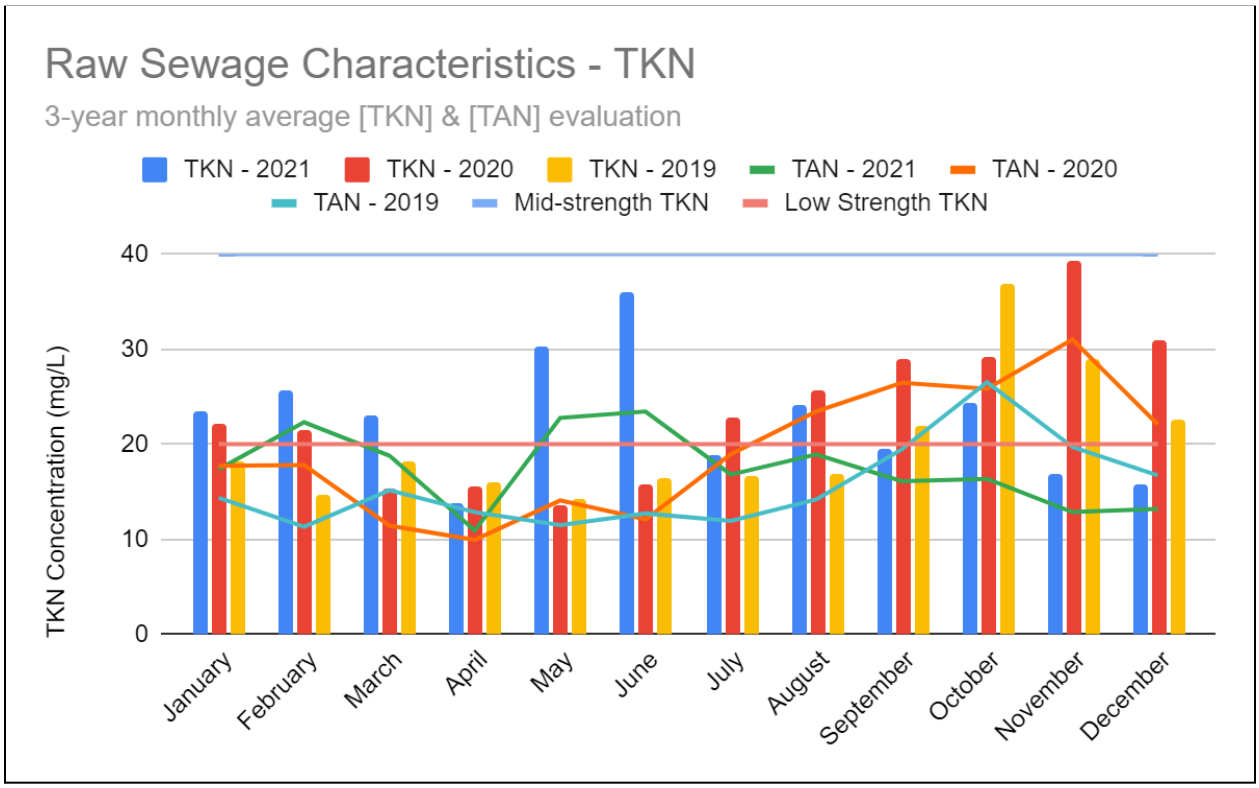
Raw Sewage Total Phosphorus (TP)

Generally speaking, Total P concentrations trended higher in 2019 and 2020 than in 2021. It is likely that seasonal influent flows impacted the monthly average concentrations. Further, TP concentrations in raw sewage tend to range in low strength area according to Metcalf and Eddy, as discussed in previous sections. It is also likely that these trends were impacted by industrial associated Influent flows. In 2021, industrial operations have decreased as previously described in the raw sewage BOD5 characteristics. These industries may have played a role in the characteristics of TP concentrations.



