Town of Bradford West Gwillimbury
2023 WPCP/WWC Summary Report

Environmental Compliance Approval
No. 3705-BGRP97

Air Certificate of Approval
No. 9408-7SFP7B

Consolidated Linear Infrastructure Environmental Compliance Approval
No. 116-W601

Wastewater Treatment Facility Class IV
Certification No. 297

Wastewater Collection Facility Class III
Certification No. 3060

February 2024

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1. Introduction

This report contains the relevant information required to meet the annual reporting requirements outlined within the Town of Bradford West Gwillimbury's (Town) Water Pollution Control Plant (WPCP) Environmental Compliance Approval (ECA) No.3705-BGRP97 and the Wastewater Collection System Consolidated Linear Infrastructure (CLI) ECA No. 116-W601. This report provides a performance summary for the time period of January 1st to December 31st 2023.

Compliance with regulatory requirements, policies, and the ECA's continue to be monitored through the Supervisory Control and Data Acquisition (SCADA) system, overseen by certified operations staff, compliance staff, accredited laboratory and other regular reporting mechanisms.

1.1 Service Information

The Town's Wastewater Collection System (WWC) and WPCP collectively services a population of approximately 35,430. This includes 11,495 residential connections and 315 general connections (industrial, commercial and institutional).

The WPCP has a rated capacity of 19,400 cubic meters per day (m^3/day).

1.2 Regulatory Requirements

In Ontario, municipal wastewater treatment/collection and discharge is governed by a number of regulatory acts, regulations and instruments. This includes but is not limited to the following:

- Ontario Environmental Protection Act (EPA)
- Ontario Water Resources Act (OWRA)
- Environmental Compliance Approval(s) (ECA)
- Canadian Environmental Protection Act (CEPA)
- Wastewater System Effluent Regulation (WSER)

More specifically, this report fulfills the requirements set out within the Town of BWG's ECA No. 3705-BGRP97 and CLI ECA 116-W601. The associated stipulations are outlined in Table 1 and 2 on the following pages.

Table 1. ECA Reporting Requirements

ECA Reporting Requirement	Report Section
A. A summary and interpretation of all influent monitoring data, and a review of the historical tend of the sewage characteristics and flow rates.	**2.4.1**
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.	**2.3, 2.4.2, 2.4.3**
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.	**2.4**
D. A summary of all operating issues encountered and corrective actions taken.	**7**
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.	**2.5**
F. A summary of any effluent assurance or control measures undertaken.	**2, 7.4**
G. 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.	**2.5**
H. 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 archived 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.	**2**
I. 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.	**5**
J. A summary of any complaints received and any steps taken to address the complaints.	**4**
K. A summary of all Bypasses, Overflows, other situations outside of Normal Operating Conditions and spills within the meaning of Part X of EPA and abnormal discharge events.	**7**
L. A summary of all Notice of Modification to Sewage Works completed under Paragraph I. d. of Condition 10, including a report on status of implementation of all modification.	**2.2**
M. A summary of efforts made to achieve conformance with Procedure F-5-1 including but not limited to projects undertaken and competed 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.	**2, 3.3, 7**

Table 2. CLI ECA Reporting Requirement

CLI ECA Reporting Requirement	Report Section

A. If applicable, includes a summary of all required monitoring data along with an interpretation of the data and any conclusion drawn from the data evaluation about the need for future modifications to the Authorized System or system operations.	**3.4**
B. Includes a summary of any operating problems encountered and corrective actions taken.	**3, 7**
C. Includes a summary of all calibration, maintenance, and repairs carried out on any major structure, equipment, apparatus, mechanism, or thing forming part of the Municipal Sewage Collection System.	**3.4**
D. Includes a summary of any complaints related to the Sewage Works received during the reporting period and any steps taken to address the complaints.	**4**
E. Includes a summary of all Alterations to the Authorized System within the reporting period that are authorized by this Approval including a list of Alterations that pose a Significant Drinking Water Threat.	**3.3**
F. Includes a summary of all Collection System Overflow(s) and Spill(s) of Sewage, including: I. Dates; II. Volumes and durations; III. If applicable, loadings for total suspended solids, BOD, Total Phosphorus, and total Kjeldahl nitrogen, and sampling results for E.coli; IV. Disinfection, if any; and V. Any adverse impact(s) and any corrective actions, if applicable.	**7**
G. Includes a summary of efforts made to reduce Collection System Overflows, Spills, STP Overflows, and/or STP Bypasses, including the following items, as applicable I. A description of projects undertaken and completed in the Authorized System that result in overall overflow reduction or elimination including expenditures and proposed projects to eliminate overflows with estimated budget forecast for the year following that for which the report is submitted. II. Details of the establishment and maintenance of a PPCP including a summary of project progresses compared to the PPCP's timelines. III. An assessment of the effectiveness of each action taken. IV. An assessment of the ability to meet Procedure F-5-1 or Procedure F-5-5 objectives (as applicable) and if able to meet the objectives, an overview of next steps and estimated timelines to meet the objectives. V. Public reporting approach including proactive efforts.	**2, 3, 7**

1.3 Laboratory and Analysis

1.3.1 External Analysis

In 2023 the WPCP utilized SGS Canada Inc., a facility which holds accreditation through the Canadian Association of Laboratory Accreditation (CALA). Their Accreditation No. is 1001225. SGS Canada Inc. performed all of the required analysis on the WPCP influent and effluent samples in accordance with the prescribed frequency of the WPCP ECA. Below is a list of the parameters analyzed:

- Biochemical Oxygen Demand (BOD5)[1]
- Unionized Ammonia[2]
- Carbonaceous Biochemical Oxygen Demand (CBOD5)
- E.coli[2]
- Total Suspended Solids (TSS)
- Total Ammonia Nitrogen (TAN)
- Total Phosphorus
- Total Kjeldahl Nitrogen (TKN)
- Nitrite as Nitrogen[2]
- Nitrate as Nitrogen[2]

1.3.2 In-House Analysis

In addition to the sample analysis conducted by the aforementioned accredited laboratory, the WPCP has its own laboratory on-site. The on-site laboratory allows operational analysis to be conducted to inform process adjustments and improvements to enhance effluent quality. The parameters analyzed in the internal laboratory are as follows:

- pH
- Temperature
- Total Phosphorus
- TAN
- Alkalinity

1.4 Maintenance

1.4.1 General Description

In order to ensure that all WPCP and Collection System equipment is reliable and in good working order, the Town has a Preventative Maintenance (PM) program in place for all wastewater plant and collection equipment and associated facilities. The PM program is performed as recommended by the original equipment manufacturer as per the WPCP ECA section (8) Operation and Maintenance and WWC System Schedule E Section (3) Operations and Maintenance. Inspection, testing and calibration of electrical, mechanical, instrumentation and SCADA equipment is performed and documented by fully trained and qualified technicians. The equipment includes process equipment, heating, ventilation and air conditioning (HVAC) systems, standby power and high voltage switchgear. Identified PM deficiencies are flagged and scheduled for repair in a

[1] Influent analysis only.

[2] Effluent analysis only.

priority manner. Critical process equipment that is not performing to specification is repaired or replaced immediately.

In order to conduct efficient and effective maintenance at each facility, plant maintenance activities are tracked on a computerized maintenance management system (CMMS). The CMMS monitors and schedules all of the WPCP and associated facilities maintenance plans, issues work orders for these plans and any other scheduled and unscheduled work that may be required.

The Wastewater Division manages approximately 3,300 PM work orders that are automatically generated by the current PM program, WorkTech. The work orders are generated as specified by the equipment's operations & maintenance manual.

2. WPCP

2.1 Facility Description

The WPCP is located at 225 Dissette Street, Bradford West Gwillimbury.

The first treatment system was constructed in 1962 and consisted of a pumping station and a waste stabilization pond. The facility has undergone various upgrades since the initial plant was constructed.

In 2012 the Town's WPCP and Collection System were re-rated to its current classification. The WPCP is rated as a Class four (4) and Collection System as a Class three (3).

Currently the facility is comprised of Plant B, C and D.

Plant B has a design average daily flow of 3,075m^3/day. The treatment process consists of biological treatment through aeration tanks and two (2) clarifiers.

Plant C has a design average daily flow of 4,325m^3/day, consisting of two (2) sequencing batch reactors (SBR's).

Plant D has a design average daily flow of 12,000m^3/day. There are four (4) aeration tanks with a combined volume of 10,560m^3, as well as four (4) clarifiers.

Following primary and secondary treatment wastewater is directed to tertiary treatment. In tertiary treatment wastewater flows through sand filters and undergoes ultra-violet (UV) disinfection. Alum Sulfate coagulant is added to wastewater at several places in the treatment train for phosphorus removal. Finally, upon reaching rigorous standards, treated effluent is discharged into the West Holland River through the final effluent channel.

In 2019 the WPCP was issued the current ECA 3705-BGRP97, revoking ECA No. 9725-8W4QSG. The amended ECA was a result of a regulatory update to have Limited Operational Flexibility (LOF) added to the ECA. The amended ECA was completed to assist in optimization efforts of the WPCP. The amendment was administrative and did not require technical review. Although the effluent TAN objective and the limit timeframe was adjusted to align with seasonal changes.

In 2022, the Town's Wastewater Collection System was issued its first CLI ECA 116-W601, the issuance of this approval revoked all other Town owned ECA's within the collection system.

Table 3 below identifies the current WPCP rated capacity, 2023 service area, and other applicable information regarding the operation of the WPCP.

Table 3. Water Pollution Control Plant Details

Water Pollution Control Plant	
Rated Capacity	19,400m^3/day
Service Area	Bradford West Gwillimbury
2023 Service Population	35,430
In-service Date	Plant B 1982 Plant C 1997 Plant D 2009
Effluent Receiver	West Holland River
Major Processes	
Plant B	Extended Aeration
Plant C	Sequencing Batch Reactors (SBR)
Plant D	Extended Aeration
	Tertiary treatment
	U.V Disinfection Continuous Discharge
	Biosolids Storage Lagoons 20,000m^3 (only 10,000m^3 aerated)
	Digester Sludge Stabilization
	Biosolids Storage Tanks 25,000m^3
	Emergency Sewage Overflow Pond 44,000m^3

2.2 Notice of Modification to Sewage Works

There were three (3) Notice of Modification to Sewage Works prepared in 2023. The notices outlined the replacement of a bar screen, a fitting installation on the septage receiving hatch, and the replacement of a fine bubble aeration system.

The first Notice of Modification to Sewage Works of 2023 was related to the bar screen. The existing standby manual bar screen in the Headworks was replaced with a new mechanical bar screen. This project has been completed.

The installation of a cam-lock fitting to the septage receiving hatch was the second Notice of Modification of Sewage Works. This project has been completed.

The third Notice was for the replacement of an aging fine bubble aeration system with a new fine bubble aeration system in the Sequencing Batch Reactors of Plant C. The existing system was replaced due to the aging of the existing system. This project was completed.

2.3 Flow Monitoring Data

Influent and effluent flows are monitored and recorded at the BWG WPCP, the following subsection explores the data collected in 2023. Table 4 and 5 outline the total flows both received from the BWG collection system and discharged into the West Holland River.

Plant B was brought back online from September 21, 2023 to November 16, 2023 as shown in Figure 2. Only influent flow is measured for Plant B individually. The effluent flows for Plant B are captured within Plant C's effluent flows as Plant B flows into Plant C Filter building. Influent flows for Plant B are estimates because of suspected errors in the flow meters readings. The Plant B influent readings are adjusted based on the ratio of effluent to influent. Plant B was brought online to provide treatment capacity during the upgrade of diffusers in the SBR's of Plant C.

In 2023 there were four (4) events, described in further detail below, where flow monitoring recording was interrupted, all events were reported to the MECP Barrie District Office. The Town's WPCP maintained continuous monitoring and recording of influent and effluent flow as required in Condition 9 of the ECA.

On March 14th and 15th maintenance was completed on the WPCP Headworks Building PLC. The Headworks Building is where influent data is collected from the flow meter for SCADA. On March 15th a SCADA review revealed that the recorded influent flow was not accurate, an error in the transfer of data recorded lower flows than expected. The Town's SCADA provider corrected the issue. There were no gaps within the flow trending, flow monitoring was maintained at all times by the influent flow meters. The Town maintained continuous monitoring and recording of influent and effluent flow as required in Condition 9 of the ECA. No further action was requested by the MECP Barrie District Office.

On April 13th at 22:48 HR a PLC fault occurred that caused an issue with the trending of Plant D effluent flow. The issue was resolved on April 14th at 8:30 HR. Only the Plant D effluent flow trending was impacted by the fault. All other operations at the WPCP were normal. Flow monitoring was continuously maintained at all times at the WPCP by the effluent and influent flow meters. Plant D effluent flow for April 13th and 14th were estimates based on available influent and effluent flow data. No further action was requested by the MECP Barrie District Office.

After Plant B was brought back online on September 21st a suspected error with the influent flow meter was noted by operations staff. Flow monitoring was continuously maintained, however, the readings were found to be inaccurate and lower than the volume of influent entering the system. A calculation based on the proportion of influent

to effluent flow was used to correct for the error. A third party contractor completed an inspection and calibration of the flow meter. No further action was requested by the MECP Barrie District Office.

The final occurrence was during a site-wide PLC upgrade project at the WPCP. The Plant C effluent flow meter encountered corrupt data faults between December 6th and 16th. Following correction of the fault, the Plant C effluent meter was not reading accurately from December 16th to January 4th. Flows were reported as lower than anticipated. A third party flow technician made minor setting adjustments to the flow meter and the issue was corrected. For both periods flows were estimated based on influent and effluent flow data available from local/manual readings. The WPCP maintained continuous monitoring and recording of influent and final effluent discharged as the meters themselves were not affected and the manual readings on the flow devices were continuously recorded daily despite the loss of SCADA capability. No further action was requested by the MECP Barrie District Office.

Table 4. WPCP Influent Flows in 2023

Influent Flows 2023						
Month	**Maximum Daily Flow (m^3)**	**Average Daily Influent (m^3)**	**Total Flow (m^3)**	**Maximum Flow Plant B (m^3) ***	**Maximum Flow Plant C (m^3)**	**Maximum Flow Plant D (m^3)**
Jan	16,984	12,715	394,154	0	4,870	12,114
Feb	18,653	13,749	384,985	0	5,084	13,741
Mar	17,283	14,190	439,890	0	4,737	12,559
Apr	17,706	14,230	426,901	0	4,752	12,954
May	14,755	12,774	395,996	0	4,361	10,563
Jun	16,665	12,348	370,443	0	4,510	12,318
Jul	14,959	12,548	388,998	0	4,421	10,752
Aug	13,963	11,854	367,459	0	4,316	9,647
Sep	12,614	11,619	348,570	2,398	4,142	8,788
Oct	11,845	11,153	345,748	2,452	1,784	8,228
Nov	13,902	11,765	352,956	2,383	4,450	9,314
Dec	14,193	13,078	405,420	0	4,992	9,383
Annual Total (m^3)			**4,621,521**			

* Plant B was only online from Sept 21 to Nov 16 during Plant C SBRs aerator replacement

Table 5. WPCP Effluent Flows in 2023

Effluent Flows 2023					
Month	**Maximum Daily Flow (m^3)**	**Average Daily Effluent (m^3)**	**Total Flow (m^3)**	**Maximum Flow Plant C (m^3)**	**Maximum Flow Plant D (m^3)**
Jan	17,272	12,078	374,405	3,502	13,770
Feb	18,025	13,035	364,989	3,625	14,400
Mar	16,572	13,216	409,708	3,222	13,350
Apr	16,340	12,877	386,306	3,280	13,060
May	13,447	11,370	352,458	4,825	10,260
Jun	15,049	10,393	311,801	3,309	11,740
Jul	13,167	10,450	323,964	3,327	9,840
Aug	12,092	10,026	310,802	3,242	8,890
Sep	11,300	10,208	306,237	3,610	8,280
Oct	10,390	9,783	303,288	3,231	7,260
Nov	12,195	10,075	302,248	3,425	8,770
Dec	12,264	10,911	338,240	3,455	8,810
		Annual Total (m^3)	**4,084,447**		

The total monthly flows for influent and effluent are graphed below in Figure 1. Influent flow is higher than effluent flow for all months of the year. March had the highest monthly total flow at 439,890m^3, in contrast to the lowest monthly total of 302,248m^3 in November.

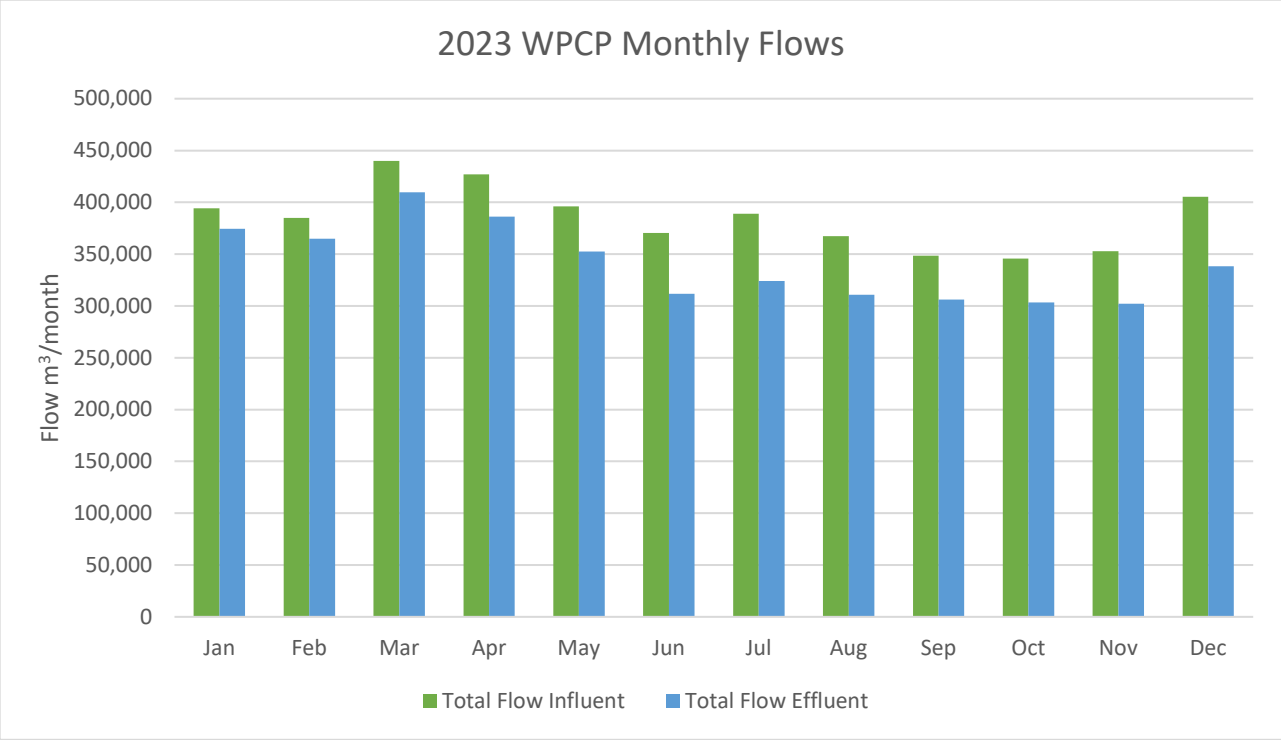

Figure 1. WPCP Total Monthly Flows.

It can be seen that Plant D processes more influent and discharges more effluent than Plant C in all months of the year. The total monthly flows have been broken into influent, effluent and treatment trains below in Figure 2.

As mentioned previously, Plant B was brought back online from September 21, 2023 to November 16, 2023. This was done during an upgrade to the Plant C diffusers which can be seen reflected in the lower Plant C influent numbers during the three months. Plant B does not have separately recorded effluent because it flows into Plant C filter building, hence why there is no significant change seen in Plant C Effluent during the diffuser upgrade.

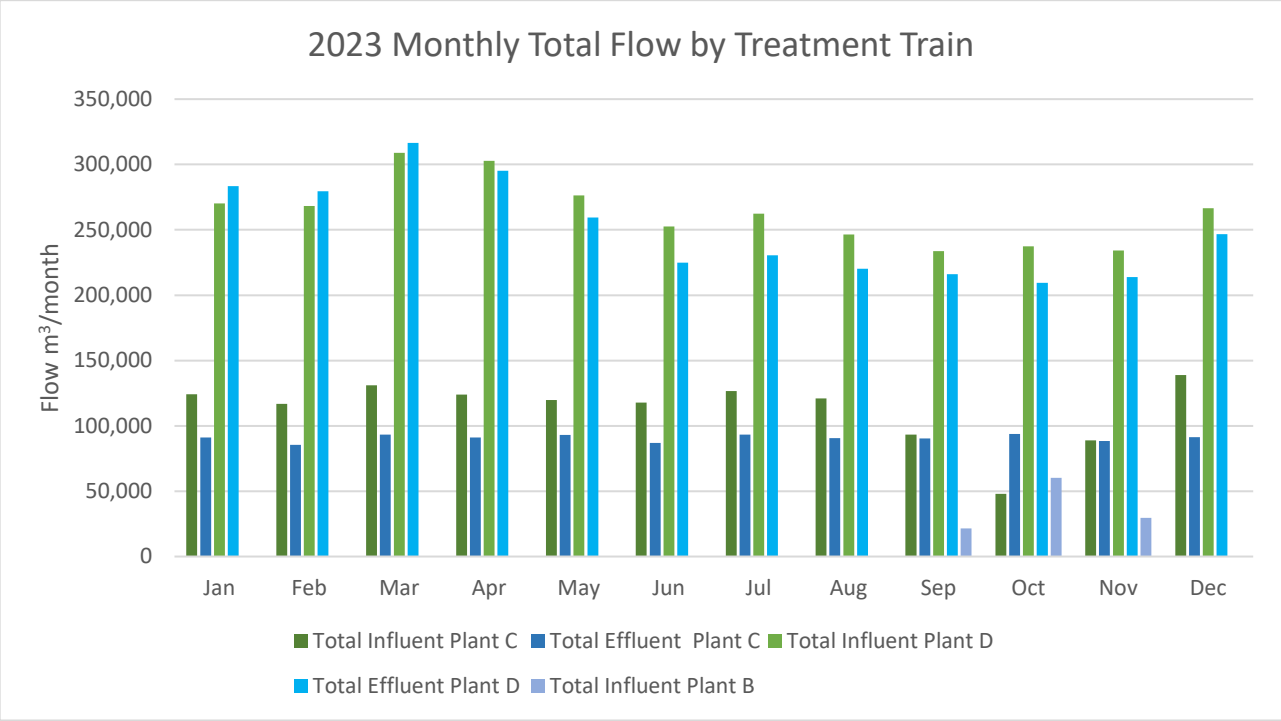

Figure 2. Monthly Total Flows by Treatment Train.

Figure 3 identifies the average monthly influent and effluent flows for the WPCP. The rated capacity refers to the average daily flow for which the works is approved to handle, specifically influent. Both influent and effluent flow remain well below the rated capacity. The average daily influent flow for the works in 2023 was 12,662m^3/day and the effluent flow was 11,190m^3/day.

