



The Corporation of the Township of Perth East
2023 Annual Operations Report
Milverton Water Pollution Control Plant

Lot 5, Concession 3 Mill Street West
Milverton, Ontario

March 11, 2024



Ministry of the Environment, Conservation and Parks

London Regional Office
733 Exeter Road
London, Ontario
N6E 1L3

March 11, 2024

ATTN: Mr. Pierre Adrien, London District Manager

**Re: The Corporation of the Township of Perth East
Milverton Water Pollution Control Plant, Annual Report 2023**

Please find enclosed the Township of Perth East's Milverton Wastewater Treatment Facility Annual Operations Report for the year 2022. The report is prepared in accordance with the annual report criteria as part of the Certificate of Approval # 6264-6EEP9N, issued September 8, 2005 which contains the following:

- a) A summary and interpretation of all monitoring data and a comparison to the effluent limits outlined in condition 6, including an overview of the success and adequacy of the Works;
- b) A description of any operating problems encountered and corrective actions taken;
- c) A summary of all maintenance carried out on any major structure, equipment, apparatus, mechanism or thing forming part of the Works;
- d) A summary of any effluent quality assurance or control measures undertaken in the reporting period;
- e) A summary of the calibration and maintenance carried out on all effluent monitoring equipment;
- f) A description of efforts made and results achieved in meeting the Effluent Objectives of Condition 5;
- g) A tabulation of the volume of sludge generated in the reporting period, 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;
- h) A summary of any complaints received during the reporting period and any steps taken to address the complaints;
- i) A summary of all By-pass, spills or abnormal discharge events;
- j) Any other information the District Manager requires from time to time.

We trust that the information provided herein is satisfactory to the requirements of the above referenced Certificate of Approval. Should there be any questions or comments regarding the contents of this report, please feel free to contact the undersigned.

Jake Collings, P. Eng.
Township of Perth East
Manager of Public Works
jcollings@pertheast.ca
(519) 595-2800 x234

cc:// Neville Rising (MECP), Inspector
Matt Gabel, Chief Operator
Michael Givens, CAO



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INTRODUCTION

The Milverton Water Pollution Control Plant (WPCP) is located at Lot 5, Concession III Mill Street West in Milverton, ON. The WPCP operates under ECA number 6264-6EEP9N, and is rated as a Class 2 Facility. The facility is composed of a main sewage pumping station with a forcemain transferring raw sewage to a multi-cell lagoon system. Raw wastewater flows from the village of Milverton are directed to the treatment plant via a gravity collection system with the exception of flows captured in the east portion of village which utilizes a lift station. The raw sewage is processed through the system in accordance with all applicable laws, certificates and regulations.

The following is a list of the main treatment components:

Main Sewage Pumping Station (SPS) & Forcemain:

- One (1) 8.5m³ capacity wet well equipped with two (2) submersible pumps
- One (1) 200mm diameter forcemain from the SPS to the sewage treatment works
- One (1) 450mm diameter emergency overflow from the SPS wet well to the Boyle Drain
- One (1) 32 m³ capacity alum storage tank equipped with two (2) chemical feed pumps

Sewage Treatment Works (Multi-cell Lagoon System):

- Cell No. A1 with a capacity of 12,000m³ equipped with a fine-pore aeration system receiving raw sewage from the main SPS
- Cell No. A2 with a capacity of 12,000m³ equipped with a fine-pore aeration system operating in series with Cell No. A1, discharging to Cell No. S1
- Cell No. S1 with a capacity of 91,000m³ for seasonal storage of effluent from Cell No. A2, and discharging to Cell No. S2
- Cell No. S2 with a capacity of 142,000m³ receiving effluent from Cell No. S1 for seasonal storage, and discharging to the Boyle Drain during the discharge period
- Cell No. A3 with a capacity of 36,000m³ equipped with a fine-pore aeration system (as needed) for Cells No. A1 or A2 are out of service or for effluent storage during periods where Cells No. S1 or S2 are being drawn down
- Outlet control structure S2 with one (1) 250mm diameter outfall
- Blower Building equipped with three (3) 493m³/hr. capacity blowers for aeration

The sewage works, including both the collection and treatment systems are owned and operated by the Township of Perth East.