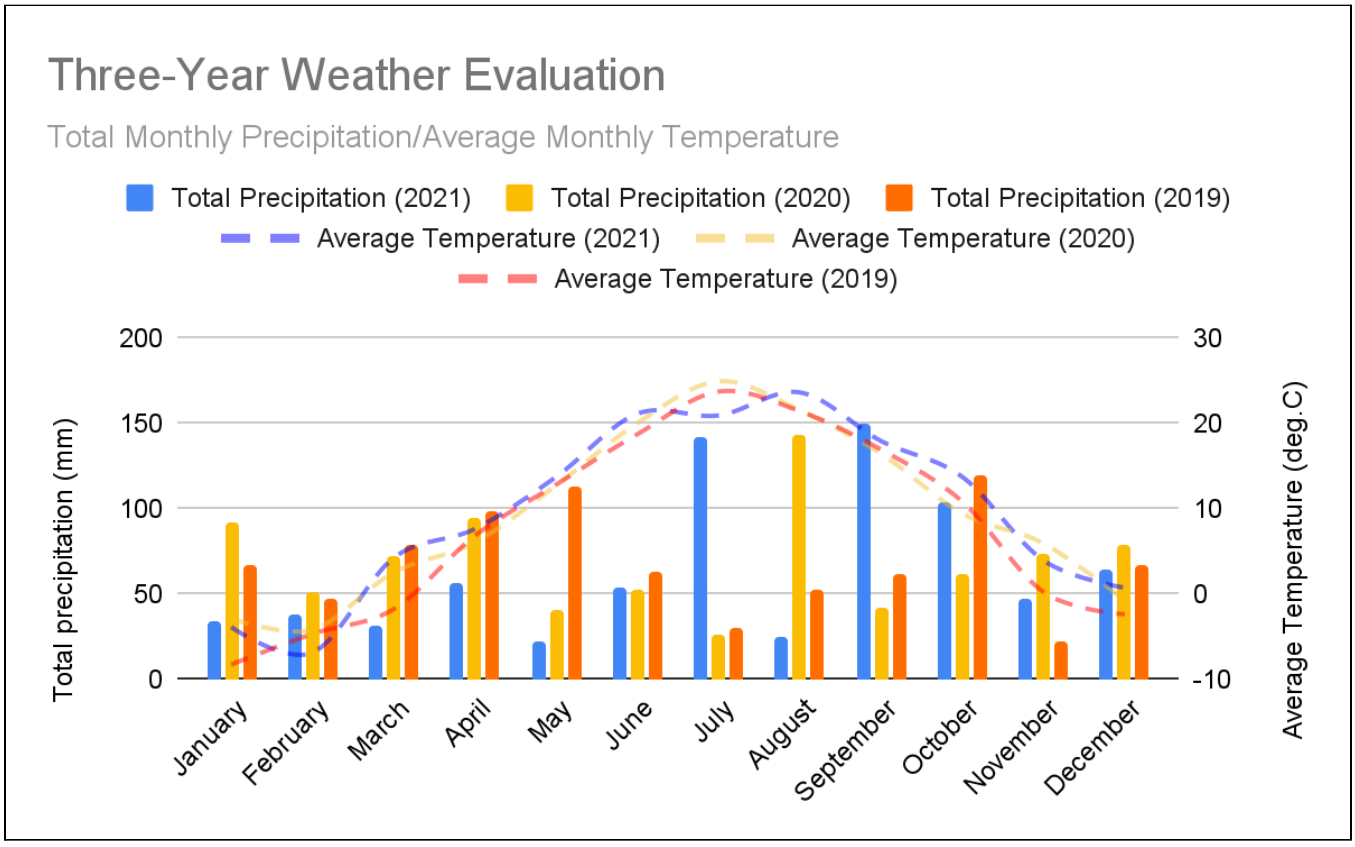
Total Kjeldahl Nitrogen (TKN) / Total Ammonia Nitrogen (TAN)

Total Kjeldahl Nitrogen (TKN) is the sum of organic nitrogen, and Total Ammonia Nitrogen (TAN) - Total Ammonia Nitrogen is the sum of Ammonia and Ammonium. Over the past three years, TAN has accounted for an average 78%, 82%, and 78% of the raw sewage TKN in 2019, 2020, and 2021 respectively. This indicates a generally stable relationship between TKN and TAN. According to Metcalf and Eddy, the TKN is considered to be in the range of low - mid-strength concentration.