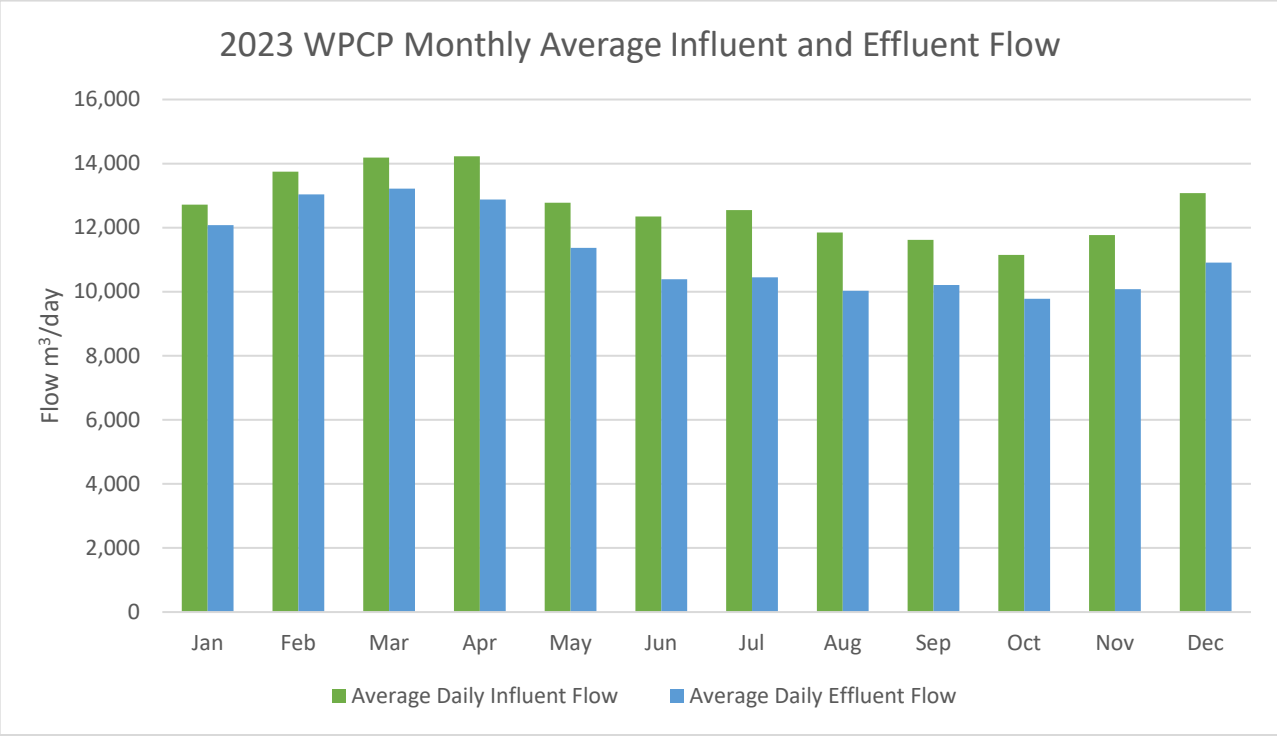

Figure 3. Average Daily Influent and Effluent Flow.

In 2023, the total volume of effluent discharged to the West Holland River increased by three and a half percent (3.5%) from 2022. More specifically the WPCP discharged 138,701m^3 more effluent in 2023. Figure 4 visually identifies the year over year trend from 2015 to 2023 in monthly total effluent discharged at the WPCP.

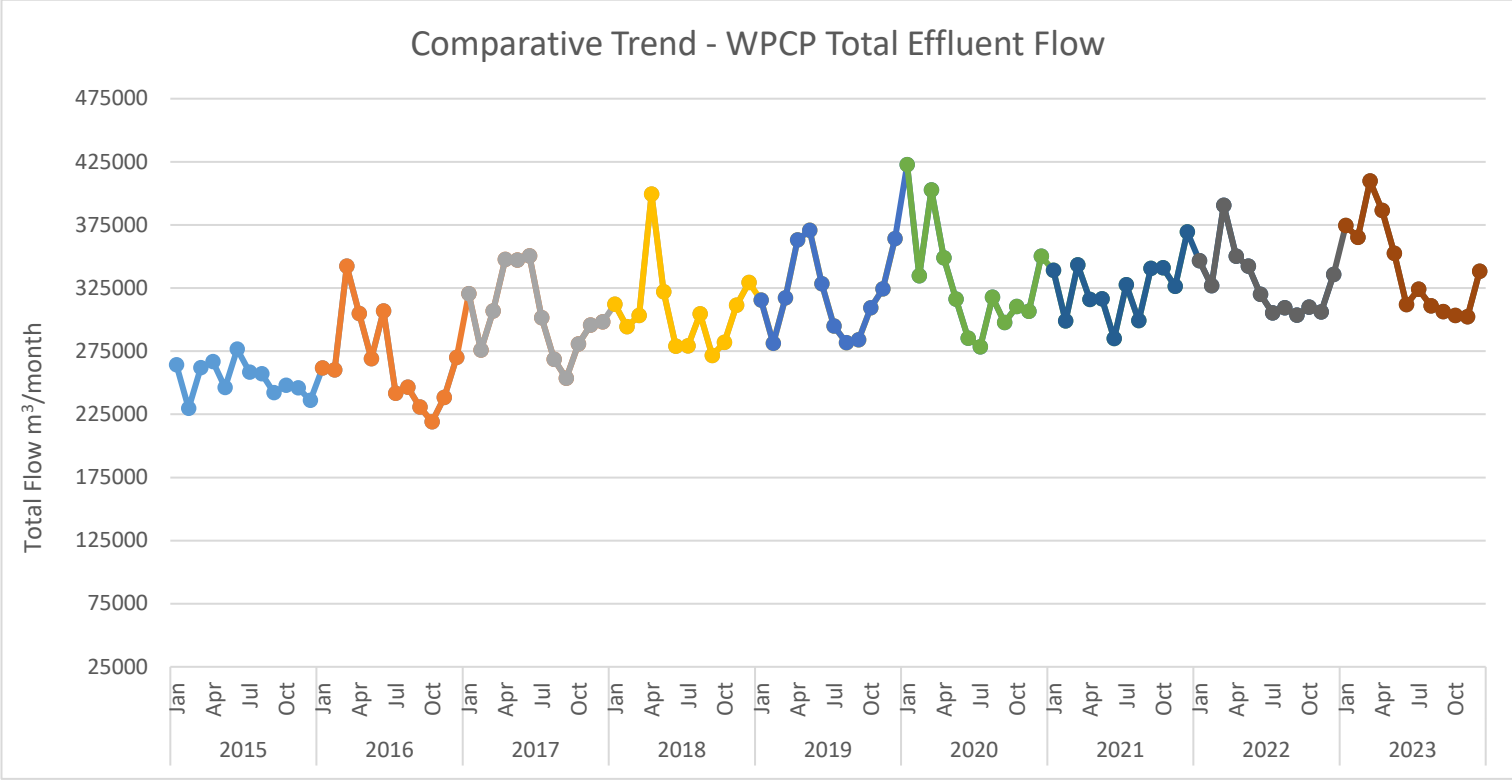

Figure 4. Historical Trend Total Effluent Flow.

2.4 Analytical Data

Condition 9 Monitoring and Recording of the ECA requires a scheduled monitoring program, meeting the requirements of Schedule E of the ECA. This includes sample type, location, and frequency of analysis.

The Town maintains a sampling schedule in order to meet the requirements of the ECA, the 2024 schedule can be found in Appendix A.

There were zero deviations from the sampling schedule in 2023 and all required sampling was completed.

The following subsections provide an overview of influent and effluent concentration data analysis.

Additionally, the Town completed a benthic survey in West Holland River as due diligence near the end of 2022, the results are included in this report in section 2.5.

2.4.1 Influent

2.4.1.1 BOD5

The monthly average influent concentrations for BOD5 are graphed in Figure 5. May experienced the highest BOD5 monthly average concentration of 284mg/L, and October had the lowest concentration of 158mg/L. The annual average concentration and the monthly annual concentration was 249mg/L.

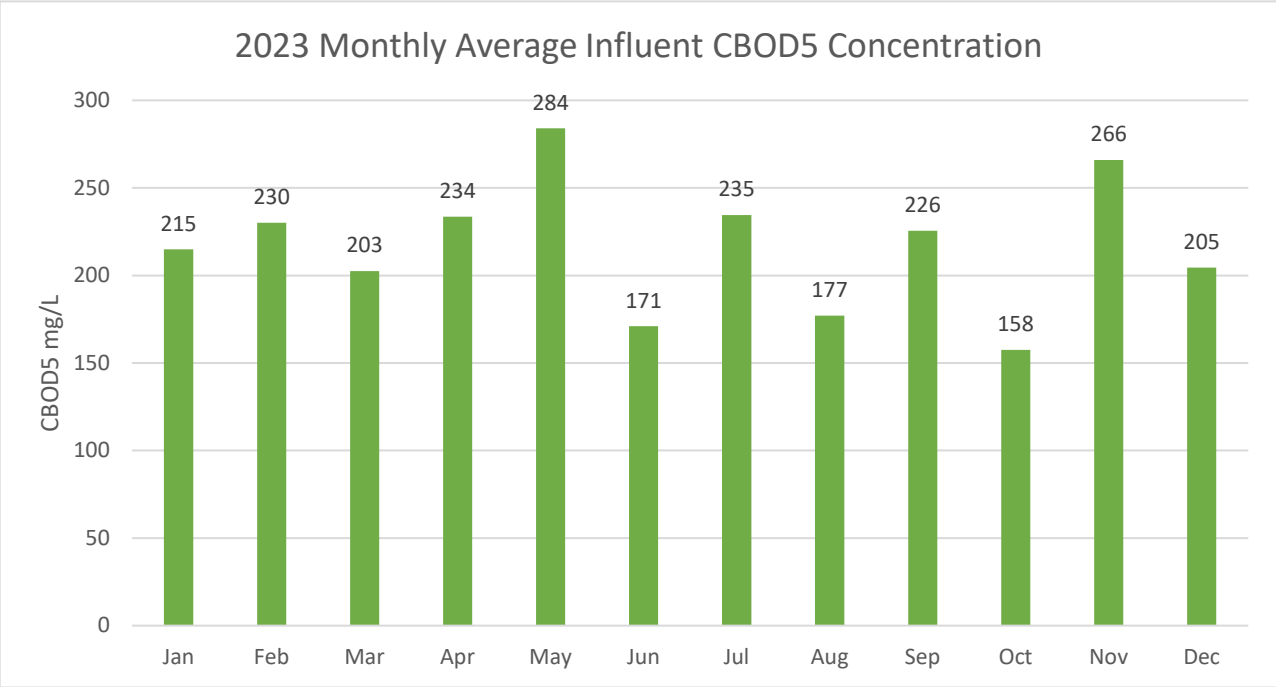

Figure 5. Monthly Average Influent BOD5 Concentration.

A historical trend of influent BOD5 concentrations can be found in Appendix B. The historical trend captures monthly data from 2017 to 2023. There have been no significant changes to the influent BOD5 concentrations. There was a slight increase in BOD5 concentrations compared to 2022. The largest outlier is the monthly average concentration in March 2019 of 560mg/L, an erroneous single sample result of 897mg/L on March 20th 2019 is attributed to the increased concentration.

2.4.1.2 TSS

The monthly average influent TSS concentration has been graphed in Figure 6. December had the highest TSS concentration at 641mg/L, while August had the lowest at 207mg/L. The annual average concentration for TSS was 352mg/L.

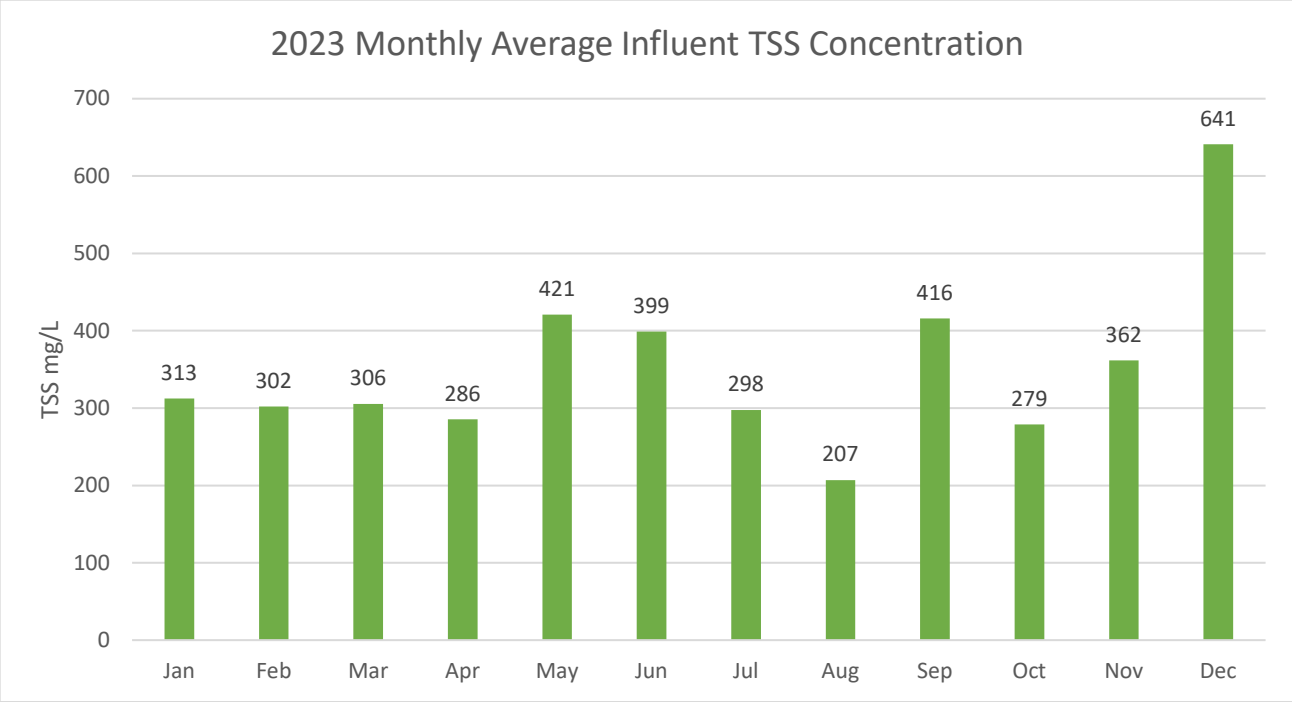

Figure 6. Monthly Average Influent TSS Concentration.

A historical trend of influent TSS concentrations can be found in Appendix C. The historical trend captures monthly data from 2017 to 2023. The trend shows that there has been an increase in the monthly concentrations of TSS starting in 2019 and continuing into 2023. An erroneous single sample of 815mg/L on December 20th 2023 is responsible for the large spike in TSS concentrations seen in December of 2023.

2.4.1.3 Total Phosphorus

The monthly average influent Total Phosphorus concentration is graphed below in Figure 7. The annual average concentration for Total Phosphorus is 4.32mg/L. The average monthly concentration did not fluctuate significantly month to month, the highest being 5.44mg/L (December) and lowest 3.25mg/L (February).

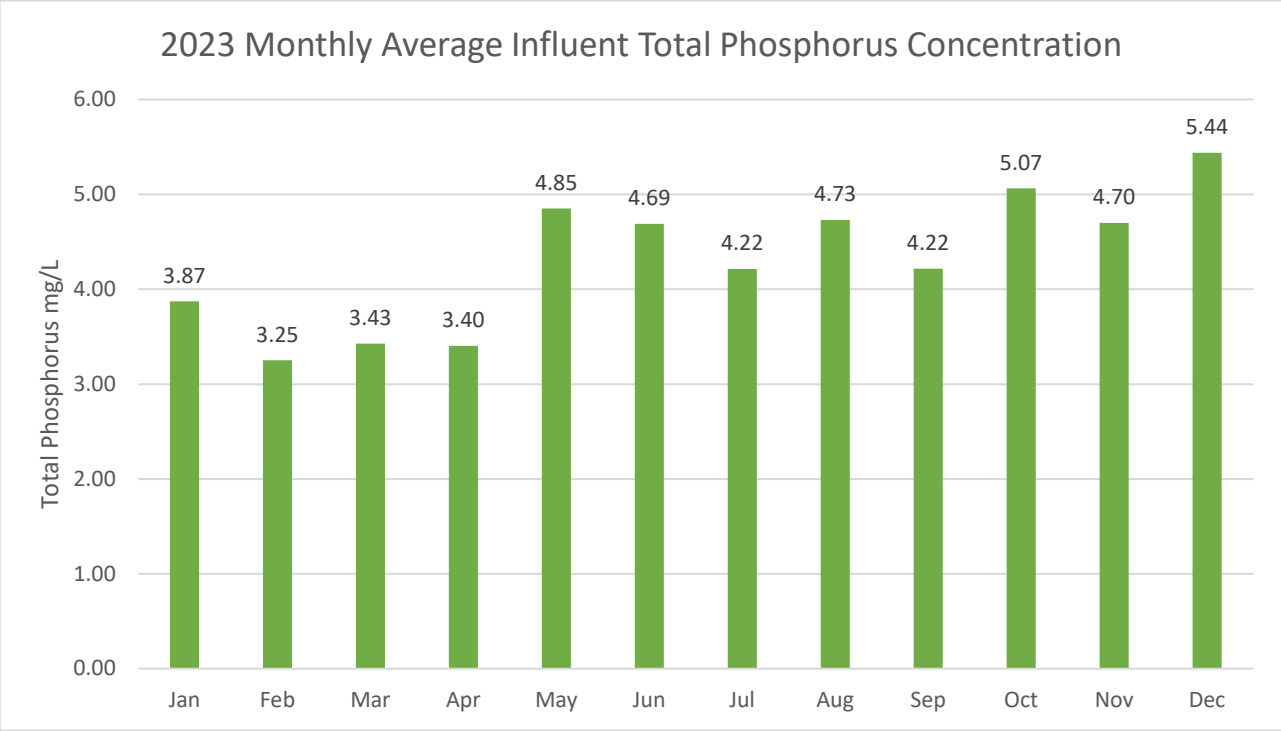

Figure 7. Monthly Average Influent Total Phosphorus Concentration.

A historical trend of influent Total Phosphorus concentrations can be found in Appendix D. The historical trend captures monthly data from 2017 to 2023. The trend shows a decreasing concentration of the monthly averages from 2019 and 2020, with a trend of slightly increasing concentrations in 2021 and 2022, followed by a slight decrease in 2023.

2.4.1.4 TKN

The monthly average influent concentrations for TKN are graphed in Figure 8. December experienced the highest monthly average concentration at 54.00mg/L. While April had the lowest monthly average concentration of 31.8mg/L. The annual average concentration and monthly annual average concentration were 40.35mg/L.

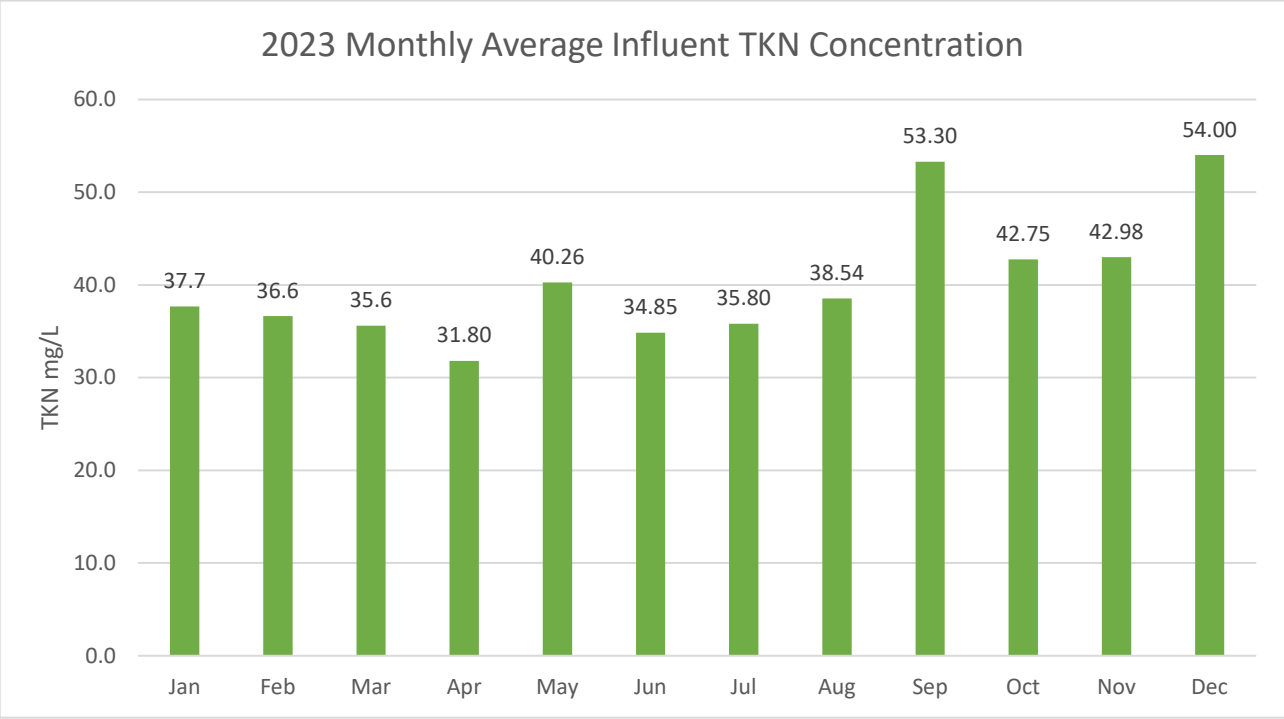

Figure 8. Monthly Average Influent TKN Concentration.

A historical trend of influent TKN concentrations can be found in Appendix E. The historical trend captures monthly data from 2017 to 2023. In 2023 there was an overall decrease to the TKN concentrations compared to 2022. All months excluding September (53.3mg/L) had a lower average TKN concentrations year-over-year. However, September (53.3mg/L) and December (54.0mg/L) were two of the highest averages since 2017.

2.4.2 Effluent

2.4.2.1 Monitoring Data

The parameters discussed within this section do not have compliance objectives and limits stipulated within the ECA but are part of the required monitoring program.

Nitrite and Nitrate

The below Figures 9 and 10 graph the month's average effluent concentrations. Even though the ECA does not prescribe objectives and limits for the parameters the Canadian Council of Ministers of the Environment (CCME) has recommended guidelines for aquatic life long term exposure for the parameters. Nitrite has a guideline of 0.197mg/L and Nitrate has a guideline of 13mg/L. Although if the guidelines are exceeded it does not necessarily imply that aquatic life will be adversely affected (Canadian Council of Ministers of the Environment, 2012) (Canadian Council of Ministers of the Environment, 2020).