The following information corresponds with the reporting parameters set forth under Section 6 of the aforementioned ECA (6264-6EEP9N).



A) SUMMARY & INTERPRETATION OF MONITORING DATA

The following tables summarize the influent and effluent data relative to the limits and objectives provided in the C of A:

Table 1 - Effluent Quality Monitoring Data and Regulatory Compliance Parameters							
Year	Month	CBOD ₅ (mg/L)	Total Suspended Solids (mg/L)	Total Phosphorus (mg/L)	Unionized Ammonia (mg/L)	pH	Temperature °C
		<i>Limit: 15.0</i>	<i>Limit: 15.0</i>	<i>Limit: 1.0</i>	<i>Limit: 0.2</i>		
	January	12.4	15.1	0.4	0.2	8.7	7.2
	February	13.1	14.3	0.7	0.2	8.3	4.3
	March	12.7	15.9	0.7	0.3	8.9	6.8
	November	3.0	3.9	0.8	0.01	8.9	7.6
	December	7.4	5.6	0.9	0.03	9.9	4.4

Table 2 - Influent and Effluent Flow Data							
Year	FLOW DATA (m ³)						
	Month	EFFLUENT			INFLUENT		
		Average Daily Flow	Total Monthly Flow	Maximum Daily Flow	Average Daily Flow	Total Monthly Flow	Maximum Daily Flow
	January	2249.35	69730	2570	706.13	21890	1270
	February	1790.00	50120	2240	786.79	22030	1210
	March	813.10	23580	1120	948.71	29410	1680
	April	No Discharge			884.67	26540	1690
	May				592.26	18360	950
	June				491.67	14750	600
	July				673.55	20880	1060
	August				538.39	16690	580
	September				544.33	16330	670
	October	560.32	17370	710			
	November	1768.33	53050	2750	587.67	17630	690
	December	1834.52	56870	2030	835.16	25890	1460



Table 3 - Influent Quality Monitoring Data					
Year	Month	CBOD ₅ (mg/L)	Total Suspended Solids (mg/L)	Total Phosphorus (mg/L)	Total Kjeldahl Nitrogen (TKN)
	January	107.0	76.6	4.1	31.6
	May	257.0	159.0	5.7	58.4
	August	173.0	170.0	4.1	45.3
	November	223.0	237.0	7.7	64.6

I. Carbonaceous Biological Oxygen Demand (CBOD₅)

Throughout the reporting period, the monthly average Carbonaceous Oxygen Demand concentration did not exceed the effluent limit of 15.0 mg/L. The average for the reporting year was 9.7 mg/L, which indicates the treatment was effective for CBOD₅. The impact of the new diffusers is apparent with the effluent results in the months of November and December, indicating aeration has greatly improved since the installation. Figure 1 below details the CBOD₅ concentrations in relation to the compliance parameter limit.