Facility Influent Flow Evaluation

The following three charts provide a visual representation of weather patterns in relation to monthly average temperatures, a 3-year evaluation of the monthly average influent flows in relation to the total precipitation measured at Environment Canada Belleville, ON monitoring station, and a close look at the 2021 monthly average Influent flows in relation to the total precipitation measured at the Belleville, ON monitoring station, respectively. It is important to note that the Environment Canada website identified a number of months as being 'estimated' total precipitation amounts as some days were not captured. Therefore, these figures should be considered as such. The chart below provides an indication that while generally seasonal temperatures remained stable, the total amount of precipitation measured in the three years didn't necessarily follow the same pattern year after year though were fairly similar with total annual precipitation amount of 819 mm in 2019, 827 mm in 2020 and 770 mm in 2021.

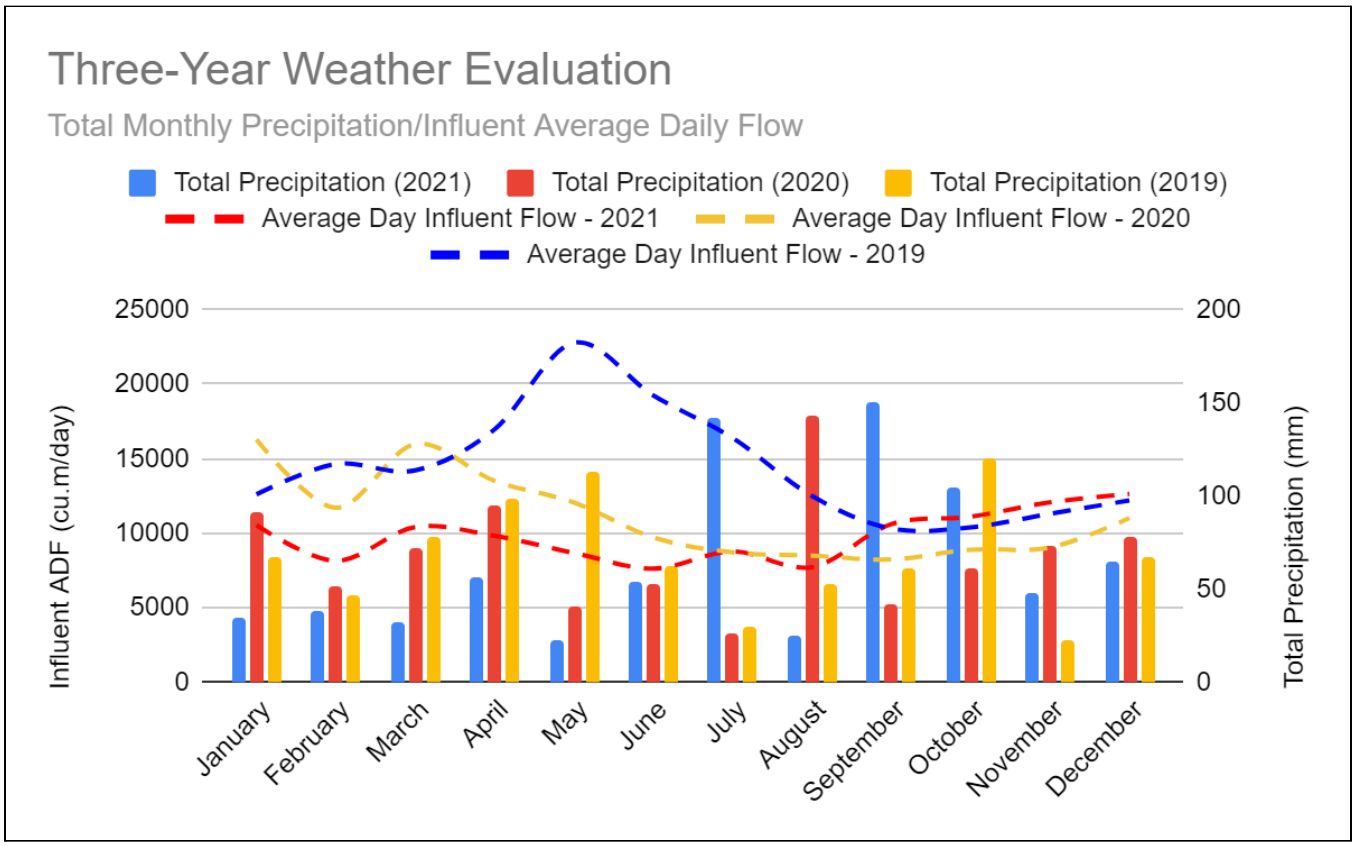


The following chart provides a depiction of how I&I may be impacting the Trenton facility as, generally speaking, Influent flows are trending in the same fashion to the corresponding weather patterns. Outlined below are assessments of the Influent Annual Average Daily Flow over the last three years:

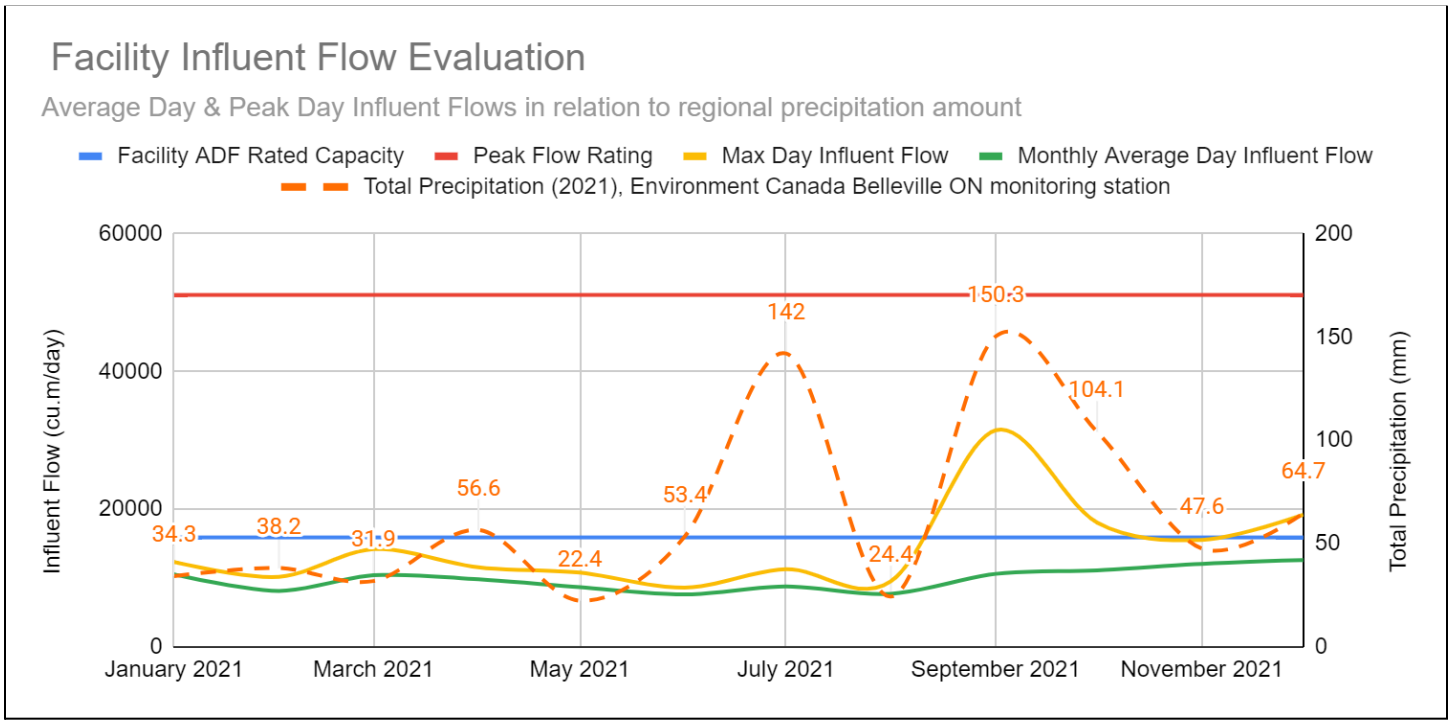
2019 - Influent AADF = 14,457 cu.m/day; 91% of Rated Capacity