A single erroneous sample result of 1.14mg/L on June 7th, 2023 is attributed to the spike seen in June outside of the normal average of 0.03mg/L.

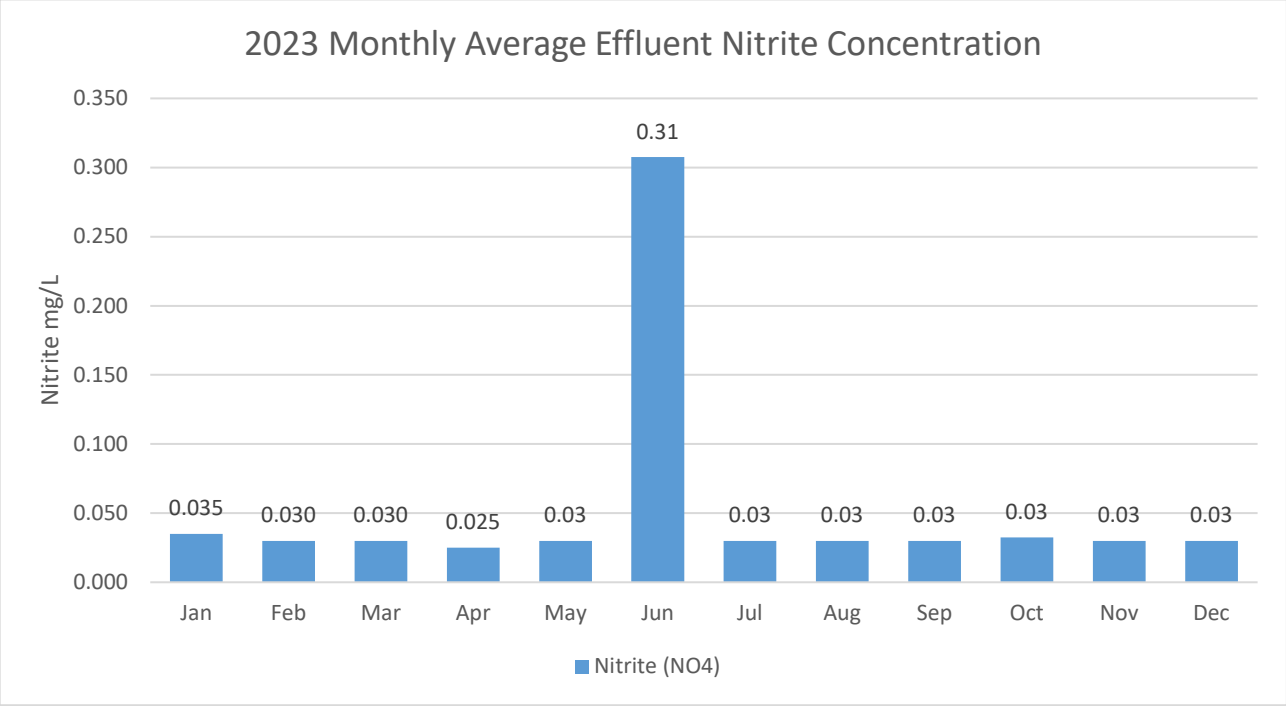

Figure 9. Monthly Average Effluent Nitrite Concentration.

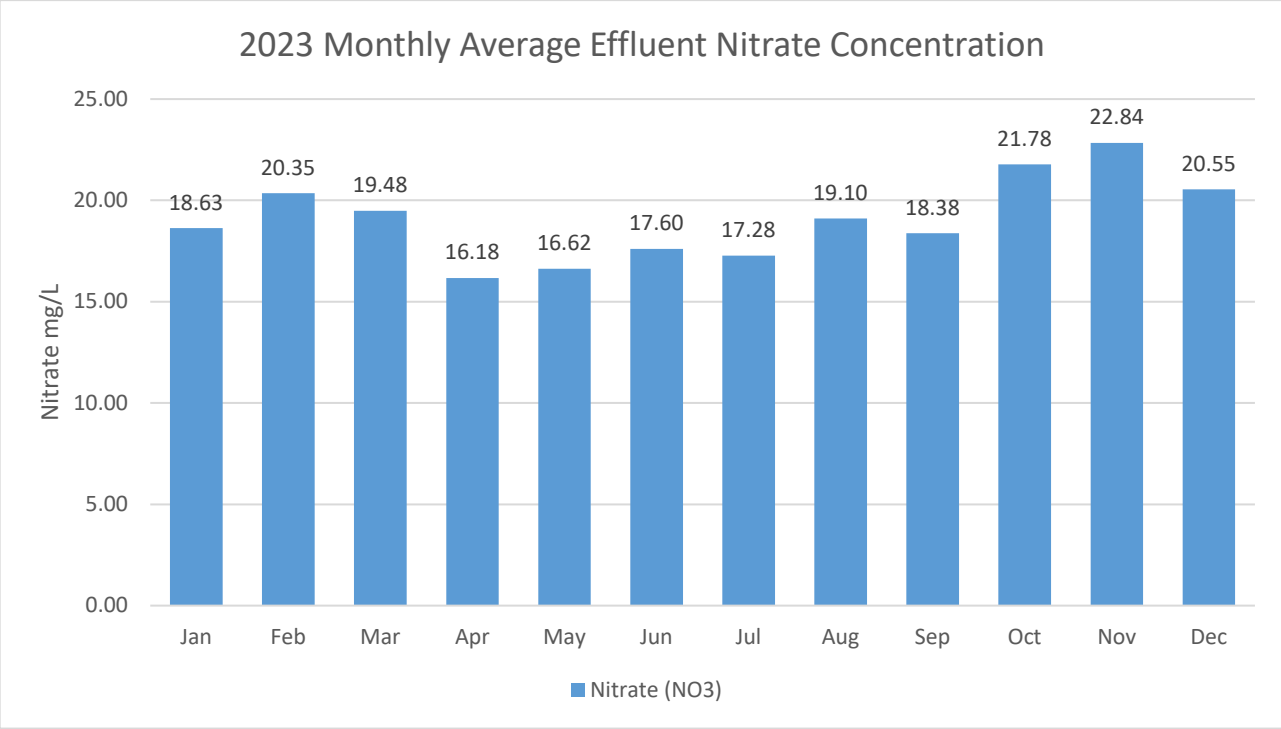

Figure 10. Monthly Average Effluent Nitrate Concentration.

Unionized Ammonia

Unionized Ammonia is a calculated parameter using the effluent TAN concentration, pH and temperature. The pH and temperature are determined in the field at the time of sampling for TAN. As depicted below the unionized ammonia concentration does not fluctuate significantly throughout 2023. The monthly average for all months is at or below 0.0010mg/L except October (0.0013mg/L) as seen graphed in Figure 11. Similar to Nitrate and Nitrite the CCME has a recommended guideline for aquatic life for Unionized Ammonia of 0.019mg/L (Canadian Council of Ministers of the Environment, 2010).

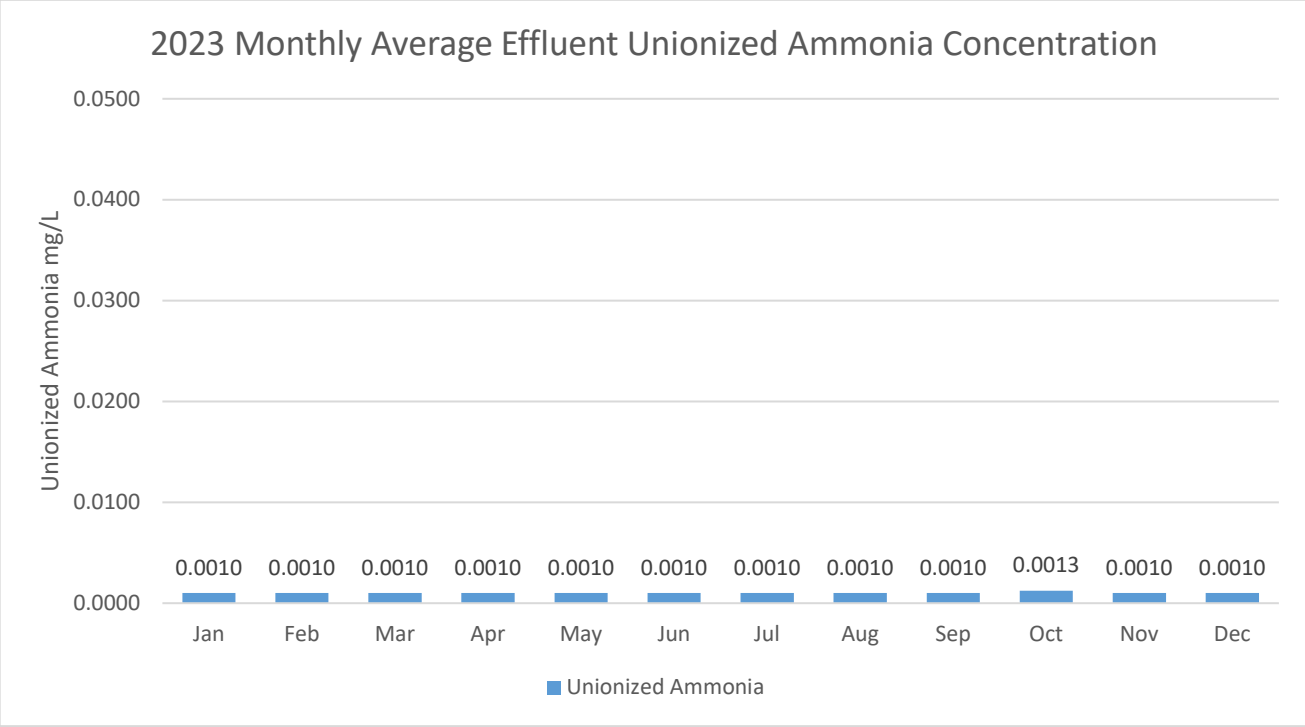

Figure 11. Monthly Average Effluent Unionized Ammonia Concentration.

TKN

The monthly average effluent TKN concentrations see slight fluctuations throughout the year, ranging from 0.5mg/L to 1.43mg/L. The monthly average concentrations are graphed below in Figure 12.

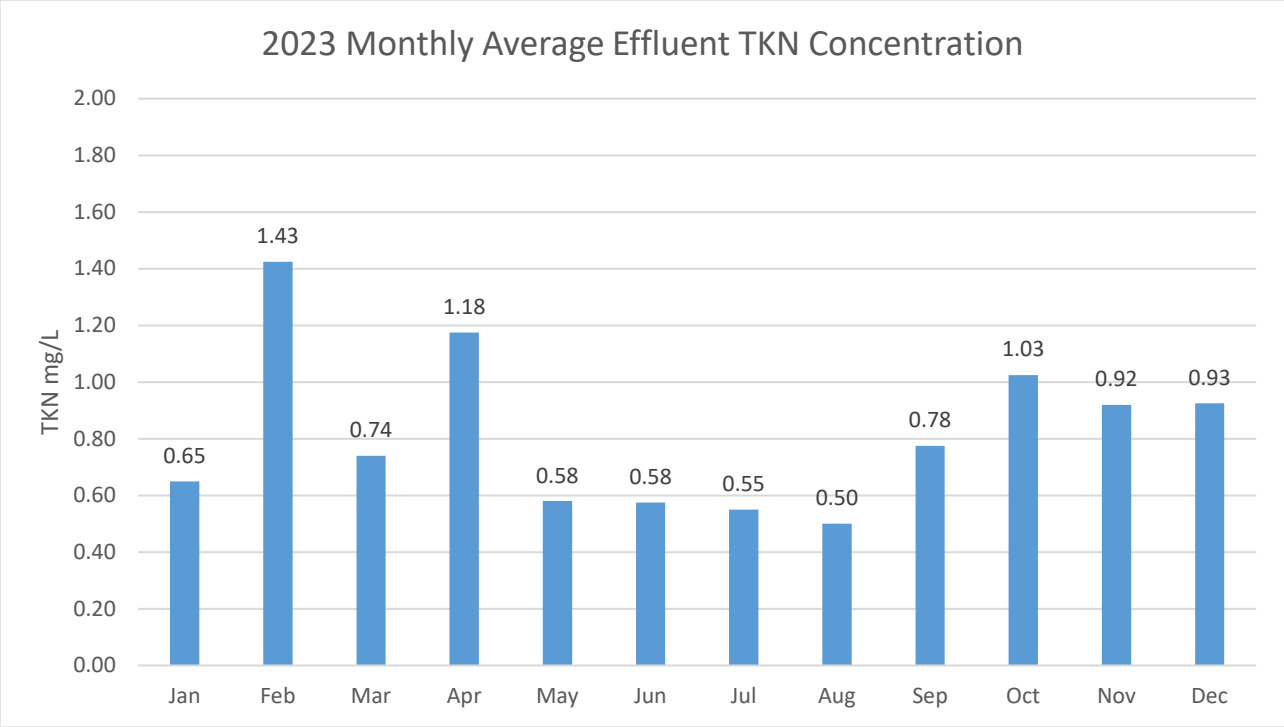

Figure 12. Monthly Average TKN Concentration.

2.4.3 Effluent Objectives and Limits

The WPCP ECA outlines effluent objectives to establish non-enforceable effluent quality concentrations as a trigger to best maintain the operational effluent quality. The WPCP has used best efforts to maintain operational effluent objectives outlined below in Table 6. The Effluent Objectives Table from ECA No. 3705-BGRP97 has been displayed to identify the requirements.

Table 6. ECA Effluent Objectives.

Effluent Objectives		
Effluent Parameter	Averaging Calculator	Objective (mg/L unless otherwise indicated)
CBOD5	Monthly Average Effluent Concentration	5
Total Suspended Solids	Monthly Average Effluent Concentration	5
Total Phosphorus	Monthly Average Effluent Concentration	0.096
Total Ammonia Nitrogen	Monthly Average Effluent Concentration	0.6 (May 1 to October 31)
		2.0 (November 1 to April 30)
E.Coli	Monthly Geometric Mean Density	50 CFU/100mL
pH	Single Sample Result	6.5-8.5 inclusive

The WPCP ECA outlines effluent limits to maintain the health of the West Holland River and to meet the Ministry's effluent quality requirements. The effluent limits are outlined below in Table 7. In Figures 13-22 effluent samples analyzed by SGS Canada Inc. are utilized to compare analytical results to the effluent limits and objectives.

All sampling is completed within the guidelines of the ECA and are carried out in compliance with the sampling methods and procedures set out by the MECP. The sample frequency and analysis meets and surpasses the minimum requirements.

The WPCP operated within the requirements for all parameters outlined within the current WPCP ECA.

Table 7. Final Effluent Compliance Limits.

Final Effluent Compliance Limits		
Effluent Concentration Limits		
Final Effluent Parameter	Averaging Calculator	Limit (maximum unless otherwise indicated)
CBOD5	Monthly Average Effluent Concentration	10 mg/L
Total Suspended Solids	Monthly Average Effluent Concentration	10 mg/L
Total Phosphorus	Annual Average Effluent Concentration	0.098 mg/L
Total Ammonia Nitrogen	Monthly Average Effluent Concentration	0.8 (May 1 to October 31) 2.5 (November 1 to April 30)
E.Coli	Monthly Geometric Mean Density	100 CFU/100mL
pH	Single Sample Result	6.0-9.5 inclusive
Effluent Loading Limits		
Final Effluent Parameter	Averaging Calculator	Limit (maximum unless otherwise indicated)
CBOD5	Monthly Average Daily Effluent Loading	194 kg/d
Total Suspended Solids	Monthly Average Daily Effluent Loading	194 kg/d
Total Phosphorus	Annual Average Daily Effluent Loading	1.912 kg/d

2.4.3.1 pH

pH was consistently maintained between the ECA limits of 6.0 to 9.5 within the reporting year as seen in Figure 13. The monthly averages ranged between 6.94 and 7.12. The single sample results ranged within 6.5-7.8, as mentioned pH was maintained within both the ECA high and low limits and objectives.

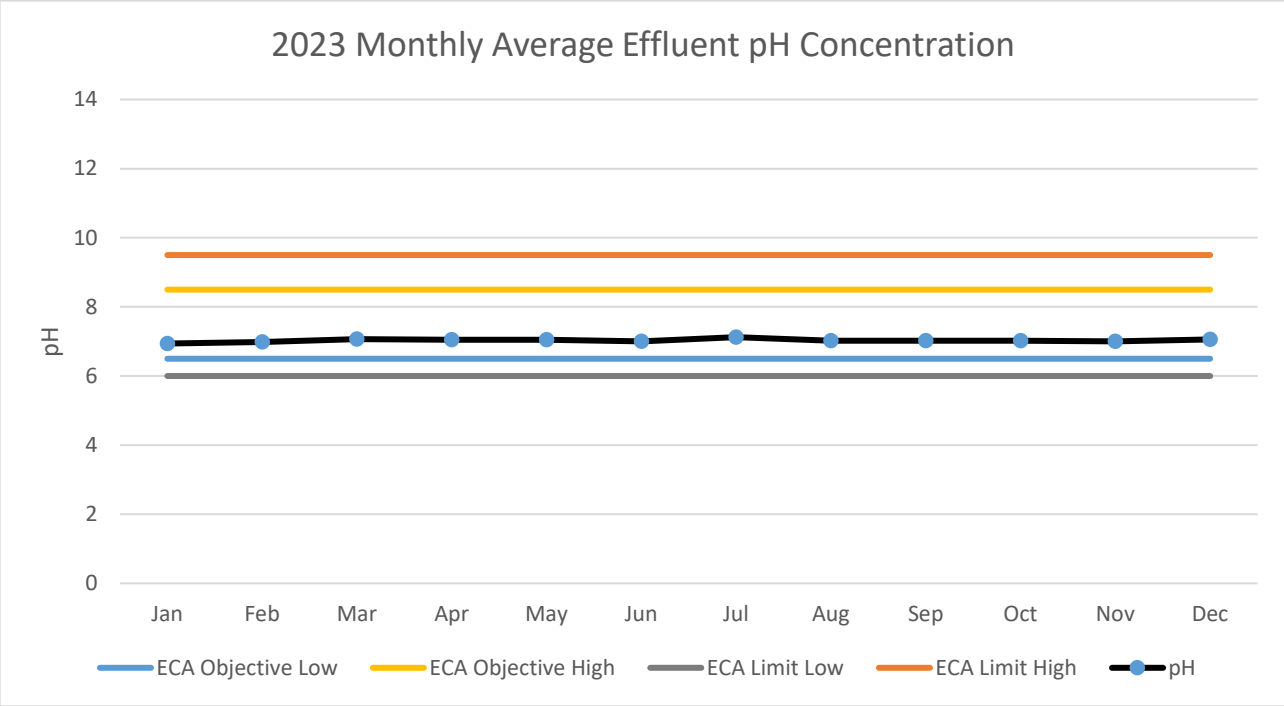

Figure 13. Monthly Average pH Compared to the ECA.

A Historical Trend of monthly pH recordings from 2015 to 2023 can be found in Appendix F. The historical trend visualizes the monthly average trends for pH. It can be seen that in 2017, 2019 and 2021 there was more variation. In 2015, 2016, 2018, 2020, 2022, and 2023 minimal variation was seen.

2.4.3.2 Total Suspended Solids

Figure 14 below graphs the 2023 TSS data and is compared to the limit and objective set by the WPCP ECA. The monthly average concentration for TSS fluctuated slightly throughout the year, January had the highest average at 5mg/L and July with the lowest of 2.25mg/L. The monthly average TSS remained below both the objective and limit in all months except January. The monthly average TSS for January was at the objective limit of 5 mg/L.

The annual average concentration for TSS was 3.46mg/L and the annual monthly average concentration was 3.45mg/L, both below the ECA objective.

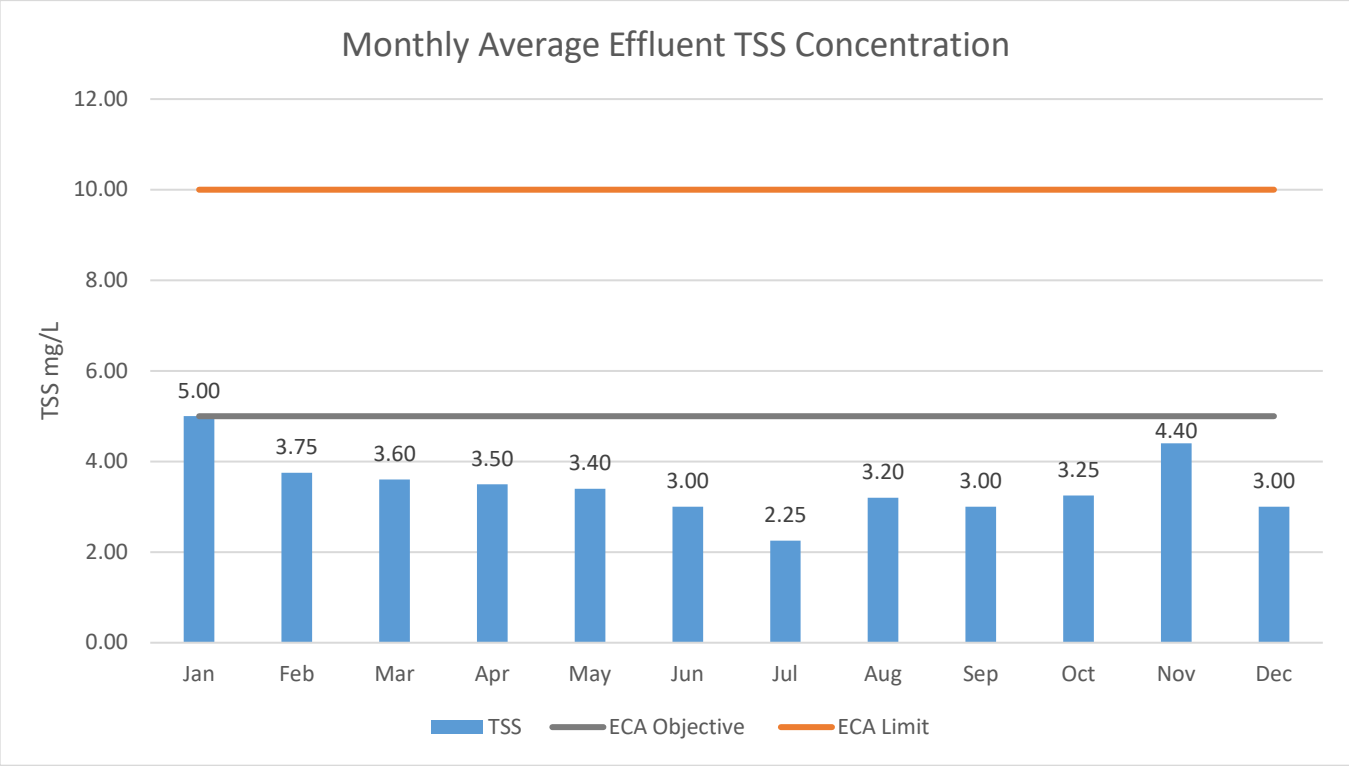

Figure 14. Monthly Average Total Suspended Solids Concentration Compared to the ECA.