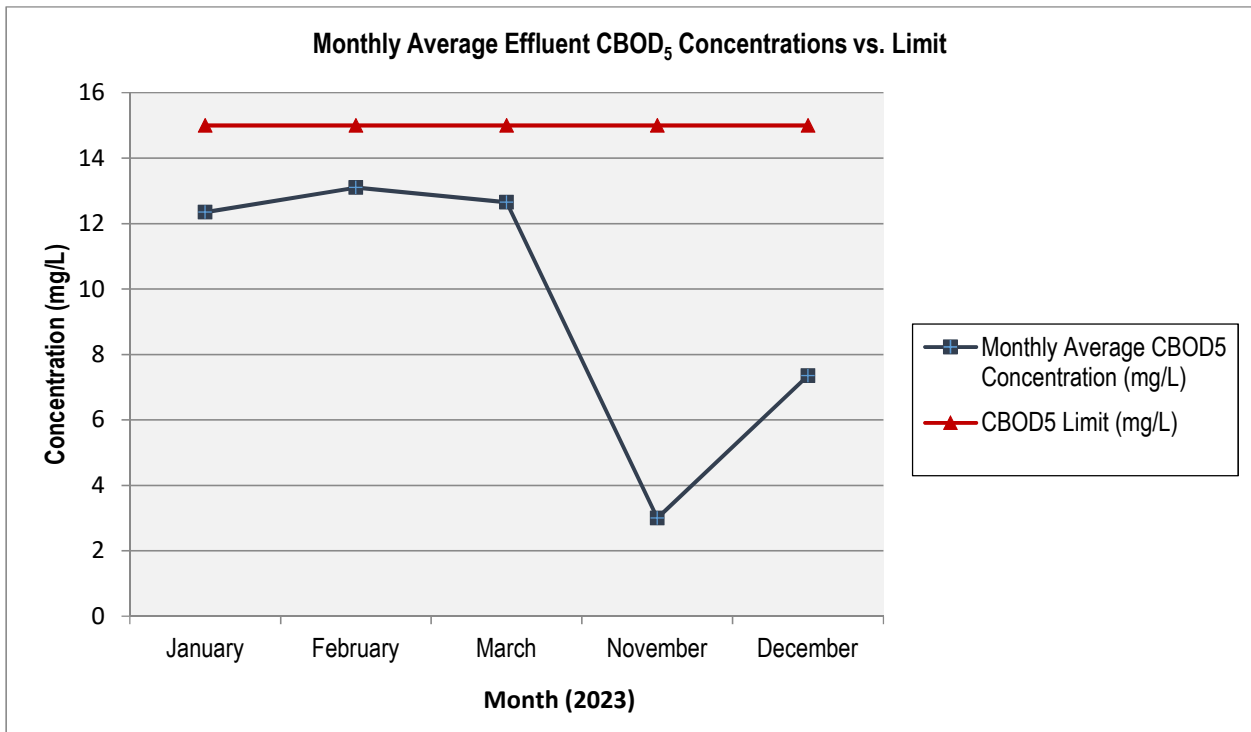


Figure 1 – Monthly Average Effluent CBOD₅ Concentration vs. CoA Limit



II. Total Suspended Solids (TSS)

Throughout the reporting period, the monthly average Total Suspended Solids concentration exceeded the effluent limit of 15.0 mg/L in the month of January and March with concentrations of 15.1mg/L and 15.9 mg/L, respectively. The average for the reporting year was 10.9 mg/L, which indicates the treatment was satisfactory for TSS. The impact of the new diffusers is apparent with the effluent results in the months of November and December, indicating aeration has greatly improved since the installation. Figure 2 below details the TSS concentrations in relation to the compliance parameter limit.