2020 - Influent AADF = 11,142 cu.m/day; 70% of Rated Capacity

2021 - Influent AADF = 9,854 cu.m/day; 62% of Rated Capacity



The facility operated at 62% of its Rated Capacity over the reporting period which is a marked improvement over the last three years. The Owner has spent several million dollars over the last six years to upgrade its WWTP and Wastewater Collection System (WWCS) infrastructure which is being realized in the Influent flows in effort to extend the lifespan of the facility and reduce sources of I&I in the WWCS.



Imported Sewage

In 2021, a total of 2,552 cu.m. of biosolids were hauled from the Frankford WWTP and dewatered at the Trenton WWTP. Please refer to the Frankford WWTP Annual Performance Report for biosolids characteristics. Generally speaking, this material does not enter the treatment process and has no bearing on the overall effluent quality.

Summary of Maintenance performed throughout Reporting Period

The City continues to support an active Preventative Maintenance (PM) program to ensure the facility is maintained in a fit state of repair. A new digital operations and asset management platform was implemented in 2021 providing a more accessible and easier to use workflow for management and staff. Outside of Preventative Maintenance, the following Reactive Maintenance activities were completed by staff, or outside contractors as identified:

- Cleaning and inspection of both digesters
- One new pressure relief valve on each digester
- Replace WAS lobe pump
- Wet end assembly replacements on both Walmart PS pumps
- Wet end replacement on one Water St PS pump
- Dundas St. PS Pump #1 rebuild
- New Pump at Chester Rd. PS.
- New Pump at Telephone Rd. East Pump station
- Initiated the replacement of Gas Booster pump, ongoing
- Installed isolation valve on digester gas line to boiler 1
- Full UV bulb replacement on Bank A
- Installed surge protection devices on lighting panels feeding PLC cabinets
- Replaced redundant substation main breaker with bus bars

Biosolids Management Summary

Date Hauled	Volume Hauled (cu.m.)	Biosolids Destination
January	1213	DES Storage & Smith's Lagoons
February 8, 10, 12	555	THF Storage & Smith's Lagoons
March	811	THF Storage & Smith's Lagoons
May 19 - 21	1760	Land Application - NASM Plan #24244, NASM Plan #23401
June 16 - 17	1000	Land Application - NASM Plan #24666
August	2880	Land Application - NASM Plan #23499, NASM Plan #23513, NASM Plan #24769
October 15, 19, 20, 29	2040	Land Application - NASM Plan #23595, NASM Plan #23928, NASM Plan #24243
November 8	360	Land Application - NASM Plan #24243
December	1080	Haulage
Total Volume of liquid sludge generated and land applied = 11,699 cu.m.		
Estimated Sludge generated in 2022 - 10,000 cu.m.		

Summary of Effluent Quality Assurance and Control Measures

The City collects samples from Raw Sewage stream, Aeration Tanks, Secondary Clarifiers and Final Effluent on a routine basis throughout the week. The City satisfies its regulatory compliance requirements by submitting a set of samples to an accredited laboratory, SGS Canada Inc. on a weekly basis, normally on Wednesday's throughout the Reporting Period. These sample results are manually entered into a spreadsheet and evaluated for compliance with the ECA. In addition to these samples, Operators perform in-house analysis for Total Suspended Solids, pH, temperature, alkalinity, dissolved reactive phosphorus, and Final Effluent Dissolved Oxygen. Sample results are entered into a spreadsheet

for facility evaluation and process optimization. On an annual basis, the spectrophotometer is calibrated by a third party. Operators calibrate other instrumentation, such as the bench top pH meter, regularly.

Monitoring Schedule

As mentioned in the previous section, the facility sampled in accordance with the ECA every Wednesday. In 2022, the facility will collect samples in accordance with the ECA, every Tuesday each week.