In APPENDIX G, TSS is graphed as a Historical Trend from 2015 to 2023. There is variation in the monthly concentration which starts to increase in 2017. 2022 is a decrease from the highest levels of 2021, 2023 is an increase from 2022 though still below the 2021 average. Monthly average concentrations remain below the ECA objective and limit, except for results in December 2017, January to March of 2021, and January 2023 which exceeded the objective.

Throughout 2023 the monthly loading remains well below the ECA limit of 194kg/day, as shown in Figure 15 below.

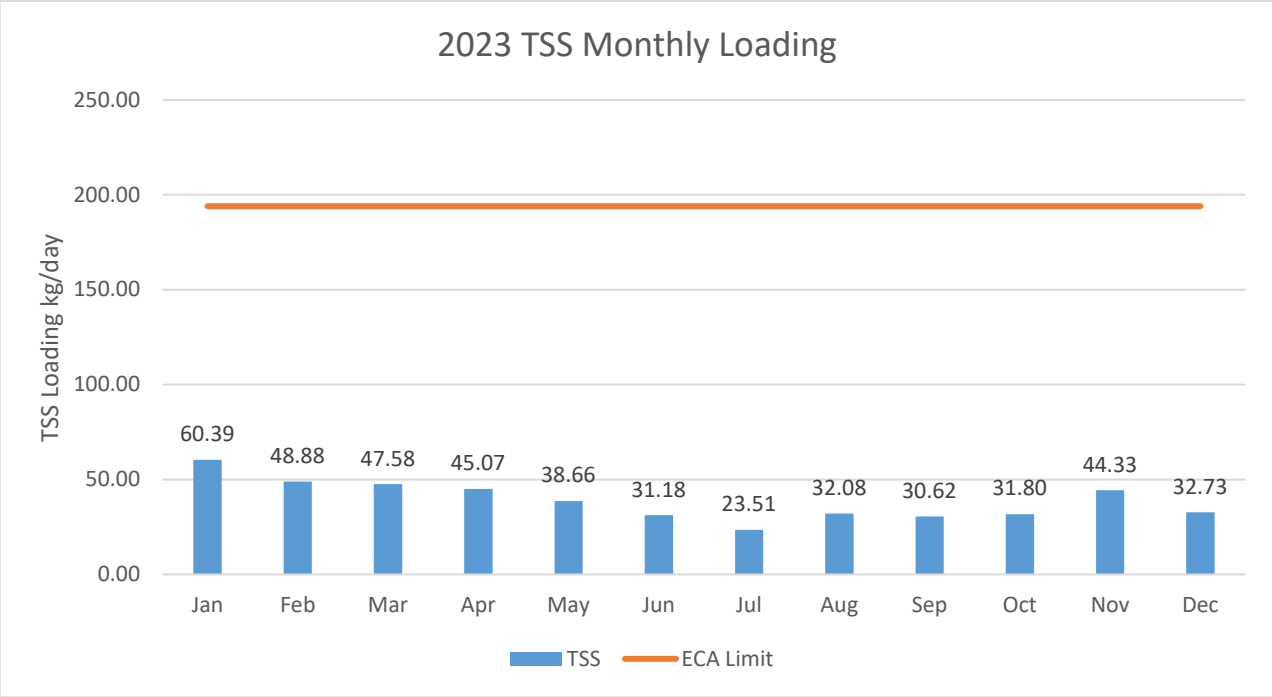

Figure 15. Monthly Average TSS Waste Loading Concentration Compared to the ECA.

2.4.3.3 E.coli

Figure 16 below identifies the E.coli effluent data throughout 2023 compared to the ECA limit and objective. E.coli did not exceed the ECA limit or surpass the objective. The E.coli monthly geometric mean ranged from 2.00 to 6.79cfu/100mL, and the single sample results ranged 0 to 30cfu/100mL. There were two (2) occurrences where the E.coli result was zero (0) (April 5 and Dec 13) to calculate the geometric mean the value one (1) was used.

There were no occurrences when the single sample results or monthly average concentration exceeded the ECA objective or limit.

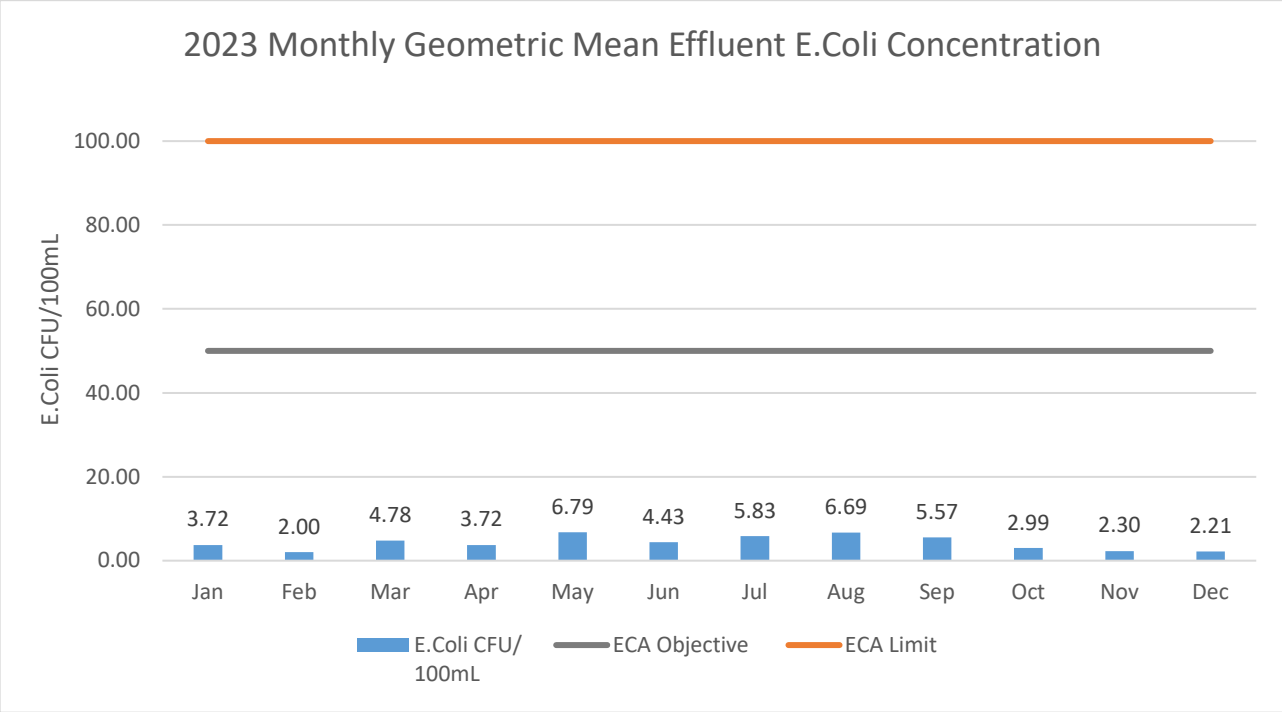

Figure 16. Monthly Geometric Mean E.coli Concentration Compared to the ECA.

In APPENDIX H, E.coli concentrations are graphed as a Historical Trend for 2015 to 2023. Overall, the effluent characteristics for E.coli remain well below the objective and limit of the ECA. An upward trend in E.coli concentrations was seen at the end of 2021 into 2022. 2023 saw a decrease from 2021 and 2022 levels, though still above the monthly averages from 2015 to 2020. Additionally, slight monthly variation started to increase in 2018.

2.4.3.4 Carbonaceous Biochemical Oxygen Demand

In 2023 the CBOD5 concentration did not exceed either the ECA objective or limit. Figure 17 below displays the CBOD5 concentrations compared to the ECA objective and limit. The highest monthly average concentration was 3.00mg/L in January. The lowest monthly average concentration of 2mg/L occurs in March, April, May, June, September, October and November.

The monthly annual average concentration was 2.20mg/L and the annual average concentration was 2.19mg/L.

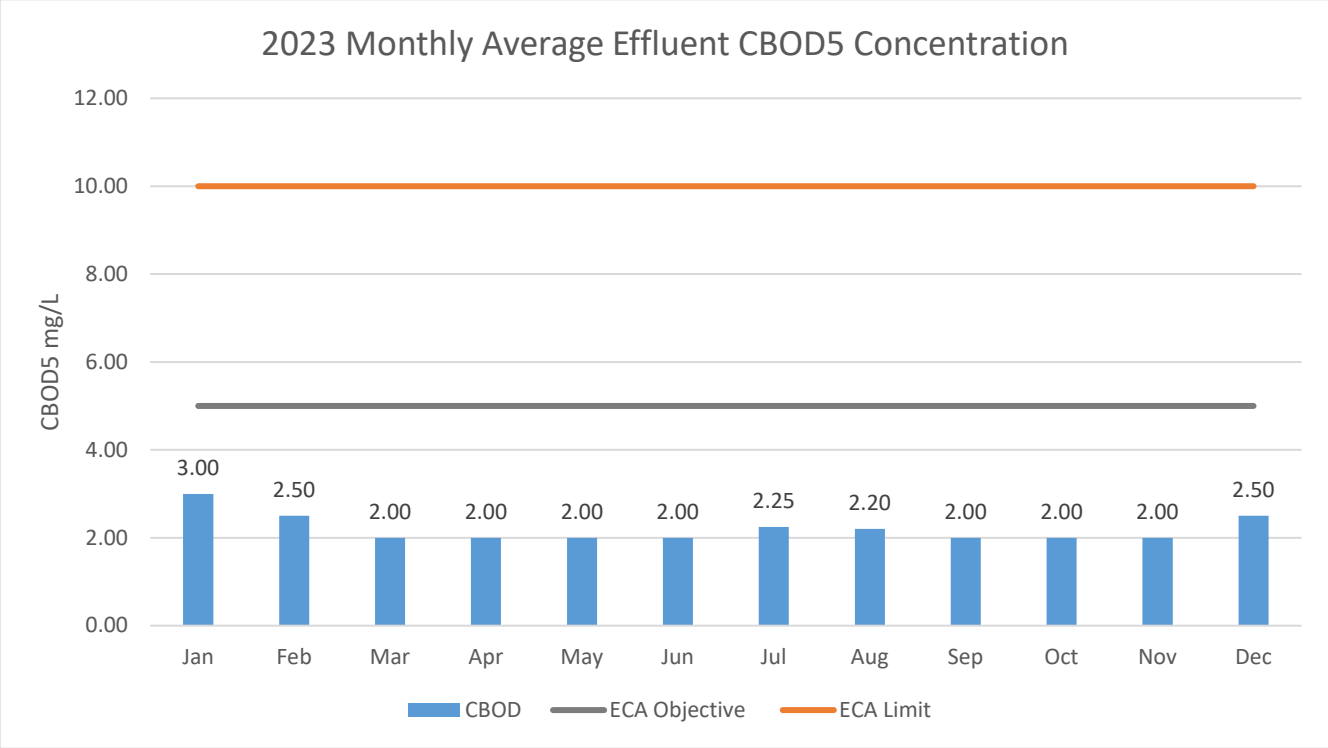

Figure 17. Monthly Average CBOD5 Concentration Compared to the ECA.

In APPENDIX I, a Historical Trend of the monthly averages for CBOD5 is graphed. The monthly average concentration is consistently similar varying marginally month to month from 2015 to 2023, there is no trend currently indicating a change in the effluent characteristics of CBOD5. There was one (1) significantly high monthly average concentration in June of 2016, although a similar monthly average concentration has not been recorded since and the result did not exceed the ECA limit.

CBOD5 monthly waste loading stayed below the ECA limit, as shown in Figure 18. The average loading does not fluctuate considerably throughout the year (range from 20.42 to 36.23 kg/day) and stays well below the limit of 194 kg/day.

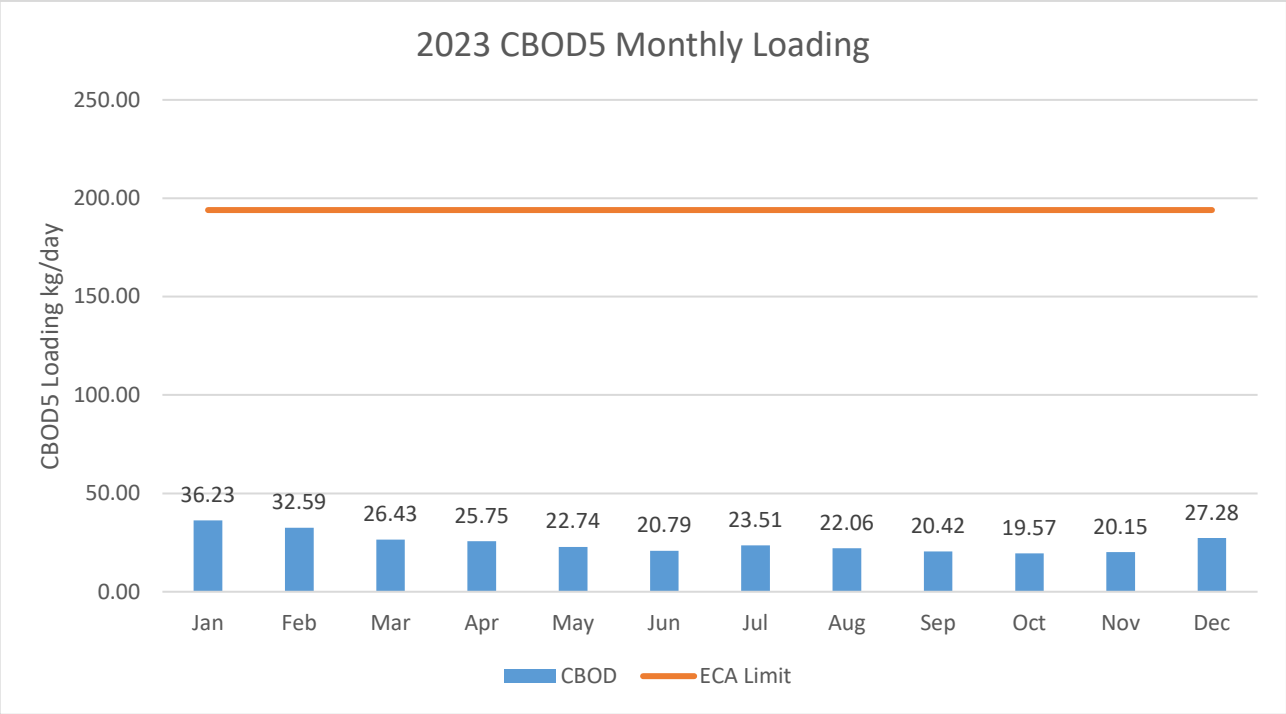

Figure 18. Monthly Effluent Average CBOD5 Waste Loading Compared to the ECA.

2.4.3.5 Total Ammonia Nitrogen

TAN monthly average concentrations stayed below the objective and limit of the ECA for all months. Figure 19 identifies the monthly average concentration of TAN throughout 2023. As identified in the ECA the limit and objective for TAN increases to 2.5mg/L and 2.0 mg/L in November to April of each calendar year and decreases to 0.8mg/L and 0.6mg/L in May to October. The monthly average concentrations range between 0.20 (October) and 0.04 (April and July). Overall there is minimal variability throughout the year.

No single sample result exceeded the ECA limit within the reporting year.

The monthly annual average concentration and the annual average concentration were 0.07mg/L.

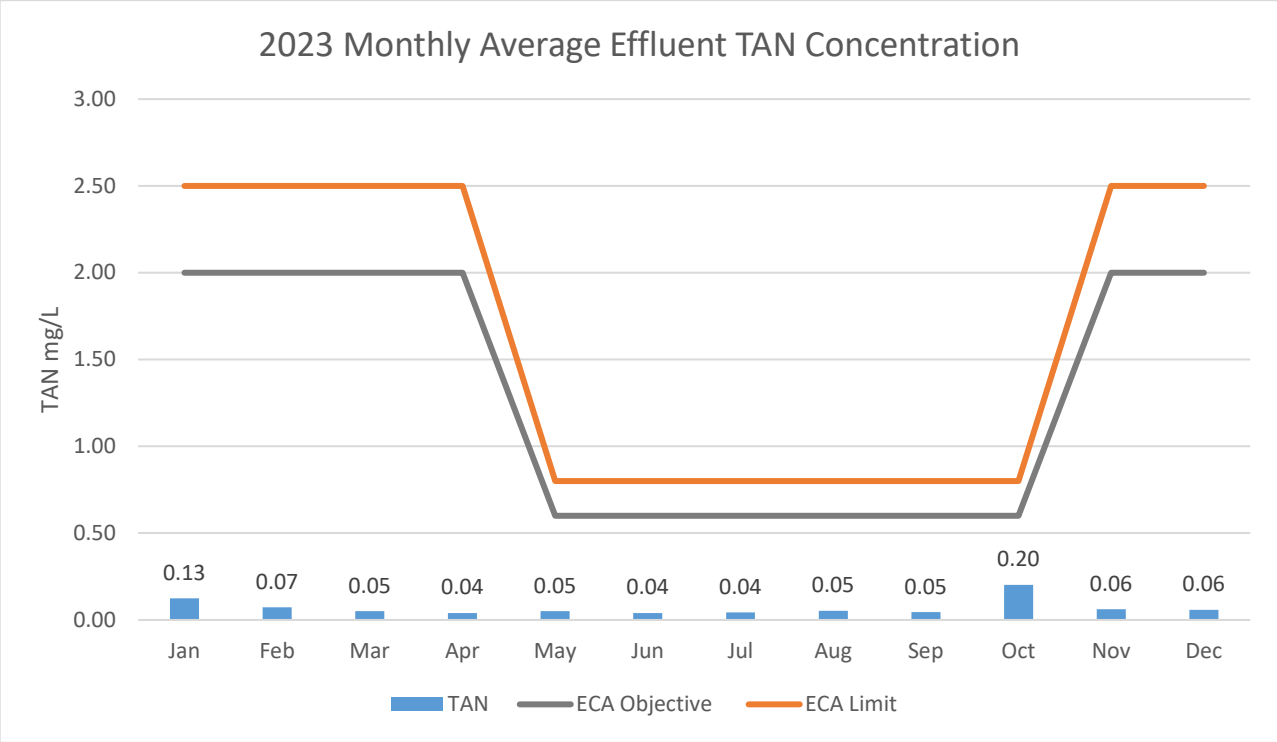

Figure 19. Monthly Average TAN Concentration Compared to the ECA.

In APPENDIX J, the monthly average TAN concentrations are graphed as a Historical Trend for 2015 to 2023. TAN monthly average concentrations trended down in 2017 and 2018 from a previous upward trend at the end of 2016. 2019 and 2020 saw a slight increase though results remained stable between the years, followed by an increase in 2022. 2023 saw a decrease back to near 2016 levels.

2.4.3.6 Total Phosphorus

The monthly average Total Phosphorus concentrations fluctuated between 0.045mg/L and 0.114mg/L. ECA compliance is determined based on the annual average effluent concentration which is discussed further in this subsection. Only the ECA objective for Total Phosphorus is subject to a monthly average concentration. In January the monthly average effluent objective was exceeded for Total Phosphorus. While the concentration may have exceeded the ECA objective, this does not indicate non-compliance with the approval as compliance is determined by the annual average effluent concentration limit.

Figure 20 below depicts the average monthly effluent concentrations for Total Phosphorus.

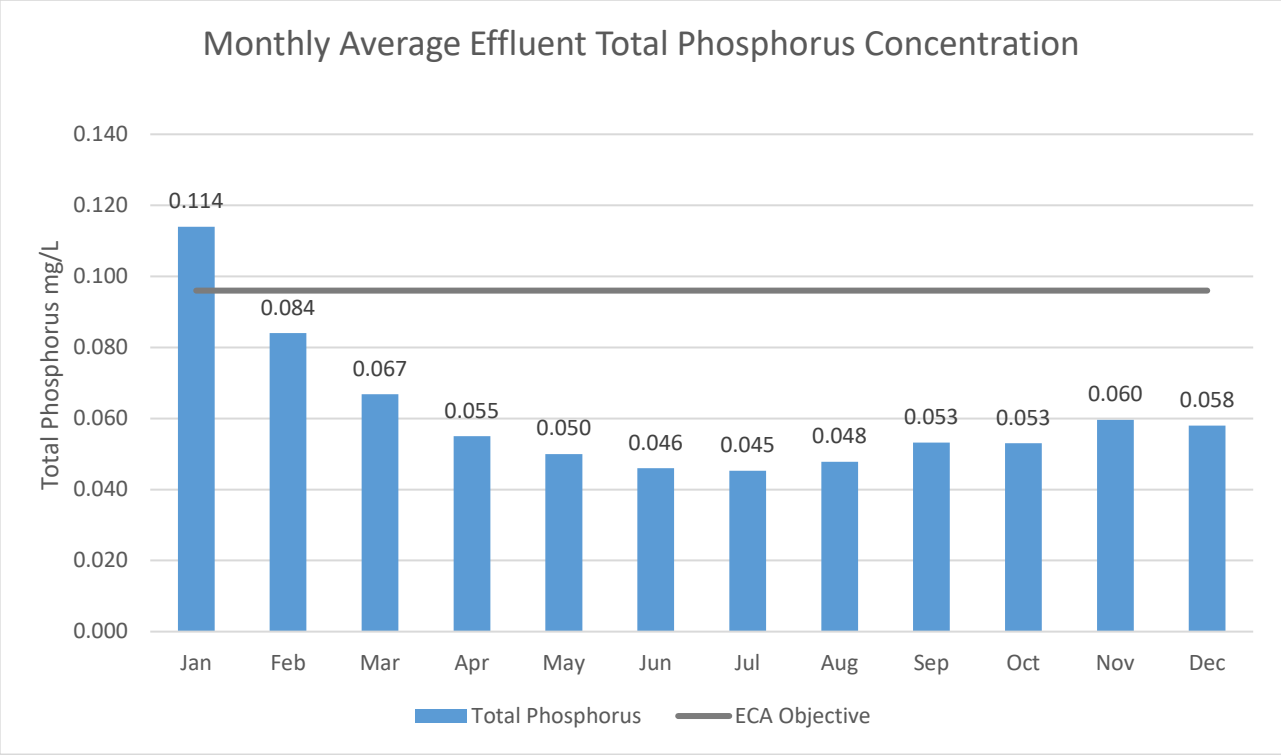

Figure 20. Monthly Average Total Phosphorus Concentration Compared to the ECA.

In APPENDIX K, Total Phosphorus monthly concentrations has been graphed in a Historical Trend for 2015 to 2023. It can be seen that January of 2021 has the highest monthly average concentration within the trend. A spike in January of 2023 is higher than any previous results in 2022 though the average for 2023 is lower than 2022. There is variance month to month within the entire trend. The highest monthly average concentration was January 2021 at 0.139mg/L and the lowest was May 2018 and July 2019 at 0.041mg/L.

The Annual Average Daily Effluent Loading of Total Phosphorus for the WPCP was 0.679kg/day which is well below the compliance limit of 1.912kg/day. The Annual Average Daily Effluent loading is depicted in Figure 21.