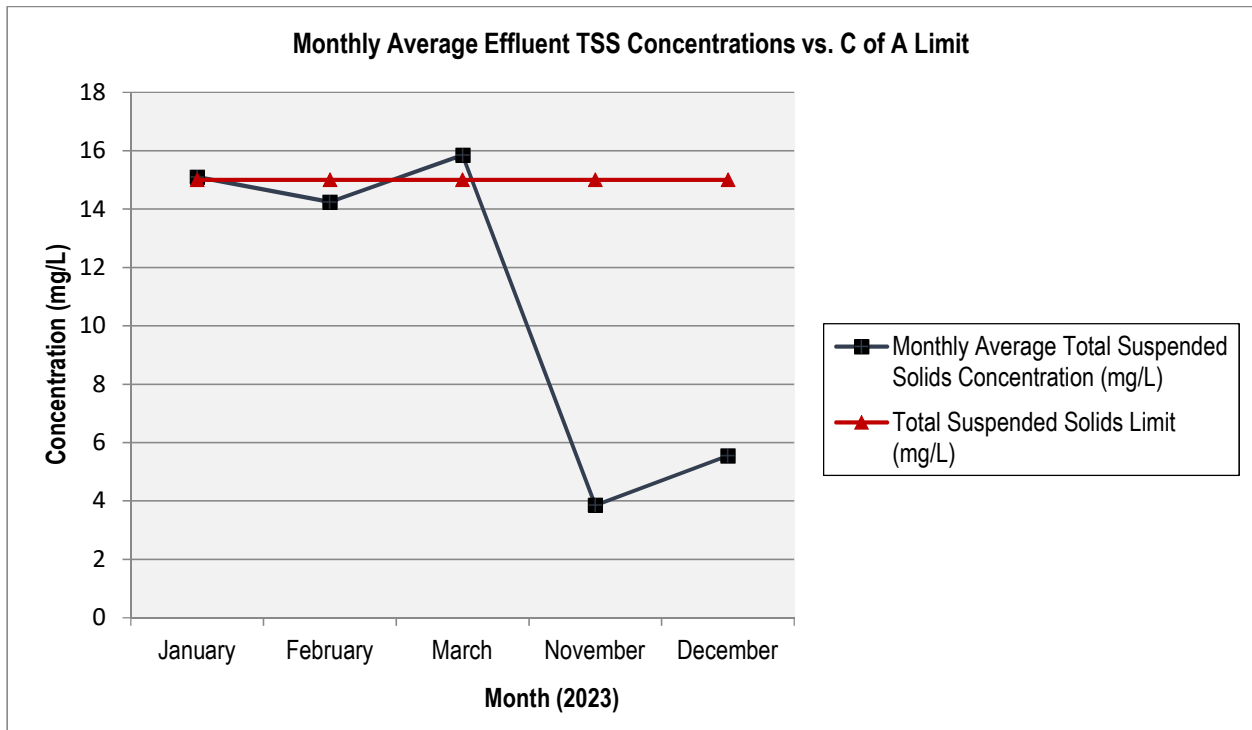


Figure 2 – Monthly Average Effluent TSS Concentration vs. CoA Limit



III. Total Phosphorus (TP)

Throughout the reporting period, the monthly average Total Phosphorus concentration did not exceed the effluent limit of 1.0 mg/L. The average for the reporting year was 0.7 mg/L, which indicates the treatment was satisfactory for TP. Figure 3 below details the TSS concentrations in relation to the compliance parameter limit.