Final Effluent Monitoring Equipment Calibration and Maintenance

Works Orders are generated on an annual basis to calibrate the facility Influent and Effluent Flow Meters. This calibration is completed by a third party contractor. The following figures are copies of the Calibration Certificates.

Tower Electronics Canada Inc.
Instrument Calibration Certificate

Customer:
The City of Quinte West
7 Creswell Drive
PO Box 490
Trenton, ON K8V 5R6

Calibration by:
Dan Matchett

Standards:
Siemens Magflo S/N NIST Cal Due Mar 2022
Rosemount 8732 MagMeter Reference Cal Due Mar 2022
Fluke 289 S/N 96220182 NIST Cal Due Mar 2022
Precision Digital S/N 1604-0199055-NIST Cal Due Mar 2022

Instrument Type
Magnetic Flow Meter

Method of verification
In Line Flow to Flow with Velocity comparison.

Meter Information

Date of Test:	2021-08-19
Calibration Due:	Aug-22
Location:	Dundas SPS
Meter Under Test	FM1
Client Tag:	QW00005644
Manufacturer:	Siemens
Model:	MAG6000
Serial Number:	081802H064
Totalizer As Found:	1419376M3
Totalizer As Left:	1419397M3
Allowable Error:	15%

Programming Parameters:

DN Size:	500.000
Cal Factor:	281.4464
Zero Cal:	0
Qmax:	1500LPS
Operating Time(Days):	2617
Flow Direction:	Positive

Flow Test

Velocity	Current Output mA			Frequency Output khz		
M/S	Theoretical	Actual	Deviation%	Theoretical	Actual	Deviation%
0.000	4.000	4.000	0.000	0.000	0.000	0.000
0.452	5.243	5.250	-0.140	0.777	0.769	0.997
1.292	7.552	7.590	-0.501	2.220	2.235	-0.671
2.239	10.155	10.120	0.343	3.847	3.774	1.925
3.134	12.613	12.660	-0.369	5.383	5.399	-0.290
	Average Error%		-0.133	Average Error%		0.392
	Result:		PASS	Result:		Pass

Totalizer Test

Start Totalizer 1	9452.500	L
End Totalizer 1	9569.400	L
Totalizer Difference	116.900	L
Volume Simulated	117.000	L
Error%	-0.085	
Result:	PASS	

Sensor Verification

Coil Resistance	101.85	Ohms
HiPot Test	Open	Ohms
Result:	PASS	

Comments:
Unit passes verification

Tower Electronics Canada Inc
2687 Hwy 40
K0K 3M0
Wooler On
Canada

Email: Dan@Tecanada.ca
Website: www.tecanada.ca

Tower Electronics Canada Inc.
Instrument Calibration Certificate

Customer:
The City of Quinte West
7 Creswell Drive
PO Box 490
Trenton, ON K8V 5R6

Calibration by:
Dan Matchett

Standards:
Siemens Magflo S/N NIST Cal Due Mar 2022
Rosemount 8732 MagMeter Reference Cal Due Mar 2022
Fluke 289 S/N 96220182 NIST Cal Due Mar 2022
Precision Digital S/N 1604-0199055-NIST Cal Due Mar 2022

Instrument Type
Magnetic Flow Meter

Method of verification
In Line Flow to Flow with Velocity comparison.

Meter Information

Date of Test:	2021-08-19
Calibration Due:	Aug-22
Location:	Dundas SPS
Meter Under Test	FM2
Client Tag:	QW00005642
Manufacturer:	Siemens
Model:	MAG6000
Serial Number:	081802H064
Totalizer As Found:	1685855M3
Totalizer As Left:	1685866M3
Allowable Error:	15%

Programming Parameters:

DN Size:	400.000
Cal Factor:	136.9221
Zero Cal:	0
Qmax:	1000LPS
Operating Time(Days):	2624
Flow Direction:	Positive