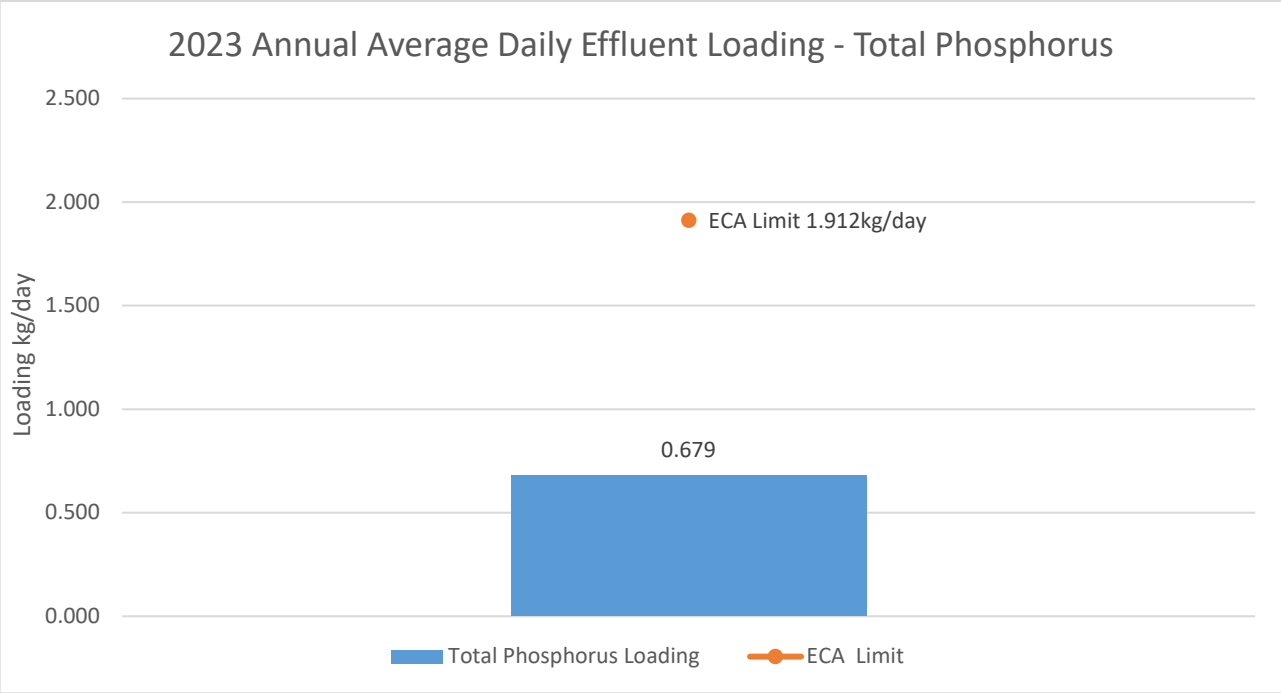

Figure 21. Annual Average Daily Effluent Loading Total Phosphorus

The Total Phosphorus annual average effluent concentration does not surpass the objective and limit of 0.096mg/L and 0.098mg/L. The annual average effluent concentration is 0.061mg/L.

The annual average Total Phosphorus concentrations have been compared below in Figure 22. The highest annual average concentration occurred in 2016 and lowest in 2018. 2023 saw a decrease from 2021 and with concentrations going from 0.074mg/L to 0.061mg/L. All annual average concentrations remain below the annual average concentration limit.

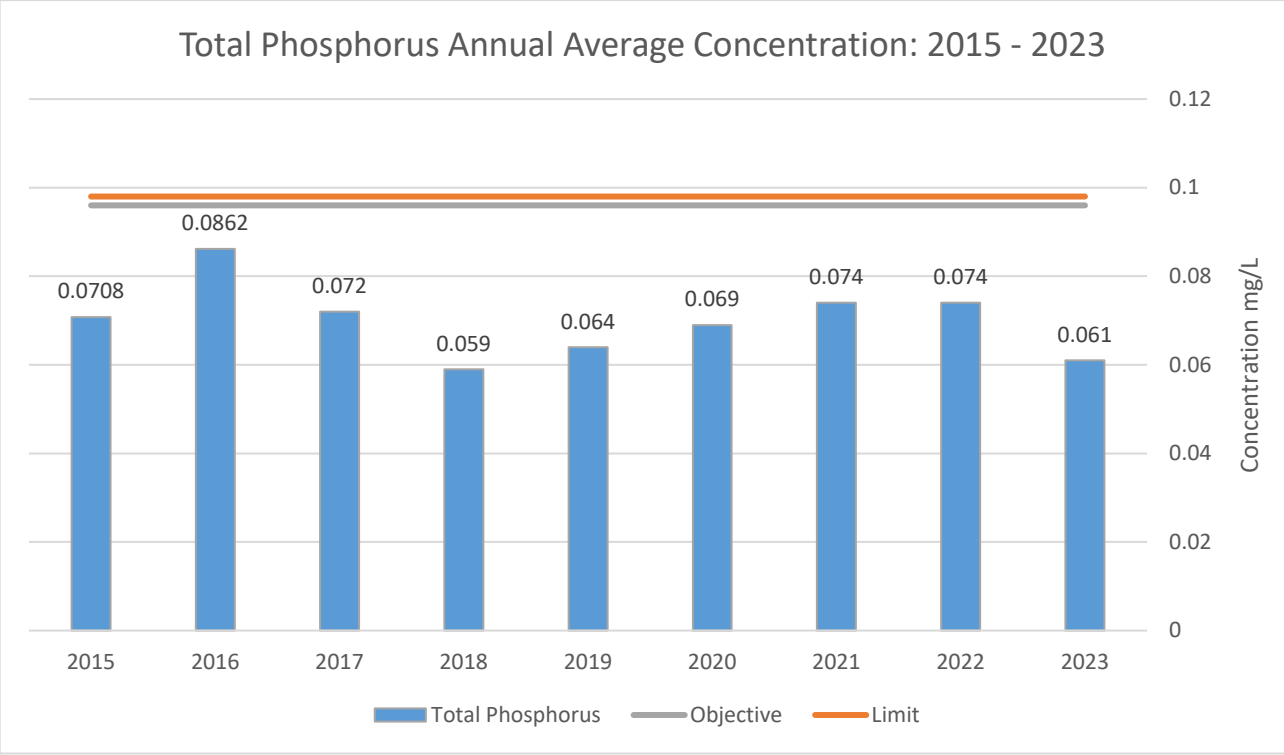

Figure 22. Total Phosphorus Annual Average Concentration Trend 2015-2023.

2.4.4 Operational Exceedance

The BWG WPCP did not experience any operational exceedances in 2023.

2.5 Operations and Maintenance

The WPCP met the operational and maintenance requirements stipulated within the ECA, there were no changes to daily operations in 2023. All annual calibrations of major equipment of the works have been completed which includes but is not limited to laboratory equipment and flow meters.

The WPCP has continued to implement and update a Quality Management System, Standard Operating Procedures (SOP's) and Policies. Additionally, the Septage Hauling Program under the Sewer Use By-law 2013-68 (By-law) remains enforced. The Town has continued to monitor new Industrial, Commercial and Institutional (ICI's) facilities connected to Town infrastructure through the By-law. For additional information on the Septage Hauling Program and imported sewage monitoring refer to Section 6 Septage Receiving.

In addition to the routine maintenance previously discussed in section 1.4, the following list provides a highlight to maintenance completed within the reporting year:

- Replaced the fine bubble aeration system in Plant C SBRs.
- The standby manual bar screen in the Headworks was replaced with a mechanical bar screen
- WPCP System Wide PLC Upgrade and alarm reconfiguration.
- Plant B brought back online from September to November.
- Completed 3,291 PM work orders, up from 2,978 PMs in 2022.

The 2022 Benthic Invertebrate Study is included in this annual report as the results did not arrive in time to be included in the 2022 Annual Report. It was the eight (8th) invertebrate study for the WPCP receiving stream. The study was completed by Hutchinson Environmental Services Ltd. The study is completed every other year with the next to be conducted in 2024. Biological metrics were compared upstream and downstream of the of the WPCP outfall, the differences between the sampling locations was not statistically significant. Based on the results, it was concluded that treated effluent from the WPCP is not clearly impacting benthic invertebrate populations (Hutchinson Environmental Sciences Ltd., 2023).

The WPCP has met strict regulatory requirements for effluent disposal into the receiving stream as previously discussed, to protect water quality, fish and other aquatic life, as identified within the current ECA.

2.5.1 Chemical Usage

In 2023 a total of approximately 780,300 litres (L) of Aluminum Sulphate (alum) was used in the wastewater treatment process. The monthly alum usage is displayed in Table 8 below. Alum is injected at the filter inlet, Plant D clarifier inlet, and the head works flow splitting chamber where the de-gritted water can be sent to Plant B, C, or D aeration tanks. Alum is injected into the system for phosphorous removal by chemical precipitation.

Table 8. Chemical Usage – Alum 2023

Chemical Usage – Alum 2023		
Month	Storage Tanks Total (L)	Polishing Tank (L)
January	62,849	1,971
February	56,783	1,971
March	64,159	2,424
April	61,990	2,552
May	63,470	2,755
June	60,578	2,252
July	63,495	2,454
August	63,428	2,378
September	64,853	2,234
October	65,526	1,877
November	64,238	1,566
December	62,912	1,593
Total (L):	754,280	26,027
Annual Total (L):	**780,307**	

3. Collection System

3.1 Facility Description

The Town's Collection System is certified as a Class three (3) system. The BWG collection system consists of approximately 2,050 maintenance holes, 36.93km of forcemain, 128.64km of gravity sewers, and nine (9) Pumping Stations.

The function of the pumping stations within the BWG collection system is to collect and transport sewage to the WPCP for treatment.

3.2 General Overview

3.2.1 Artesian Pumping Station

Artesian Pumping Station is located at 135 Artesian Industrial Parkway, approximately 800m north of Dissette Street. The station was constructed in 1996. Sanitary sewage flows by gravity from both directions in 300mm and 350mm PVC sewer mains to Manhole 1613 directly opposite the station on Artesian Industrial Parkway. The Pumping Station consists of three (3) pumps with a flow capacity of 2,419m^3/day. This

Pumping Station is monitored via SCADA and is equipped with a portable generator for back-up power.

3.2.2 Dissette Pumping Station

The Dissette Pumping Station is located at 21 Dissette Street with a rated capacity of 27,268m^3/day. The station was originally constructed in 1970 and an expansion was built in 1982. The station has two (2) separate buildings housing four (4) pumps and two (2) separate wet wells, which can be operated together and separately. This station is monitored via SCADA and is also equipped with a back-up generator.

3.2.3 Green Valley Pumping Station

Green Valley Pumping Station is located at 2541 Line 6 and was constructed in 2014. The rated flow capacity for this station is 201L/s. The Pumping Station consists of three (3) pumps and two (2) side by side wet wells that can be operated separately or as one (1). This station is also equipped with an odor control system, bar screen conveyer and back-up generator. The station is monitored via SCADA.

3.2.4 Industrial Pumping Station

The Industrial Pumping Station is located at 30 Industrial Road on the north side of Industrial Road, east of Dissette Street. This Pumping Station has a rated capacity of 18.8L/s and is equipped with two (2) pumps, a back-up generator and is monitored via SCADA.

3.2.5 Middletown Pumping Station

The Middletown Pumping Station was commissioned in May of 2016 and is located at 212 Rutherford Road. The Pumping Station was constructed to serve 18.13 hectares of residential lands designed with a peak flow of 24.5L/s. The station consists of a pre-cast wet well housing two (2) pumps, back-up diesel generator and is monitored via SCADA.

3.2.6 Ritchie Stong Pumping Station

Ritchie Stong Pumping Station is located at 458 Holland Street West and is the largest capacity Pumping Station within the Town's WWC system. The Pumping Station has a capacity of 420L/s. This station is equipped with four (4) pumps, an odor control system, bar screen conveyer, back-up generator and is monitored via SCADA.

3.2.7 Simcoe Road Pumping Station

Simcoe Road Pumping Station is located at 772 Simcoe Road and was commissioned in February of 2017. The Pumping Station was constructed to service 4.64 hectares and designed for a peak flow of 3.6 L/s. This station consists of a wet well with two (2) pumps, and has the ability to connect to a portable generator. The station is monitored via SCADA.

3.2.8 400 Lands Pumping Station

The 400 Lands Pumping Station is located at 3580 line 5 in the Town of Bradford West Gwillimbury. The station was commissioned in January of 2020 and started receiving flow in April, 2021. The facility has a total station capacity of 347L/s. The station houses a dry pit and two (2) wet wells, as well as four (4) dry pit submersible pumps each with a rated capacity of 115.8L/s. The station is equipped with a back-up generator and odour control unit and is monitored via SCADA.

3.2.9 Bond Head Pumping Station

The Bond Head Pumping Station is located at Part of Lot 24, Concession 7 in the Town of Bradford West Gwillimbury. The station was commissioned in 2021. The gates were opened for the station to receive flow on July 26, 2023. The station houses a dry pit and two (2) wet wells, as well as three (3) submersible pumps. The station is equipped with a back-up generator, an odour control unit and is monitored via SCADA.

3.3 Alterations to the Authorized System

Within the reporting period there were three (3) SS1 forms submitted to the Town and one (1) form that was previously submitted in 2022 not previously reported on.

The Alteration previously submitted in 2022 is for a new development to construct and connect a future sewer for the 400 Employment Lands. It will connect to an existing sanitary sewer going to the existing 400 Lands Pumping Station. The underground construction work is complete. The area is not assumed.

An Alteration form submitted February 2023 is for the installation of a Sanitary Sewer for the Centreville Townhouse Block. It is a residential development area. The underground construction for the work has been completed.

A third Alteration was submitted to the Town in March 2023 is under an Intersection and Signalization project. The installation of a new sanitary sewer on County Road 88 near the intersection of Sideroad 5. As part of the Alteration, a sanitary service will be installed for Sir William Osler Public School to permit future additional student capacity at the school. The underground construction for the work has been completed.

The fourth Alteration submitted to the Town in June 2023 is a revision to a previously approved design. It is for the installation of a new sanitary sewer on Danube Lane with revised pipe sizes form the original submission. The underground construction for the work has been completed.

None of the Alterations were determined to pose a Significant Drinking Water Threat. All of the proposed works are wholly located within the municipal boundaries of the Town of BWG.

3.4 Operations and Maintenance

All required maintenance has been carried out to ensure the WWC System is in compliance with all regulatory requirements. There is a PM program in effect to help maintain the integrity of all infrastructure, equipment and associated facilities to

ultimately avoid any overflow or bypasses to the environment. The PM program is carried out as per the manufacturer recommendations. Over and above the routine maintenance previously discussed in section 1.4 the following provides additional maintenance and an overview of the operational highlights that took place within the collection system.

- 3,303 meters of sanitary main line inspected.
- 341 property lines were located and added to GIS mapping.
- 763 lines flushed in the south section of Town. The Town is separated into north and south sections with Holland Street being the dividing line. The north and south sections are flushed on a yearly rotating schedule.
- Bond Head Pumping Station began receiving flow in July.
- New carbon media was installed in the Green Valley Pumping Station odor control system.

In addition to the maintenance activities listed above, two reports were completed for WWC system in 2023. The reports were both requirements of the CLI ECA.

The Significant Drinking Water Threat Assessment Report for Proposed Alterations was completed in May 2023. It was completed as per Schedule E Condition 7.2 of the WWC CLI ECA. Its purpose was to identify significant drinking water threats caused by alterations to the WWC system, outline how to assess future proposed alterations, and summarize design considerations to mitigate future drinking water threat risks. No significant drinking water threats were found.

The Assessment of Wet Weather Flows Compared to Dry Weather Flows Report was completed in November 2023. It was completed as per Schedule E Condition 8.1.1. Ten years of data was analyzed to quantify the impact of wet weather (inflow and infiltration) on the WWC and WPCP. The report concluded infiltration and inflow from wet weather events were not significant sources of increased flow to wastewater system.

All annual calibrations of major equipment of the works were completed. All required calibrations have been completed by qualified professionals to ensure the WWC system operates in compliance with CLI ECA and other regulatory requirements.

The Wastewater Division has shifted to complete the majority of maintenance in-house. The flushing program, pump inspections, infrared inspections, and all CCTV inspections continue to be completed by internal staff.

4. Summary of Complaints

The Town maintains a record of all wastewater-related complaints and the remedial actions taken to resolve each situation as required by the WPCP ECA, WWC CLI ECA and Air CofA. For more information regarding the WPCP Air CofA refer to APPENDIX P.

In 2023 there was zero (0) odour complaints as a result of wastewater operations. Figure 23 shows a historic trend for odour complaints received and reported in accordance with the CofA. There was a drop in complaints between 2015 and 2018, and a slight increase in 2019. Overall the amount of odour complaints has decreased each year since 2019, receiving two (2) in 2020, one (1) in 2021, zero (0) in 2022, and zero (0) in 2023.

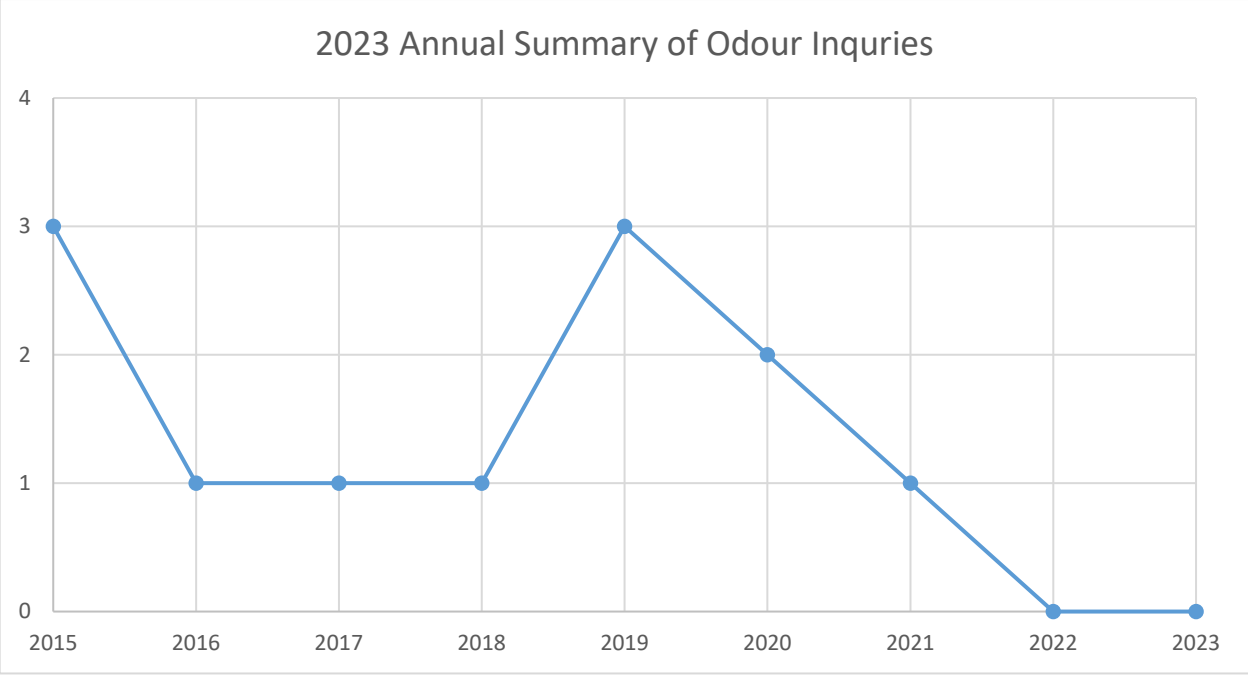

Figure 23. Odour Inquiry Reporting Trend 2015-2023

5. Biosolid Management

The WPCP produced 27,164m^3 of sludge in the reporting year. The biosolids that were produced met the MECP Ontario Guidelines for Sewage Sludge Utilization on Agricultural Lands and conditions specified under the Nutrient Management Act.

The biosolids produced by the WPCP were land applied to agricultural fields starting in April to November in accordance with the Nutrient Management Act. A summary of NASM land application is provided below (Table 9). The total amount of Non-agricultural Source Material (NASM) applied to agricultural land is an approximate total of 27,164m^3.

The volume of sludge expected to be produced within 2024 is 32,000m^3.

Table 9. NASM Land Application Totals 2023

NASM Land Application Total 2023	
NSAM Plan	**Total Land Applied (m^3)**
25122	540
25020	1,474
60332	738
24757	3,049
60501	1,303
24086	501
24534	908
24084	849
24021	3,189
24612	2,405
60555	4,423
25148	4,056
60608	1,669
24132	1,295
24520	554
24478	221
Total Sum	**27,164**

6. Septage Receiving

Imported Septage is the waste removed from a residential sewage system within the Town which was contained within a septic tank or sewage holding tank.

In 2023, septage was received in all months. The total septage received in 2023 at the BWG WPCP was 845.25m^3. The Septage Hauling Program in conjunction with the Sewer Use By-law 2013-68, was implemented January 1st, 2017. The program has given the Town the increased ability to ensure the source of septage received at the WPCP is only from within the geographical boundaries of the Town. The program will continue in 2024 with no changes.

The monitoring parameters for imported sewage sampling as required in Schedule D of the ECA are listed in Table 10.

Table 10. Imported Sewage monitoring requirements.

Imported Sewage – Imported Sewage Receiving Station		
Parameter	**Sample Type**	**Minimum Frequency**
BOD5	Grab	Monthly
Total Suspended Solids	Grab	Monthly
Total Phosphorus	Grab	Monthly
Total Kjeldahl Nitrogen	Grab	Monthly

Figures 24-27 depict the monitoring analysis of the required parameters outlined in the Table above. There is a high variety within the concentrations for all parameters analyzed for imported sewage, due to the volatility of the type of material. As mentioned imported sewage was received in all months of 2023.