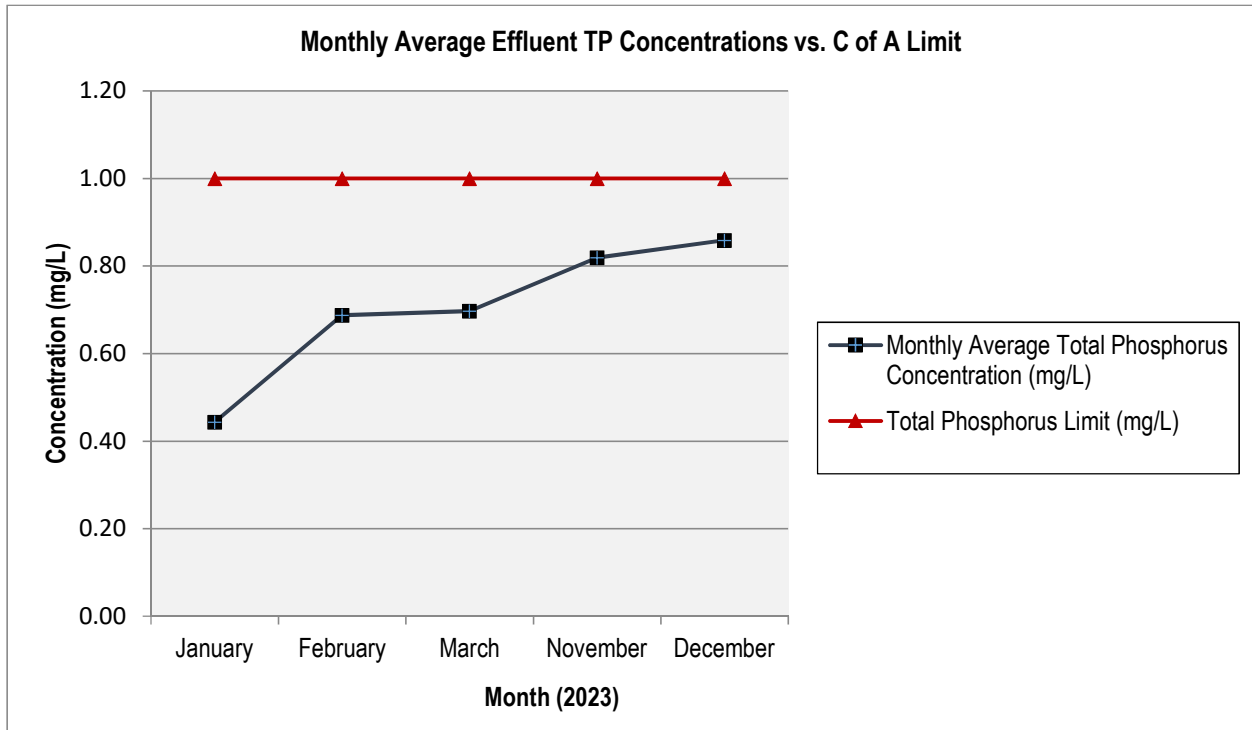


Figure 3 – Monthly Average Effluent TP Concentration vs. CoA Limit



IV. Un-ionized Ammonia (TP)

Throughout the reporting period, the monthly average Un-ionized Ammonia concentration did not exceed the effluent limit of 0.2 mg/L with the exception of the month of March. The average for the reporting year was 0.15 mg/L, which indicates the treatment was satisfactory. The impact of the new diffusers is apparent with the effluent results in the months of November and December, indicating aeration has greatly improved since the installation. Figure 4 below details the average monthly concentrations in relation to the compliance parameter limit.

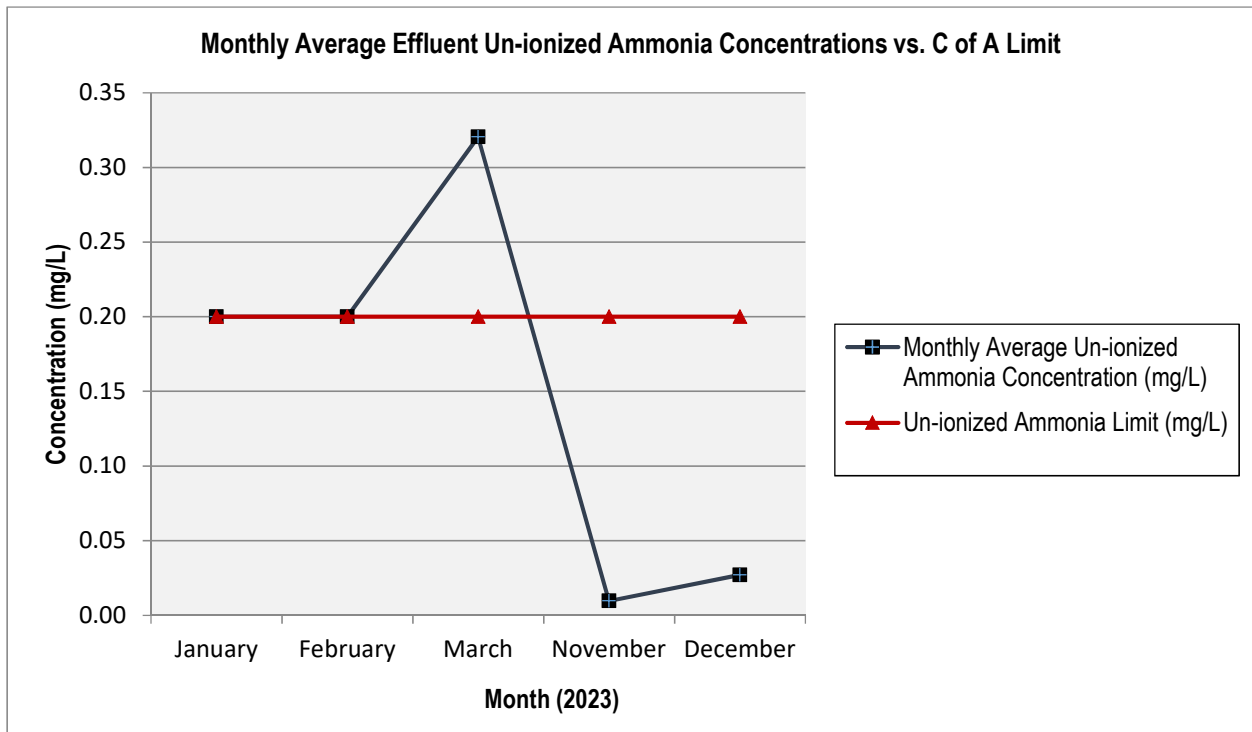


Figure 4 – Monthly Average Un-ionized Concentration vs. CoA Limit



V. Influent & Effluent Flows

Table 2 above captures influent and effluent flows over the reporting period including average daily flow, total monthly flow and maximum daily flow. In review, the average daily raw sewage influent flow for the Milverton WPCP over the reporting period was calculated to be 678.82 m³/day. This average represents approximately 67% of the plants rated capacity of 1013m³ average daily flow.