Flow Test

Velocity	Current Output mA			Frequency Output khz		
M/S	Theoretical	Actual	Deviation%	Theoretical	Actual	Deviation%
0.000	4.000	4.000	0.000	0.000	0.000	0.000
0.194	4.533	4.530	0.074	0.333	0.325	2.564
0.646	5.776	5.770	0.104	1.110	1.097	1.185
1.653	8.544	8.600	-0.651	2.840	2.831	0.318
3.328	13.147	13.170	-0.177	5.717	5.713	0.064
	Average Error%		-0.130	Average Error%		0.826
	Result:		PASS	Result:		Pass

Totalizer Test

Start Totalizer 1	9590.300	L
End Totalizer 1	9716.700	L
Totalizer Difference	126.400	L
Volume Simulated	127.000	L
Error%	-0.472	
Result:	PASS	

Sensor Verification

Coil Resistance	102.02	Ohms
HiPot Test	Open	Ohms
Result:	PASS	

Comments:
Unit passes verification

Tower Electronics Canada Inc
2687 Hwy 40
K0K 3M0
Wooler On
Canada

Email: Dan@Tecanada.ca
Website: www.tecanada.ca

Tower Electronics Canada Calibration Certificate

Customer:
The City of Quinte West
7 Creswell Drive
PO Box 490
Trenton, ON K8V 5R6

Calibration by:
Dan Matchett

Standards:
Fluke 289 S/N 96220182 NIST Cal Due Mar 2022
Thermo Perma-fuse Thermometer.

Instrument Type
Magnetic Flow Meter

Method of verification
Temperature based calculation of velocity of sound in water.

Units: M3/S
Zero: 0.00
Span: 0.926
Totalizer: M3

Meter Information

Date:	2021-08-11
Location:	Trenton WWTP
Meter Under Test	Final Effluent Meter
Client Tag:	QW00002704
Manufacturer:	Accusonics
Model:	7510+
Serial Number:	1468
Totalizer As Found:	845439M3
Totalizer As Left:	487345M3

Programming Parameters:

185VDC	Pulse Mode
Cal Factor	1.000
Temp (°C)	22.025

Calibration Due: Aug-22

Water Temperature(C): 21.8

Velocity Vs Temperature Verification

Path	Theroctical V-Sound M/S	Meter V-Sound M/S	Error%
1	1482.77	1488	0.351
2	1482.77	1489	0.418
3	1482.77	1487	0.284
4	1482.77	1487	0.284
	Average Error%		0.334
	Result:		PASS

Output Test

Current Simulation mA	Reference Reading	Error%
4	4.002	0.012
8	8.001	0.006
12	12.001	0.006
16	16.000	0.000
20	19.995	-0.031
	Average Error%	-0.001
	Result:	PASS

Comments:
Using Gaussian integration the meter calculates the water temperature base on path length and observed velocity. Only one temperature corresponds to one velocity at a given path length.
Unit passes verification.

Tower Electronics Canada
2687 Hwy 40
K0K 3M0
Wooler On
Canada

Email: Dan@Tecanada.ca
Website: www.tecanada.ca

Calibrations Service Sales
Temporary and Permanent Meter Installations
Instrumentation For Flow Level Pressure.

Notice of Modifications

There were no 'Notice of Modifications' forms submitted to the Ministry during this Reporting Period. All maintenance performed throughout the reporting period was not subject to the LOF requirements.

Summary of complaints received throughout the reporting period

There were no complaints received by City staff regarding the Trenton WWTP throughout the reporting period.

Procedure F-5-1 compliance

In 2019, the City engaged J.L. Richards to conduct an I&I evaluation of its WWCS in order to determine the level of effort required to reduce sources of Infiltration. The study first started with flow monitoring in key locations of its WWCS and concluded with J.L. Richards performing a desktop evaluation of historical data and flow monitoring results. The report was finalized in 2021 at the time of writing this annual performance report. The City will consider findings of the report in its Asset Management Planning exercise, and through the development of a Master Planning exercise. Further, attesting to the recent upgrades, modifications, and replacements within the WWTP, and WWCS, the Owner reported two Bypass Events in September which is a marked improvement over previous years during wet weather events.