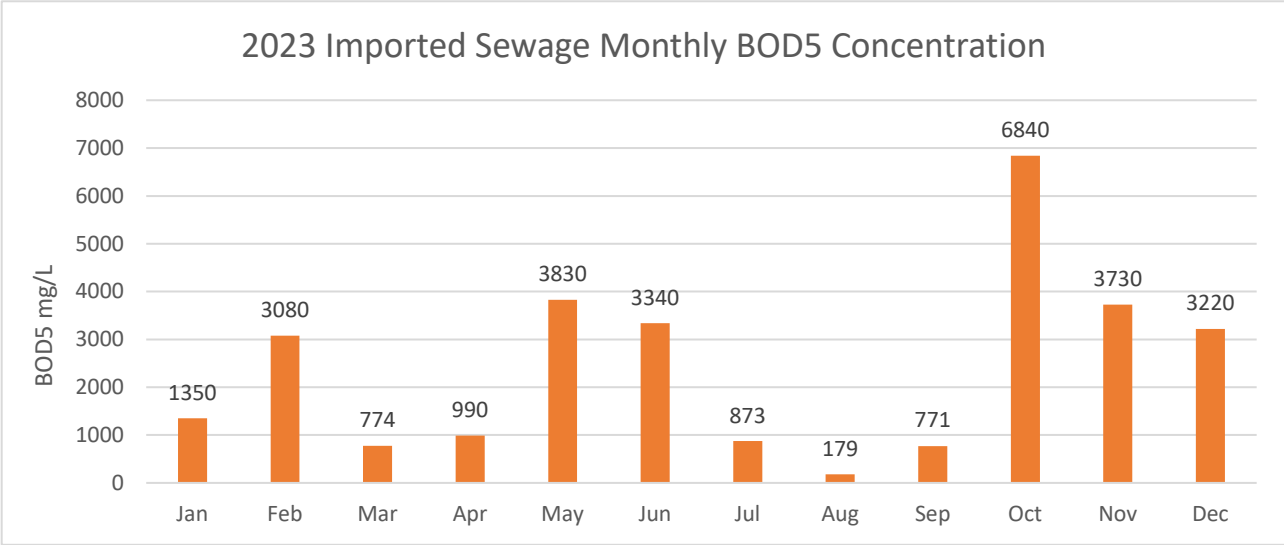

Figure 24. Imported Sewage Monthly BOD5 Concentration.

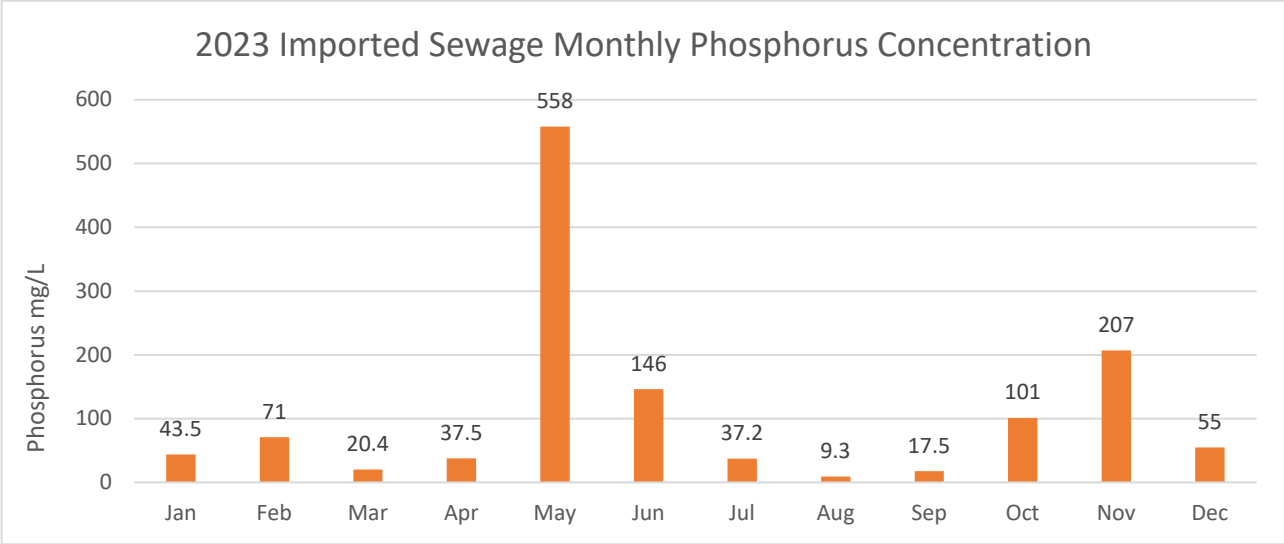

Figure 25. Imported Sewage Monthly Total Phosphorus Concentration.

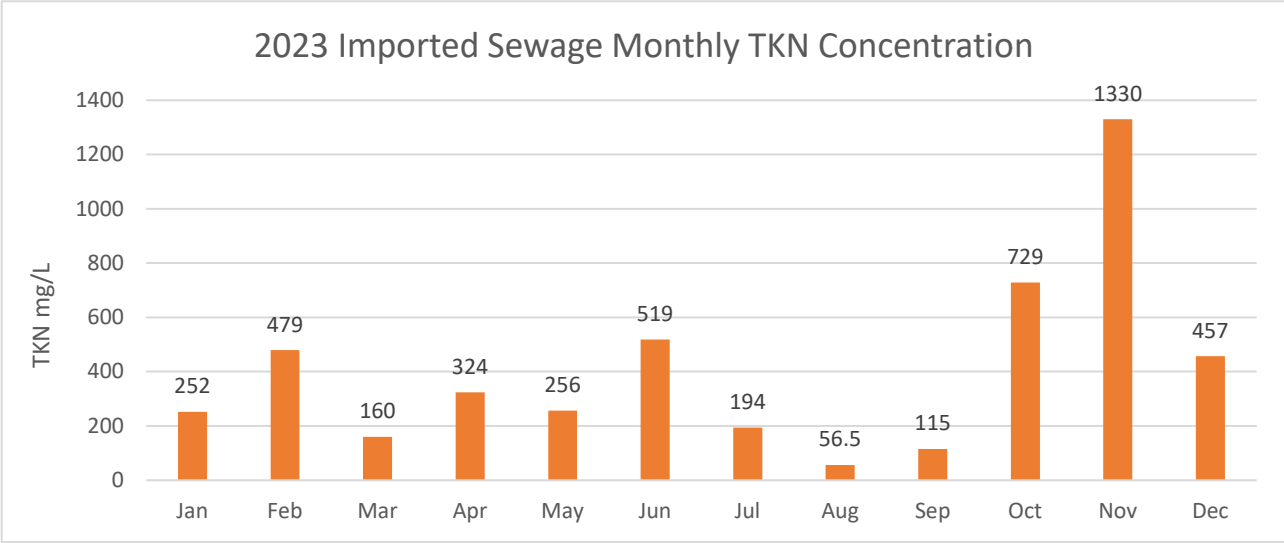

Figure 26. Imported Sewage Monthly TKN Concentration.

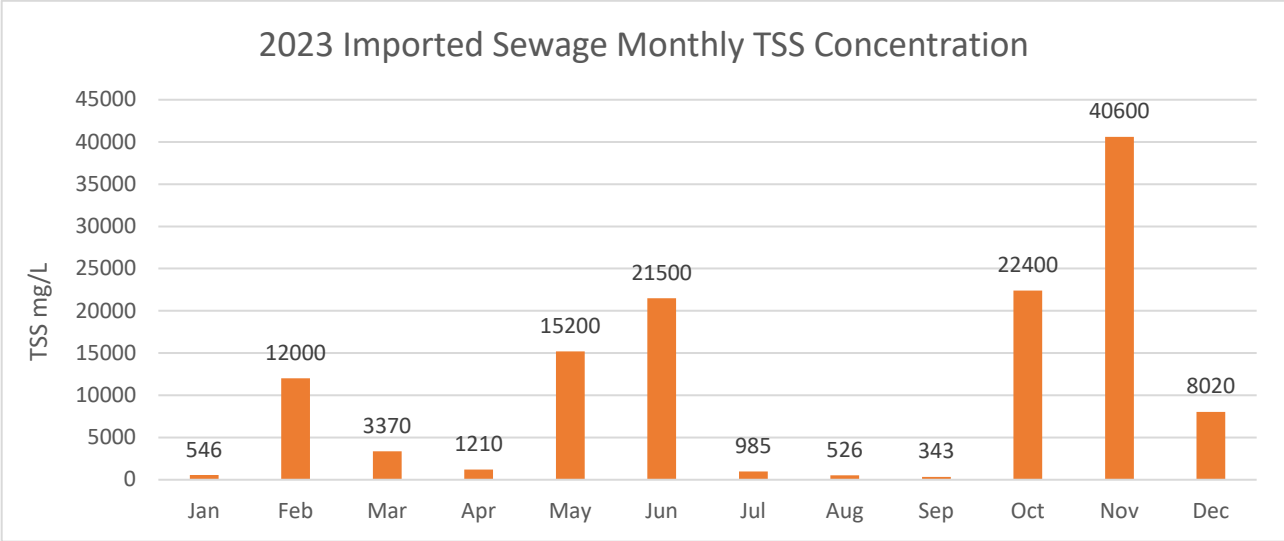

Figure 27. Imported Sewage Monthly TSS Concentration.

7. Emergency Occurrences

7.1 Abnormal Discharges, Spills and Bypass Events

The WPCP had one (1) spill event and WWC system had one (1) spill event in 2023. There were no bypass, overflow, or other abnormal discharge events in 2023.

The spill in the WWC system occurred on January 30th. The Town was notified at 11:05HR of a sanitary sewage spill. The spill was caused by a blocked service lateral. Approximately 2 m^3 of sewage was spilled during the event. Wastewater Staff attended the site and collected a grab sample of the sewage, as required by the CLI ECA Schedule E subsection 3.4.2. The sample was submitted to SGS Lakefield for analysis, the analytical results can be found in Table 11. The spilled material was contained to the driveway and roadway. Staff removed the blockage and remediated the site using a hose and a vacuum truck. Remediation was completed at 13:20HR.

The Spills Action Centre (SAC) was contacted at 11:58HR. The SAC reference number 1-2H4BYJ was assigned. No further direction or information was requested. The Ministry of Health (MOH) was contacted at 13:41HR, no further direction or information was requested.

Table 11. Summary of Analytical Results for WWC Spill

Analytic Results for WWC Spill	
Parameter	**Concentration**
BOD5	332 mg/L
Total Suspended Solids	159 mg/L
Total Phosphorus	2.91 mg/L
Total Kjeldahl Nitrogen	28.9 mg/L
Total Ammonia Nitrogen	3.8 mg/L
E.coli	123000 cfu/100mL

The spill at the WPCP occurred on On August 15th at 17:07HR. It was caused by a ruptured hose which lead to 13.3m^3 of biosolids to spilling on site at the WPCP. The incident was contained to the loading area at the WPCP. Staff collected a grab sample, the sample was submitted to SGS Lakefield for analysis. Remediation of the site was completed by staff using a hose and vacuum truck, the material was disposed on site at the plant. SAC was contacted at 18:11HR. The SAC reference number 1-3QLBFU was assigned. No further direction or information was requested.

Baseline grab samples were taken in 2023 at applicable wastewater pumping stations as required by Schedule E Condition 3.4.1 of the CLI ECA. Standard Operating Procedures are in place for any overflow/spill event that occurs at the WPCP or in the WWC system.

7.2 Flow Diversion at WPCP

In 2023 there were two (2) flow diversions conducted. In this context a flow diversion is conducted as sludge dewatering and supernating. The diverted supernatant is sent to the lagoons and will be fed back to the head of the plant for treatment when appropriate. Flow diversions were conducted on March 28-30 and Oct 17-20.

7.3 Control Measures

The WPCP has quality assurance and quality control measures in place to ensure that the effluent requirements have been met. The control measures include a PM program, SCADA, back-up generator(s), a sampling program, and storage lagoons.

In 2019, the Compliance and Wastewater Divisions rolled-out a Quality Management System (QMS), which has been an ongoing initiative for the Division. The WW QMS was modeled after the DWQMS framework. The WW QMS was developed and implement to formalize a system for documentation, processes and responsibilities for the Wastewater System.

In the event that the plant is unable to handle the flow, there is a provision at the WPCP to allow the excess flow to be diverted to one (1) of the on-site storage lagoons. If this happens, the sewage is held in this lagoon until such a time that it is feasible to return the sewage back to the head of the plant. The WPCP is equipped with a 1,000 kilowatt (kW) diesel generator which provides one hundred percent (100%) back-up power to the WPCP in case of a power outage. This eliminates any sewage diversion to the holding lagoon due to a power failure. Diverting sewage to a temporary location and then pumping it back to the head of the plant is not considered a by-pass event.

On March 16th, the Wastewater Division conducted a mock emergency focusing on a sanitary forcemain break and spill in the WWC system. The exercise was conducted in-person with both a field component and a table-top discussion. Additionally, staff reviewed past emergencies since the last exercise and changes to the Emergency and Contingency Plan for wastewater operations.

7.4 Call-outs

The WPCP and WWC system received 108 (one hundred and eight) call-outs in 2023. Figure 28 visually identifies the frequency of call-outs the wastewater division has received from 2013 to 2023. 2023 saw a sharp increase with fifty-three (53) more call-outs than 2022.

In 2017 a number of the call-outs were related to communication problems between the Pumping Stations and the WPCP. The communication issues were rectified in 2018 and the improvement can be seen within the decrease of call-outs in the following years. The recent increase can be attributed to communication issues and PLC alarms from ongoing projects at the WPCP including a Plant-wide PLC upgrade and alarm reconfiguration.

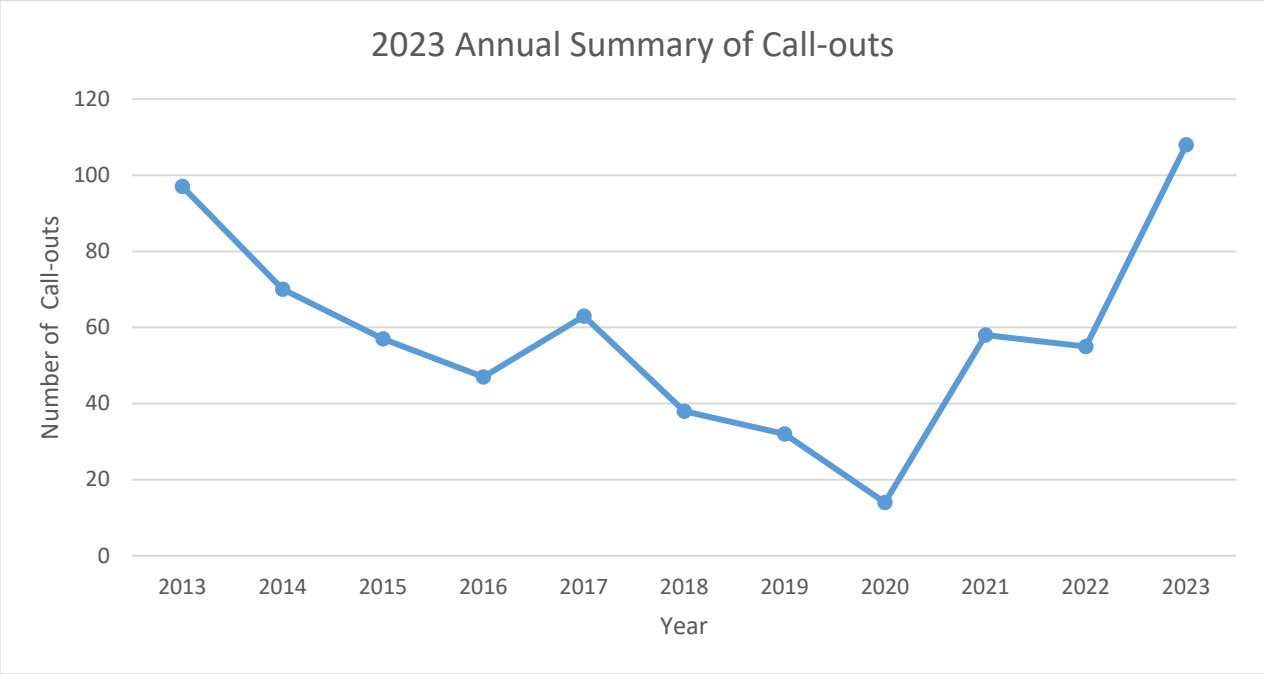

Figure 28. Wastewater call-outs from 2013-2023.

Documentation is completed for both call-outs during work hours and after hours of operation. All call-outs received in 2023 are categorized by type of call in Figure 29. This includes the location of the call-out and if the call-out required on-site action or was completed remotely. Call-outs were received for the WPCP and Collection System. An 'other' category which includes responding to sewer blockages and non-site specific call-outs exists, but no Call-outs were received in the category for 2023.

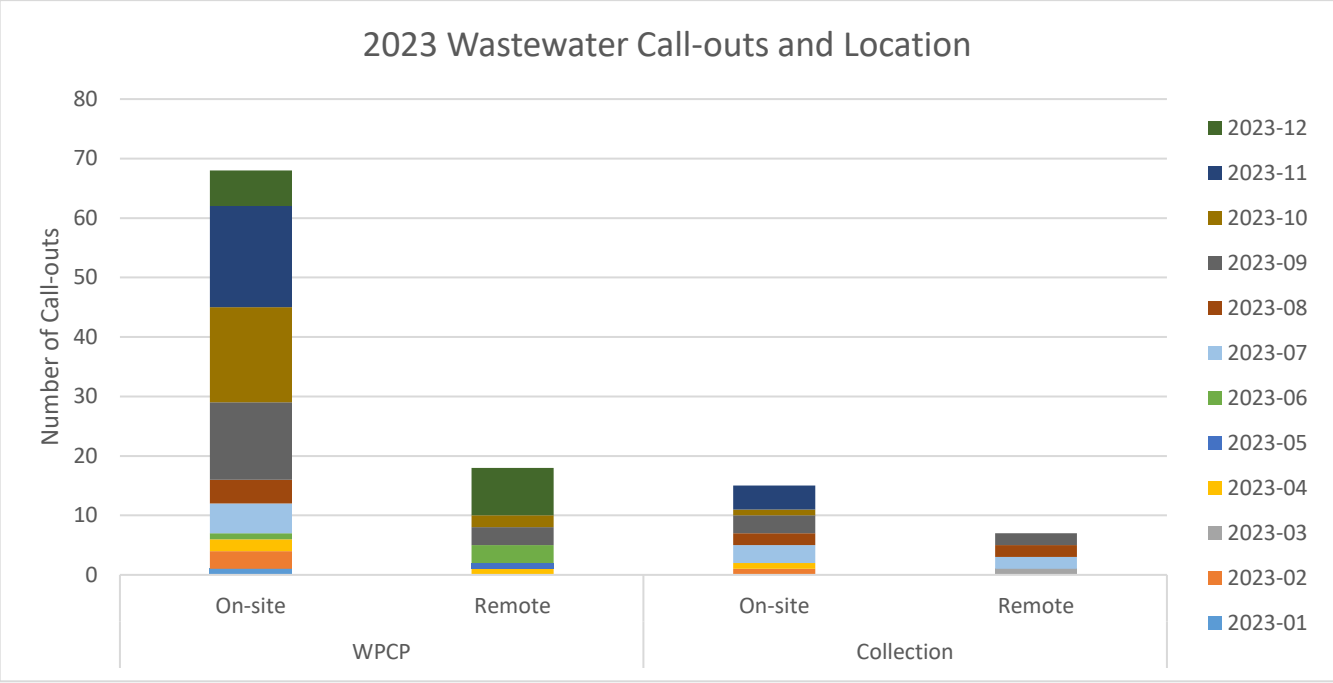

Figure 29. Wastewater Call-outs for 2023 by location.

November and September had the highest number of call-outs totaling 21 (twenty-one) in both months. On average, the wastewater division acknowledged approximately nine (9) call-outs per month. The 2023 call-outs per month are outlined in Figure 30, there were call-outs in all months.

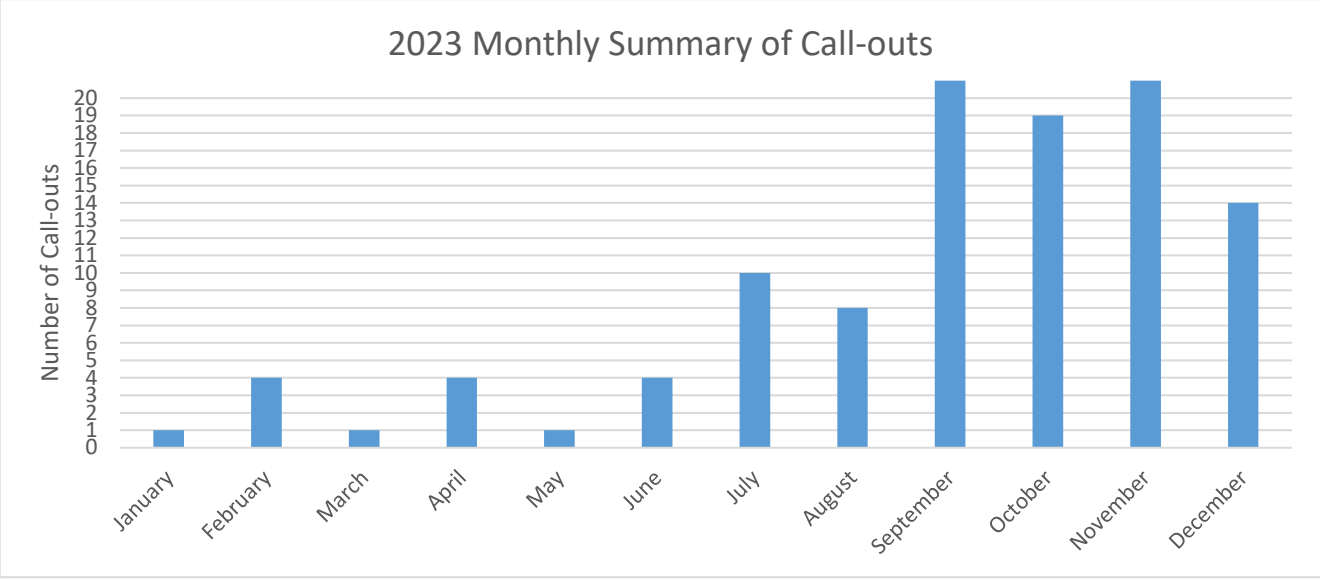

Figure 30. 2023 Call-outs by month.

8. Source Water Protection

The Source Water Protection Plan for the South Georgian Bay Lake Simcoe Source Protection Region contains policies designed to prevent contaminates from getting into municipal wells and water supplies, refer to APPENDIX L for wellhead protection area map. The BWG WPCP is outside of the wellhead protection area and does not have any applicable Source Water Protection policies to adhere to.

9. Wastewater System Effluent Regulation (WSER)

WSER is a Federal Regulation in place to protect the environment and human health. The regulation applies to facilities that deposit deleterious substances into areas frequented by fish and areas referred to in the Fisheries Act subsection 36(3). The regulation also applies to facilities that have an influent of at least 100m^3 per day or year. The BWG WPCP is required to follow the aforementioned regulation.

The Town of BWG submitted all required quarterly reports for 2023. The reports state the total effluent deposited (m^3), the number of day's effluent was deposited, average CBOD5 and average TSS concentrations. One (1) report in each year must include the determination if the effluent was acutely lethal. The acute lethality sampling was conducted in the second quarter on June 6th, 2023 and the results determined that the effluent was not acutely lethal. Nautilus Environmental conducted the acute lethality testing for the WPCP. Figure 31 and 32 graph the quarterly average for TSS and CBOD5 WSER reporting.