The maximum daily influent flow event over this reporting period occurred in the month of April and was recorded to be 1690 m³/day which exceeds the rated capacity by some margin. This continues to be a concern as the severity of peak flow events are forecasted to increase as climate change has seemingly resulted in more intense precipitation events. The Township has been approved for twinning of the primary forcemain in addition to the rehabilitation of the existing wet well to increase the peak flow capacity. This is set to occur in 2024 pending appropriate MECP approvals.

Figure 5 below shows the monthly average influent flow against the plants rated capacity for the 2023 reporting year.

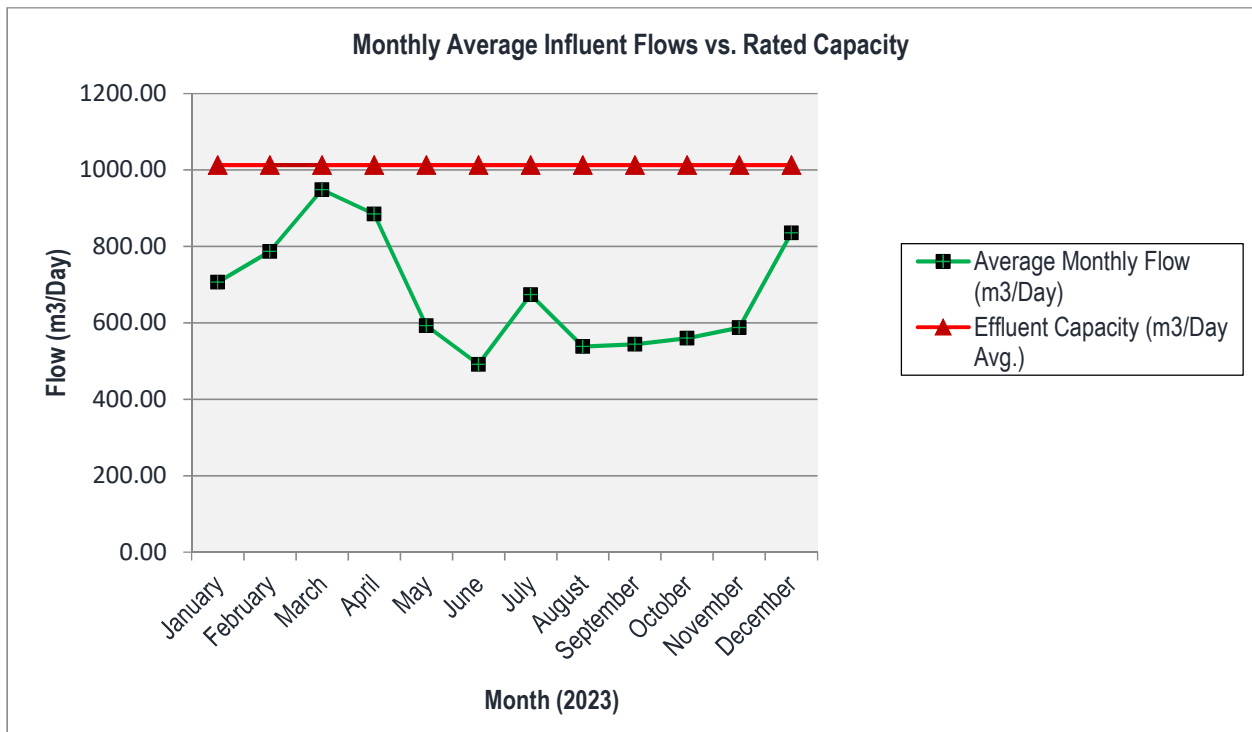


Figure 5 – Monthly Average Influent Flows vs. Rated Capacity



In terms of effluent flows, the seasonal discharge limit of 2750 m³/day was not exceeded over the reporting period. Figure 6 below outlines the monthly average effluent flow in comparison to the seasonal discharge limit. This represents approximately 62% of the effluent limit. It should be noted that the effluent is controlled by operations staff and can be adjusted as needed based on circumstances. This is of primary importance leading up to the end of the seasonal discharge period as enough capacity needs to be attained in the overall lagoon system to ensure storage is available for influent flows over the summer months when discharge is not permitted. Staff were very comfortable with the storage capacity leading up to the end of March 2023 and significant capacity remained following collection from April to the beginning of the discharge period on November 1.

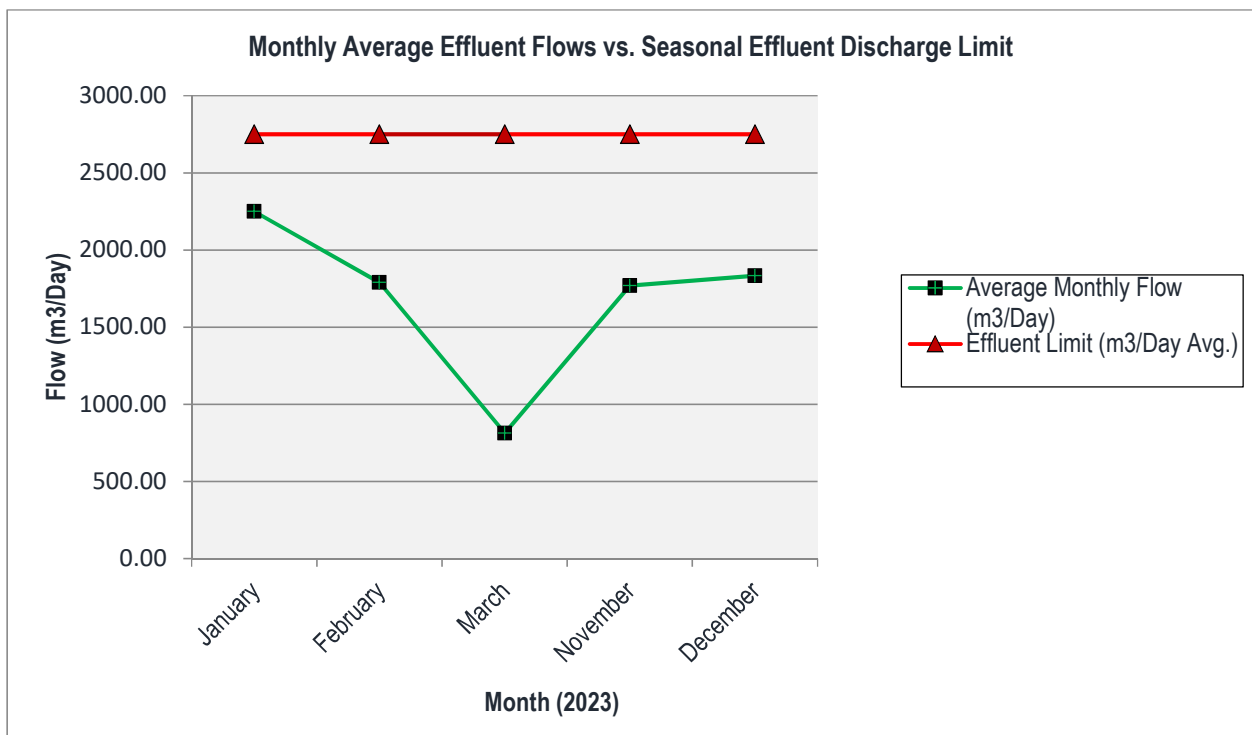


Figure 6 – Monthly Average Effluent Flows vs. Seasonal Discharge Limit



B) OPERATING PROBLEMS & CORRECTIVE ACTION

The Township of Perth East operating staff has made every effort to ensure that this lagoon facility operates in accordance with all applicable laws, certificates and regulations. Operations were continually monitored and modified in order to improve the treatment process as the nature of the raw sewage changes and the influent flows fluctuate.

The largest operating issue at the Milverton WPCP continues to be that of high flow events as a result of precipitation and/or melt events. In response to these events, the treatment plant is subject to peak influent flows in excess of the rated capacity which can lead to by-pass/ overflow events. As previously mentioned, the Township has been approved for twinning of the primary forcemain in addition to upgrading the existing wet well and piping to increase the peak flow capacity. This is set to occur in 2024 pending appropriate MECP approvals.