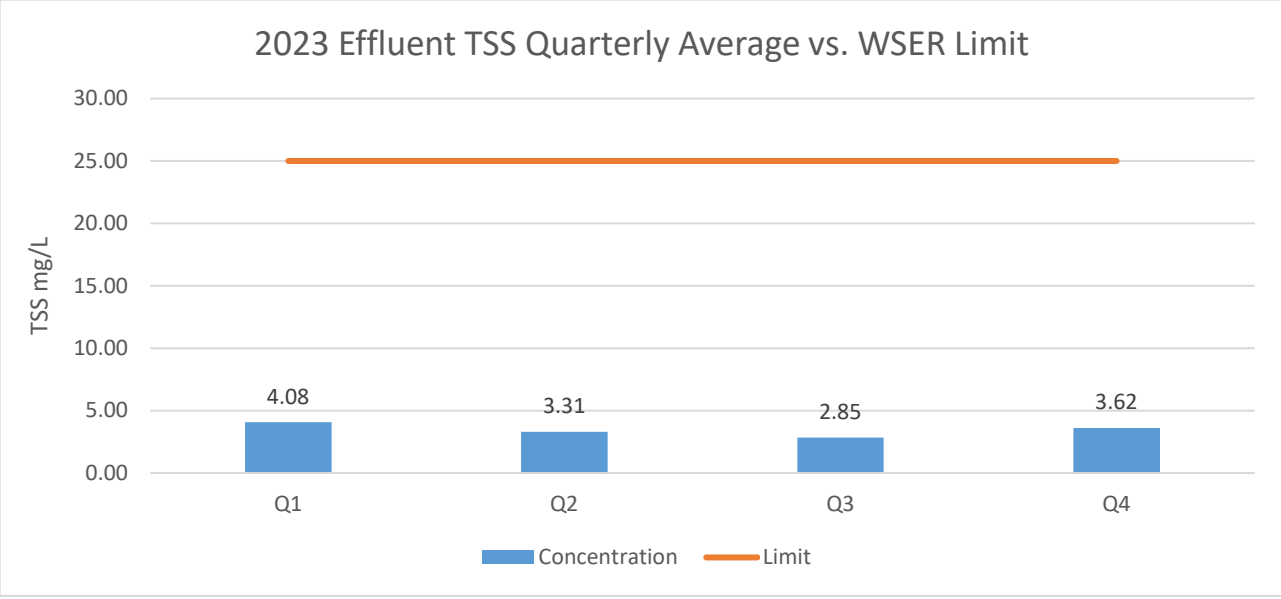

Figure 31. Effluent TSS Quarterly Average vs. WSER Limit.

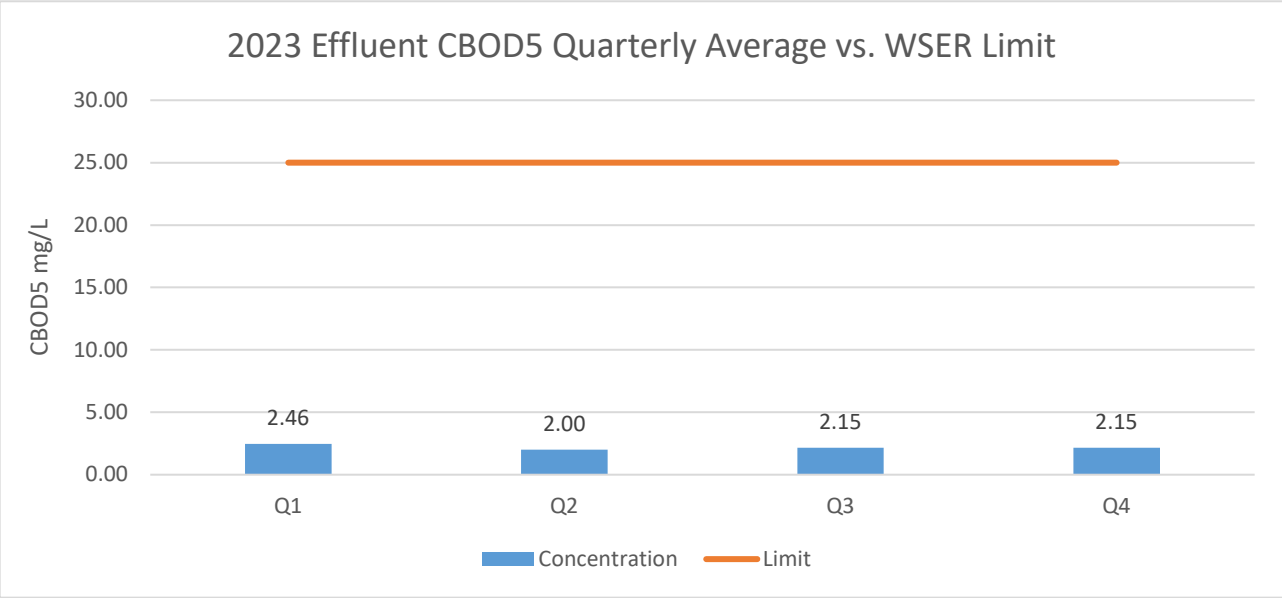

Figure 32. Effluent CBOD5 Quarterly Average vs. WSER Limit.

10. Education and Outreach

The Town's website (www.townofbwg.com) contains educational information regarding the wastewater system, the WPCP, and current outreach initiatives including the I Don't Flush Campaign.

In addition to electronic information, Town staff attended a public event to educate the public on how they can help protect the Town's infrastructure and the environment, though informative pamphlets and games.

Education and outreach initiatives empower the local community to do their part in protecting the environment.

10.1 I Don't Flush

With the growing problem of unacceptable household waste being flushed down toilets, the Town worked in partnership with the "I Don't Flush" awareness campaign.

The campaign focuses on pharmaceutical, Fats, oils and greases (FOG), and what not to flush awareness. The Town continues to promote the "I Don't Flush" campaigns, through the Town's website and events.

11. Conclusions

The Town managed and operated the WPCP and Collection System in accordance with the current ECA's and legislation including the EPA and OWRA.

The following conclusions are provided on the basis of the information reviewed in this report, in addition, a technical summary can be found in Table 12.

- The WPCP and WWC system continue to operate in compliance with applicable legislation and regulatory requirements.
- The WPCP and WWC system did not experience any operational exceedances.
- All required sampling was conducted and met or surpassed legislative requirements.
- No bypass or overflows events occurred at the WPCP or in the Collection System.
- Two (2) spills occurred in 2023, one at the WPCP and one in the Collection System as discussed in Section 7.1.
- Zero odour complaints reported related to wastewater operations.
- The Assessment of Wet Weather Flows Compared to Dry Weather Flows and Significant Drinking Water Threat Assessment Report for Proposed Alterations were completed as required by the CLI ECA for the WWC system.
- Baseline grab samples were taken at applicable wastewater pumping stations as required by the CLI ECA
- The Town is working on the continual improvement of the works through a Quality Management System as well as accommodating new infrastructure needs.
- The Town is helping to educate the public to protect the wastewater system and the natural environment through the "I Don't Flush" campaign and other educational initiatives.

Table 12. WPCP Annual Summary Information Table

2023 WPCP Annual Summary Table			
Service Population	35,430		
Flow			
Item	**Influent**	**Effluent**	
Average Daily Flow (m^3)	12,662	11,190	
Average Daily Flow Plant D (m^3)	8,657	8,207	
Average Daily Flow Plant C (m^3)	3,700	2,983	
Average Daily Flow Plant B (m^3)	1,954	N/A*	
Rated Capacity (**19,400m^3/day**) Used	65%	58%	
Total Flow (m^3)	4,621,521	4,084,447	
Max Day Flow Plant D (m^3)	13,741	14,400	
Max Day Flow Plant C(m^3)	5,084	4,825	
Total Phosphorus Concentrations and Loadings			
Parameter	**Concentration/ Loading**	**ECA Limit**	
Annual Average Daily Effluent Loading (kg/day)	0.679	1.912	
Annual Average Effluent Concentration (mg/L)	0.061	0.098	
Chemical Usage			
Total Alum (L)	780,307		
Odour Inquires			
Number of odour Inquiries attributed to the Wastewater System	0		
Biosolids			
Approximate volume of biosolids produced (m^3)	27,164m^3		
Volume of biosolids land applied (m^3)	27,164m^3		
Septage Hauling Program			
Number Haulers Enrolled:	3	Amount of Septage Received (m^3):	845.25

*Plant B Effluent is captured in the Plant C Effluent total as Plant B flows into Plant C Filter Building

12. References

Canadian Council of Ministers of the Environment. (2010). *Canadian water quality guidelines for the protection of aquatic life: Ammonia.* Winnipeg: Canadian Council of Ministers of the Environment.

Canadian Council of Ministers of the Environment. (2012). *Canadian water quality guidelines for the protection of aquatic life: Nitrate.* Winnipeg: Canadian Council of Ministers of the Environment.

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Goverment of Canada. (2021, 11 25). *Daily Data Report for January 2020*. Retrieved from Government of Canada: https://climat.meteo.gc.ca/climate_data/

Hutchinson Environmental Sciences Ltd. . (2021). *Bradford West Gwillimbury WPCP 2020 Benthic Invertebrate Study.* Bracebridge: Hutchinson environmental Sciences Ltd. .

Appendix A

Bradford West Gwillimbury — A Growing Tradition	**WPCP Sampling Schedule - 2024** **WWD-031**	**Wastewater Department** **Resources**
Revised: December 5, 2023	**Revision: 10**	**Page 1 of 1**

Parameter	pH (Field Analysis)	Temperature (Field Analysis°C)	Total Phosphorus	Total Ammonia Nitrogen (TAN)	Total Kjeldahl Nitrogen (TKN)	Total Suspended Solids (TSS)	Carbonaceous Biological Oxygen Demand (CBOD5)	Biological Oxygen Demand (BOD5)	E.Coli	Total Solids	Nitrate as Nitrogen	Nitrite as Nitrogen	Metals (Al, As, Cd, Co, Cr, Cu, Fe, Hg, K, Mn, Mo, Ni, Pb, Se, Na, Zn)	Un-ionized Ammonia	Benthic Monitoring (NOTE 7)	Acute Lethality (NOTE 6)
Internal Laboratory Analysis																
Raw Influent	**Grab**															
Frequency	**W**															
Requirement	Due Diligence															
Final Effluent	**Grab/ Probe/ Analyzer**	**Grab/ Probe/ Analyzer**	**24Hr Comp**	**24Hr Comp**												
Frequency	**W**	**W**	**W**	**W**												
Requirement	ECA/ MUMP	ECA	Due Diligence	Due Diligence												
External Laboratory Analysis																
Raw Influent			**24Hr Comp**	**24Hr Comp**	**24Hr Comp**	**24Hr Comp**	**24Hr Comp**	**24Hr Comp**					**Grab**			
Frequency			**W**	**W**	**W**	**BM**	**BM**	**BM**					**Q**			
Requirement			ECA/ MUMP	Due Diligence	ECA/ MUMP	ECA/ MUMP	Due Diligence	ECA/ MUMP					NPRI			
Final Effluent			**24Hr Comp**	**24Hr Comp**	**24Hr Comp**	**24Hr Comp**	**24Hr Comp**		**Grab**		**24Hr Comp**	**24Hr Comp**	**Grab**	**Calculated**	**Grab**	**Grab**
Frequency			**W**	**W**	**W**	**W**	**W**		**W**		**W**	**W**	**Q**	**W**	**2 Year**	**Y**
Requirement			ECA/ MUMP	ECA/ MUMP	ECA/ MUMP	ECA/ MUMP/ WSER	ECA/ MUMP/ WSER		ECA/ MUMP		ECA	ECA	NPRI	ECA	Due Diligence	WSER
Sludge/ Biosolids			**8Hr Comp**	**8Hr Comp**	**8Hr Comp**				**8Hr Comp**	**8Hr Comp**	**8Hr Comp**	**8Hr Comp**	**8Hr Comp**			
Frequency			**M (Feb-Nov)**	**M (Feb-Nov)**	**M (Feb-Nov)**				**M (Feb-Nov)**	**M (Feb-Nov)**	**M (Feb-Nov)**	**M (Feb-Nov)**	**M (Feb-Nov)**			
Requirement			ECA	ECA	Due Diligence				O.Reg 267/03 General	O.Reg 267/03 General/ ECA	O.Reg 267/03 General/ ECA	O.Reg 267/03 General	O.Reg 267/03 General/ ECA			
Imported Sewage			**Grab**		**Grab**	**Grab**		**Grab**								
Frequency			**M**		**M**	**M**		**M**								
Requirement			ECA		ECA	ECA		ECA								

ECA 3705-BGRP97 Condition 9.b. **Sampling Rotation Schedule 2024:**	Influent/ Effluent:	Tuesday	Imported Sewage	First load of the month received	Biosolids: Tuesday (Feb-Nov) Monthly

Legend	
W	Weekly
D	Daily
Q	Quarterly
BM	Bi-monthly, twice per month
M	Monthly
Y	Yearly
2 Year	Every two (2) years
RED	Scheduled Analysis

Note 1: This schedule is to be used as a reference only and may be altered by the ORO conforming with all applicable legislation.

Note 2: The ECA requirement is in reference to the current Environmental Compliance Approval No. 3705-BGRP97 issued to the Water Pollution Control Plant on November 12, 2019.

Note 3: MUMP requirement is in reference to the Municipal Utility Monitoring Program (MUMP) parameters that are reported to the MECP and the current Water Inspector quarterly.

Note 4: O.Reg 267/03 is the General regulation issued under the Nutrient Management Act, this governs the sampling requirements for non-agricultural source material.

Note 5: WSER requirement is in reference to the Federal Wastewater System Effluent Regulation.

Note 6: Acute Lethality sampling is conducted the second week of June annually.

Note 7: Benthic Monitoring last completed 2022, next sampling 2024. Sampling is conducted in the effluent receiving stream (West Holland River).

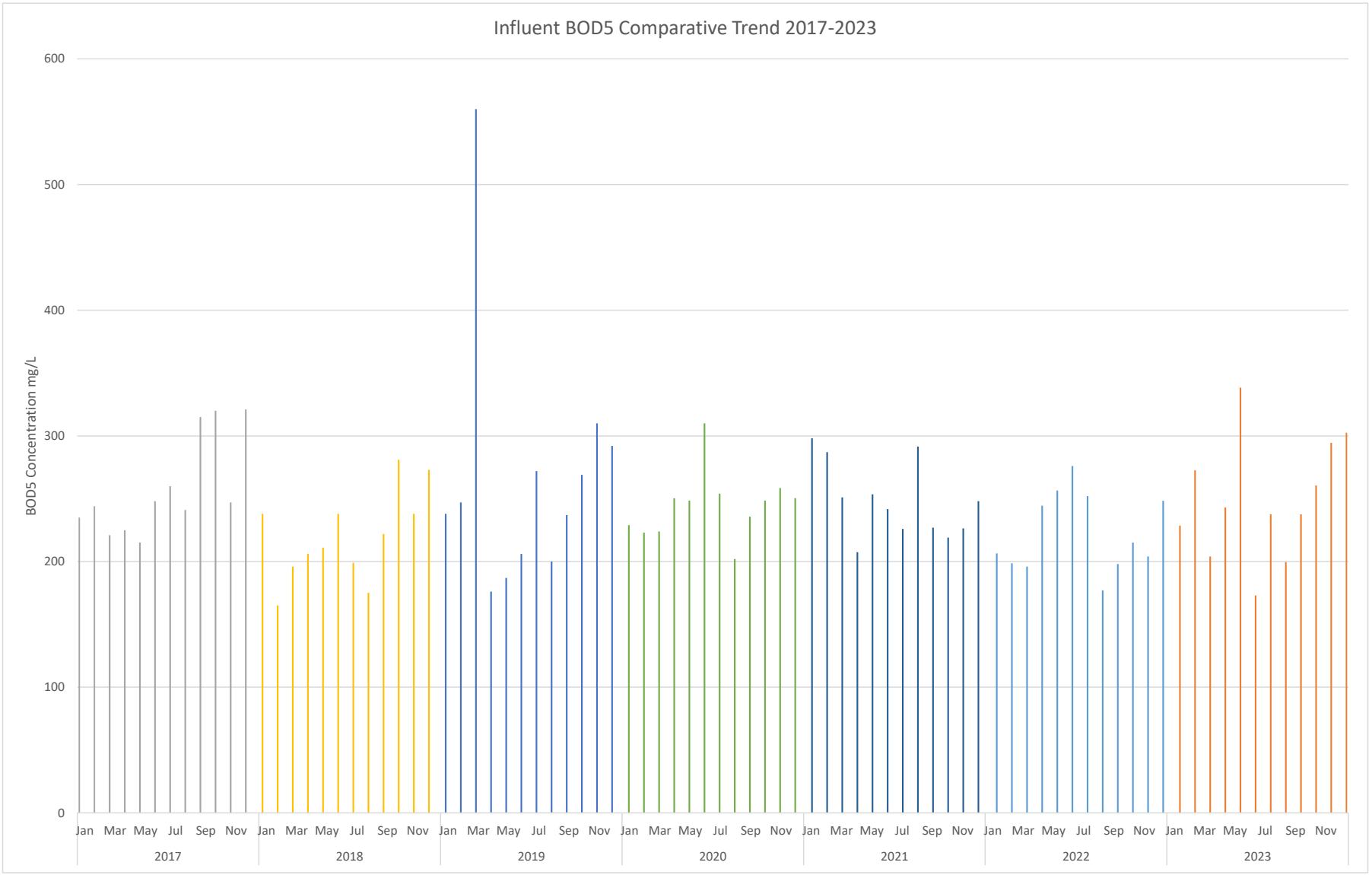
Note 8: Imported Sewage, sampling is only required when septage has been received within the month.

Note 9: The sampling schedule has been developed to conform with the requirements of applicable legislation. In some cases exceeds the frequency required in the legislative tool.

Note 10: NPRI is in reference to the National Pollutant Release Inventory.

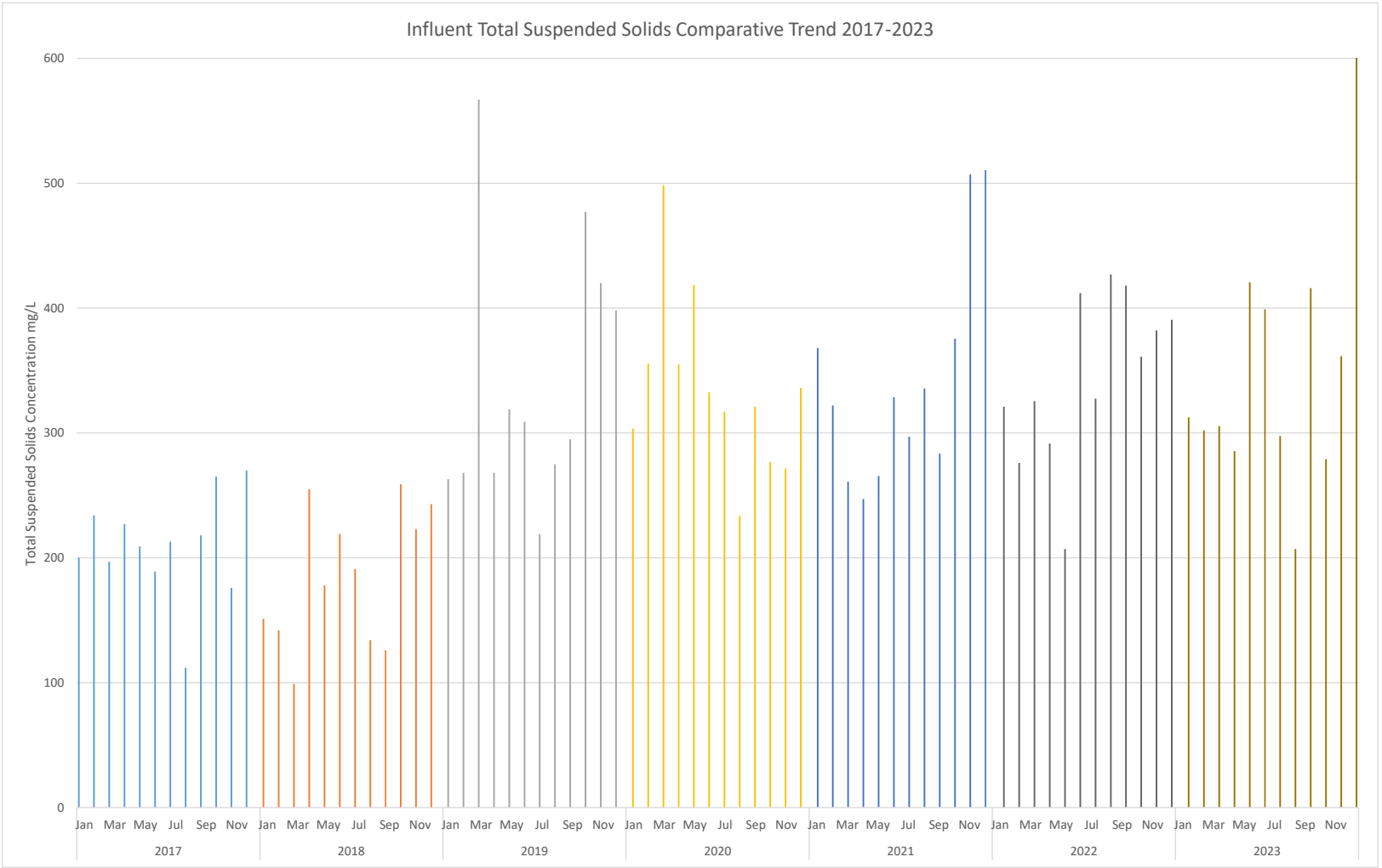
Appendix B

Appendix B


Influent BOD5 Comparative Trend 2017-2023
BOD5 Concentration mg/L
600
500
400
300
200
100
0
Jan Mar May Jul Sep Nov
2017
2018
2019
2020
2021
2022
2023