Furthermore, through the update of the Township's Water/ Wastewater Master Plan occurring in 2024, the consultant and staff will examine the urgency around conducting an inflow & infiltration (I&I) study and the potential implications of such.

C) MAINTENANCE SUMMARY

The following is a list of the maintenance activities carried out during this reporting period on any of the plants major structures, equipment, apparatus, or mechanisms which form the integral parts of the treatment process.

- Monthly inspection carried out on backup generator; weekly checks
- Generators inspected and load tested as required by T&T Power Group
- Raw sewage flow meter and lagoon effluent flow meter annual calibration completed
- Aeration cell diffusers removed, inspected, cleaned and repaired as required
- All diffusers replaced over the reporting period
- 1 Blower replaced over the reporting period
- Blowers checked and maintained monthly; greased, oil & filter changes as required
- Raw sewage lift station wet wells cleaned by vacuum truck
- Raw sewage pumps pulled and inspected. Repaired as required
- General maintenance of Lagoon Facility grounds



D) EFFLUENT QUALITY ASSURANCE

All samples are collected and tested as per the requirements of the Certificate of Approval.

All collected samples were delivered to ALS Global in Waterloo a CAEAL accredited laboratory. The lab is responsible for performing the quality assurance and control checks.

Effluent quality monitoring is achieved by collecting bi-weekly grab samples during the seasonal discharge period (November 1st to March 31st) and analyzed for all parameters listed in the C of A. For the purpose of influent quality monitoring, grab samples are collected and sent to the lab for testing. Raw sewage samples are tested for CBOD₅, total suspended solids, total phosphorus and total Kjeldahl nitrogen.

E) CALIBRATION OF EFFLUENT MONITORING EQUIPMENT

Annual calibrations of influent and effluent flow meters for the year 2023 were conducted by SCG Flowmetrix. Calibrations were completed on all meters on May 18, 2023. Calibration of the temperature and pH meters are performed in-house according to manufacturer's instructions.

F) EFFORTS MADE IN ACHIEVING EFFLUENT OBJECTIVES

Over the reporting period, operational staff made every effort to meet effluent objectives. In 2023, compliance was generally achieved with the Rated Capacity of the Works with the exception of 28 days within the reporting period. This represents approximately 92% of the days in the calendar year. As previously mentioned, the Township is in the process of twinning the primary forcemain in addition to the upgrading of the existing wet well to increase the peak flow capacity. This is set to occur in 2024 pending appropriate MECP approvals. Furthermore, through the update of the Township's Water/ Wastewater Master Plan occurring in 2024, the consultant and staff will examine the urgency around conducting an inflow & infiltration (I&I) study and the potential implications of such.

EFFLUENT PARAMETER	EFFLUENT LIMIT
Carbonaceous Biological Oxygen Demand (CBOD ₅)	Achieved 5 out of 5 months
Total Suspended Solids (TSS)	Achieved 3 out of 5 months
Total Phosphorus (TP)	Achieved 5 out of 5 months
Un-ionized Ammonia	Achieved 4 out of 5 months

In relation to the seasonal discharge criteria, the overall treatment generally met the effluent limits. One significant step the Township took to improve effluent quality was the replacement of all diffusers in both aeration cells. This occurred in the summer of 2023 and results over the months of November and December were indicative that treatment efficacy improved substantially. Staff believe the increased aeration process is responsible for these improvements.



G) SLUDGE GENERATION

No sludge was removed from the Milverton WPCP over the reporting period.

H) COMPLIANTS

There were no complaints received regarding the overall operation of the Milverton WPCP and collection system during the reporting period.

I) BY-PASSES, SPILLS & ABNORMAL DISCHARGE

Over the reporting period, there was one overflow by-pass event which occurred on July 13, 2023. This event was the result of a significant precipitation event. The overflow took place for approximately 6.5 hours with an estimated 100m³ being discharged into the Boyle Drain. The event was reported to the appropriate authorities and sampled accordingly.

No other by-passes, spills or abnormal discharge events occurred over the reporting period.

J) ADDITIONAL INFORMATION

The District Manager did not request any additional information over the reporting period.