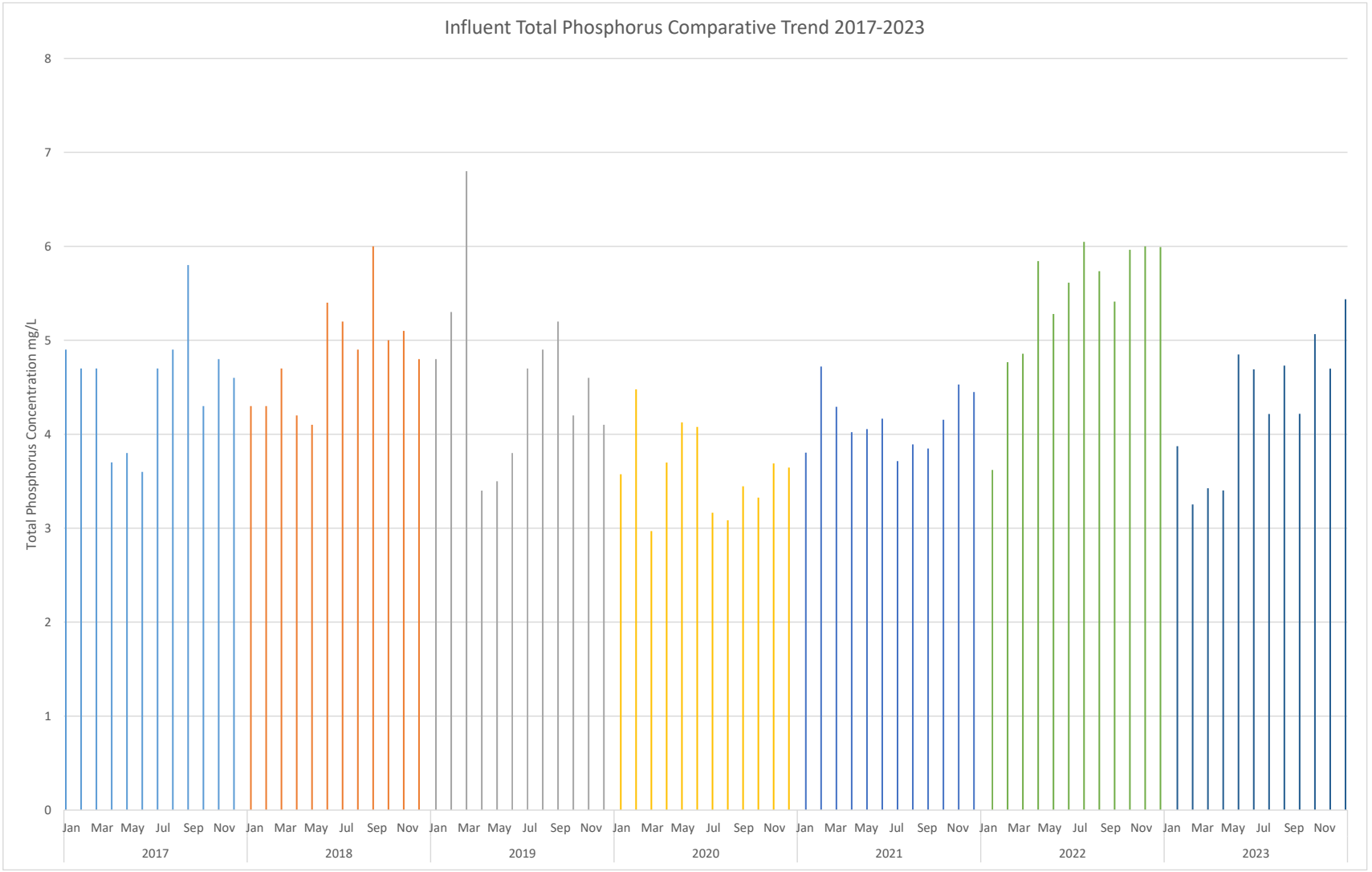
Appendix C

Appendix C


Influent Total Suspended Solids Comparative Trend 2017-2023
Total Suspended Solids Concentration mg/L
600
500
400
300
200
100
0
Jan Mar May Jul Sep Nov
2017
2018
2019
2020
2021
2022
2023

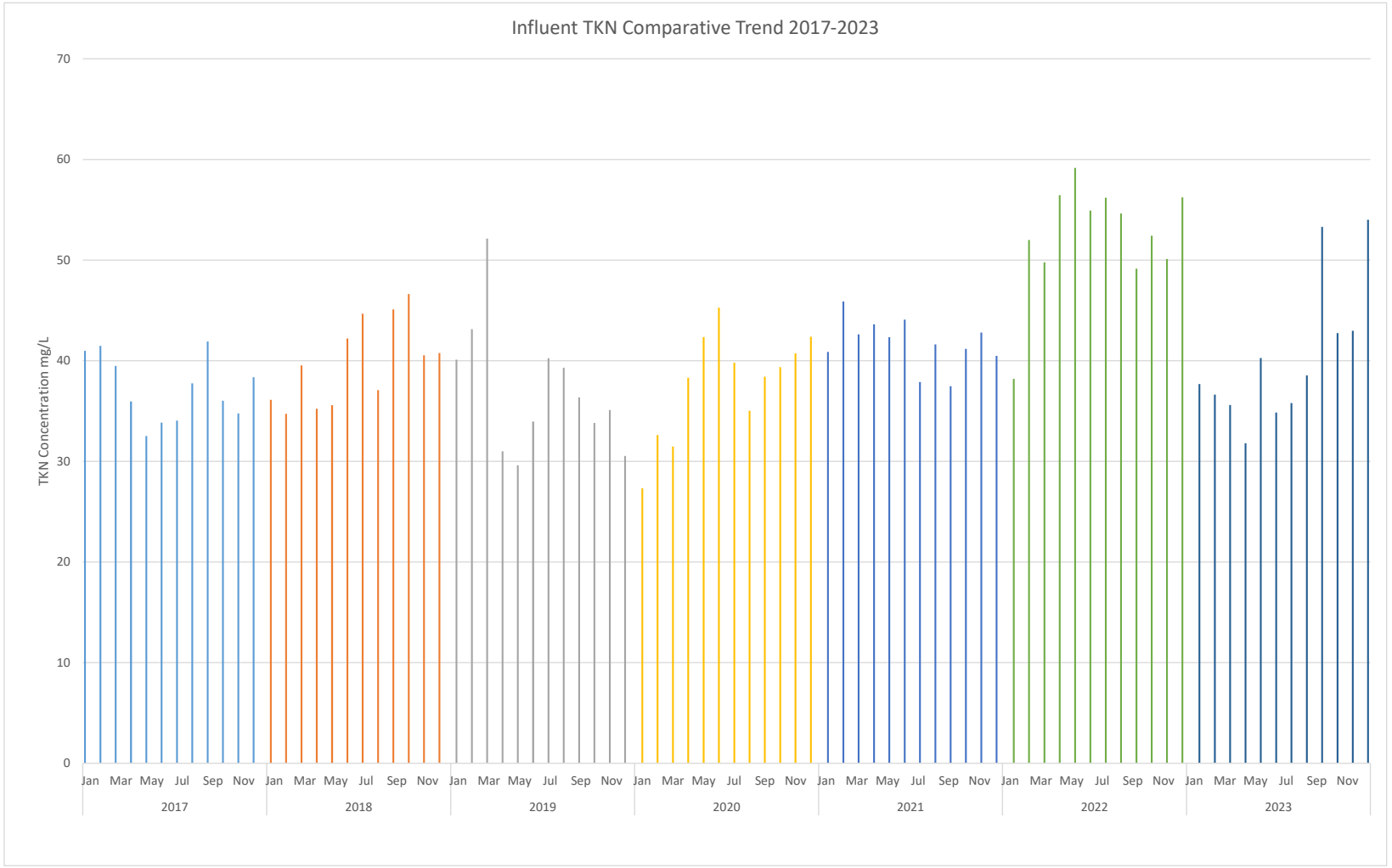
Appendix D

Appendix D


Influent Total Phosphorus Comparative Trend 2017-2023
Total Phosphorus Concentration mg/L
0
1
2
3
4
5
6
7
8
Jan Mar May Jul Sep Nov
2017
2018
2019
2020
2021
2022
2023

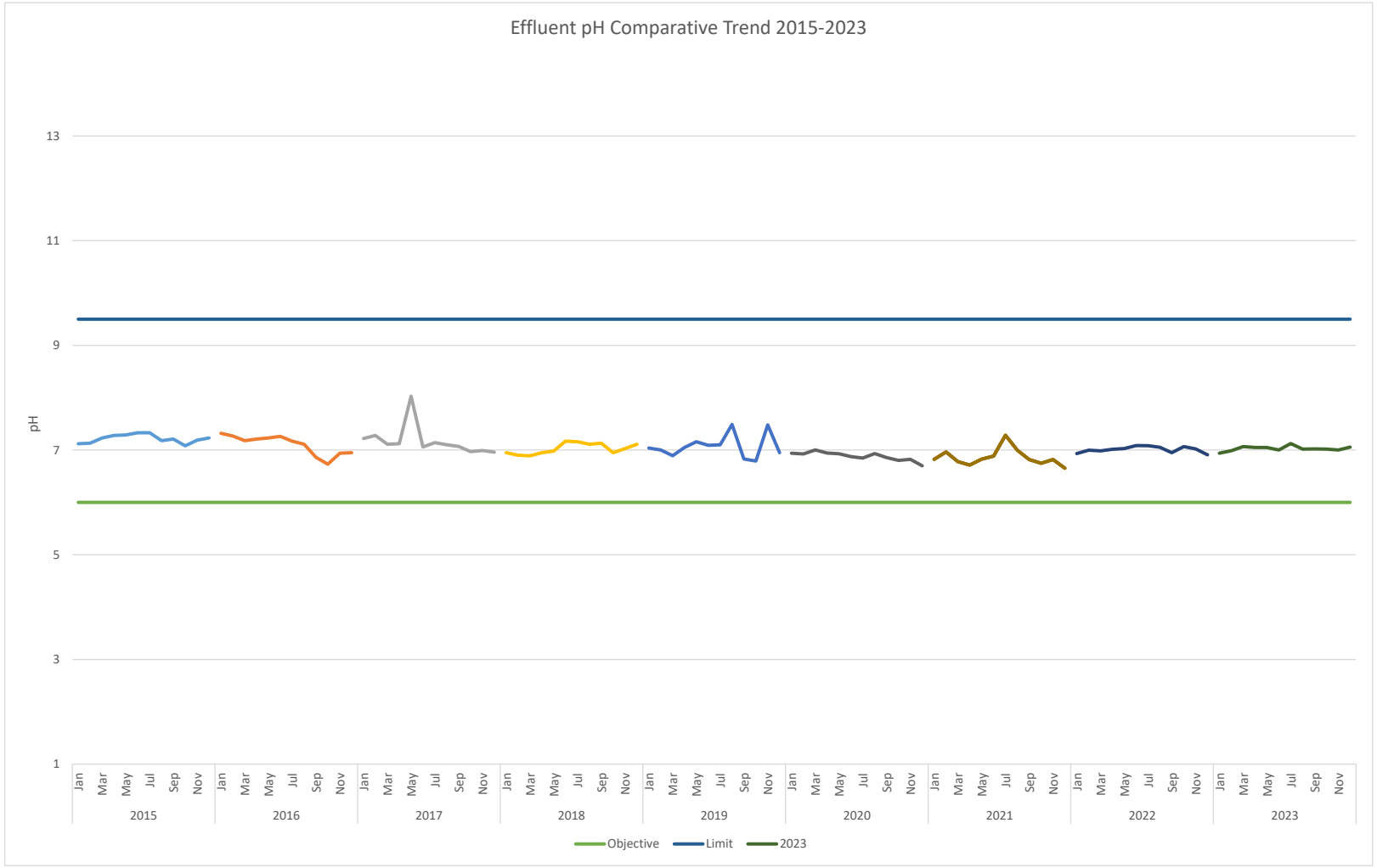
Appendix E

Appendix E


Influent TKN Comparative Trend 2017-2023
TKN Concentration mg/L
70
60
50
40
30
20
10
0
Jan Mar May Jul Sep Nov
2017
2018
2019
2020
2021
2022
2023

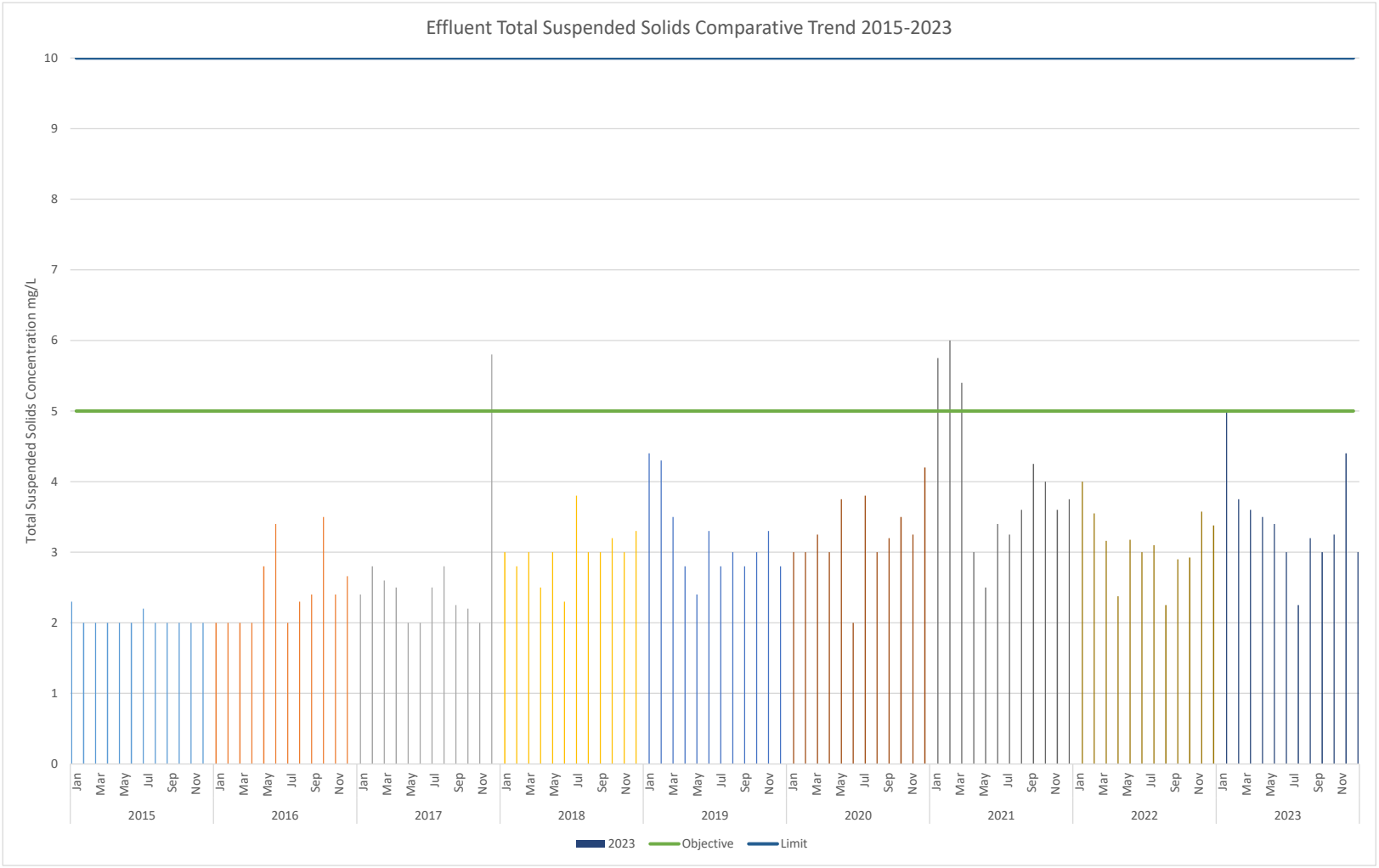
Appendix F

Appendix F


Effluent pH Comparative Trend 2015-2023
pH
13
11
9
7
5
3
1
Jan Mar May Jul Sep Nov
2015
2016
2017
2018
2019
2020
2021
2022
2023
Objective
Limit
2023

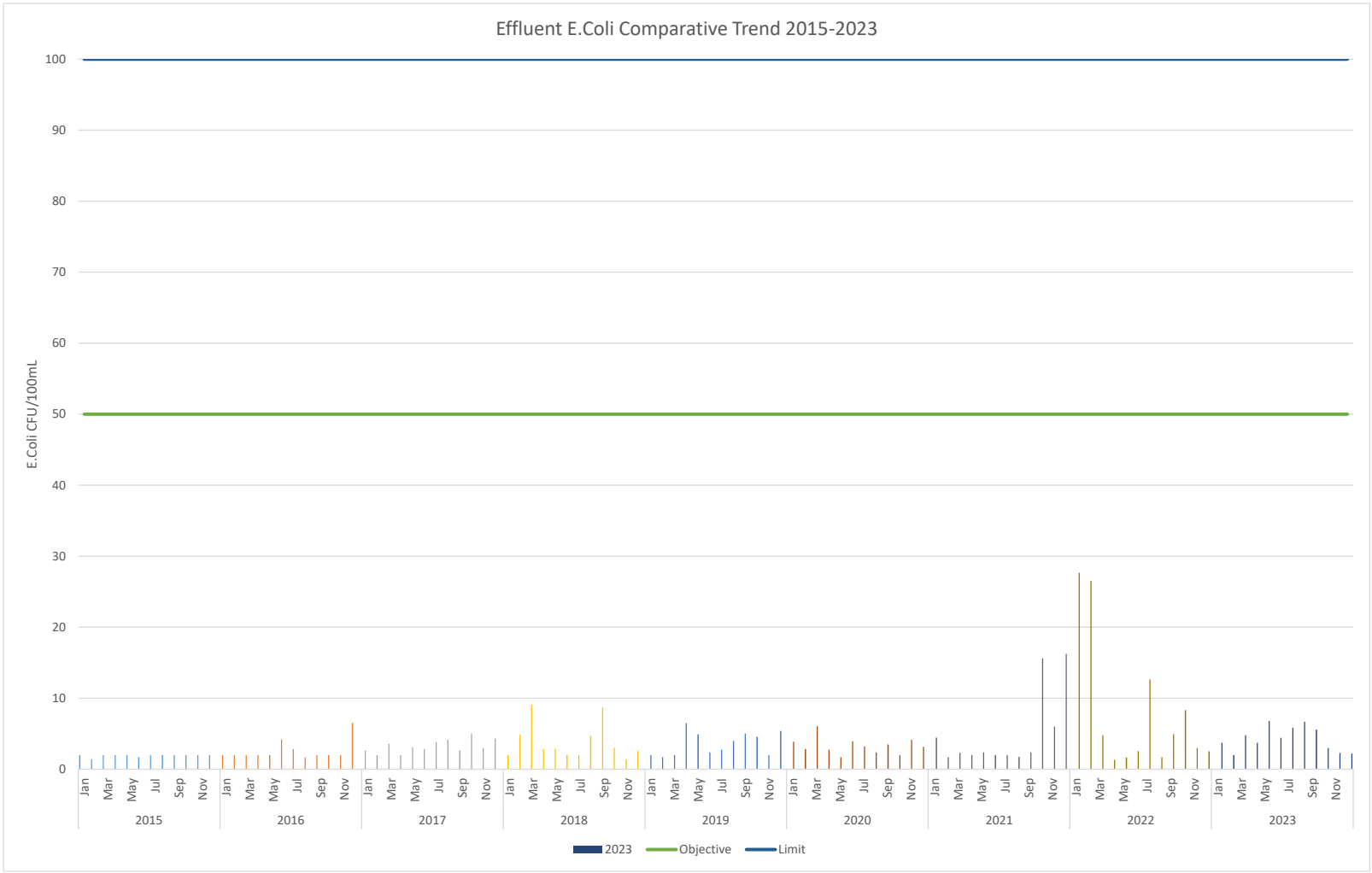
Appendix G

Appendix G


Effluent Total Suspended Solids Comparative Trend 2015-2023
Total Suspended Solids Concentration mg/L
10
9
8
7
6
5
4
3
2
1
0
Jan Mar May Jul Sep Nov
2015
2016
2017
2018
2019
2020
2021
2022
2023
2023
Objective
Limit

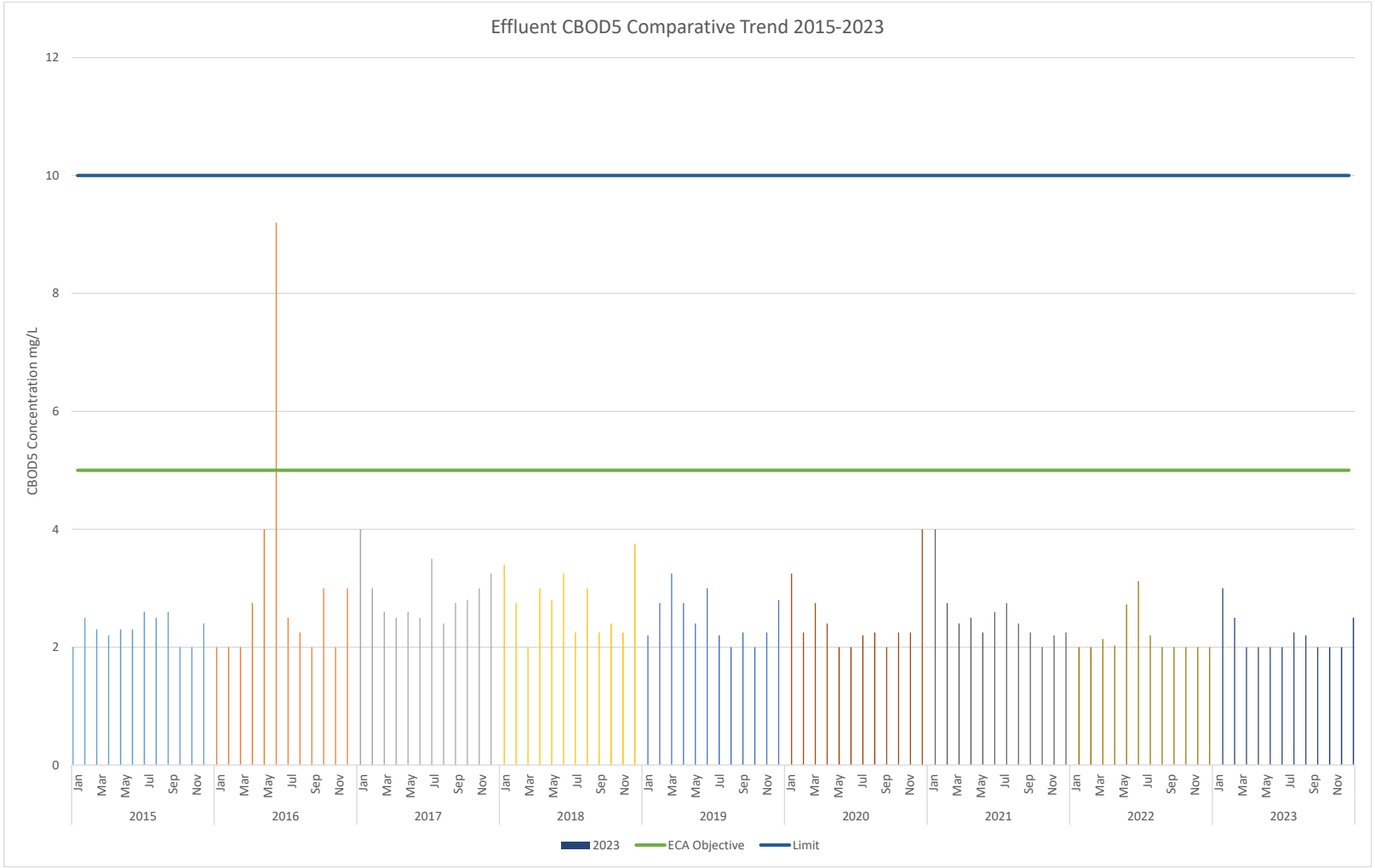
Appendix H

Appendix H


Effluent E.Coli Comparative Trend 2015-2023
E.Coli CFU/100mL
100
90
80
70
60
50
40
30
20
10
0
Jan Mar May Jul Sep Nov
2015
2016
2017
2018
2019
2020
2021
2022
2023
2023
Objective
Limit

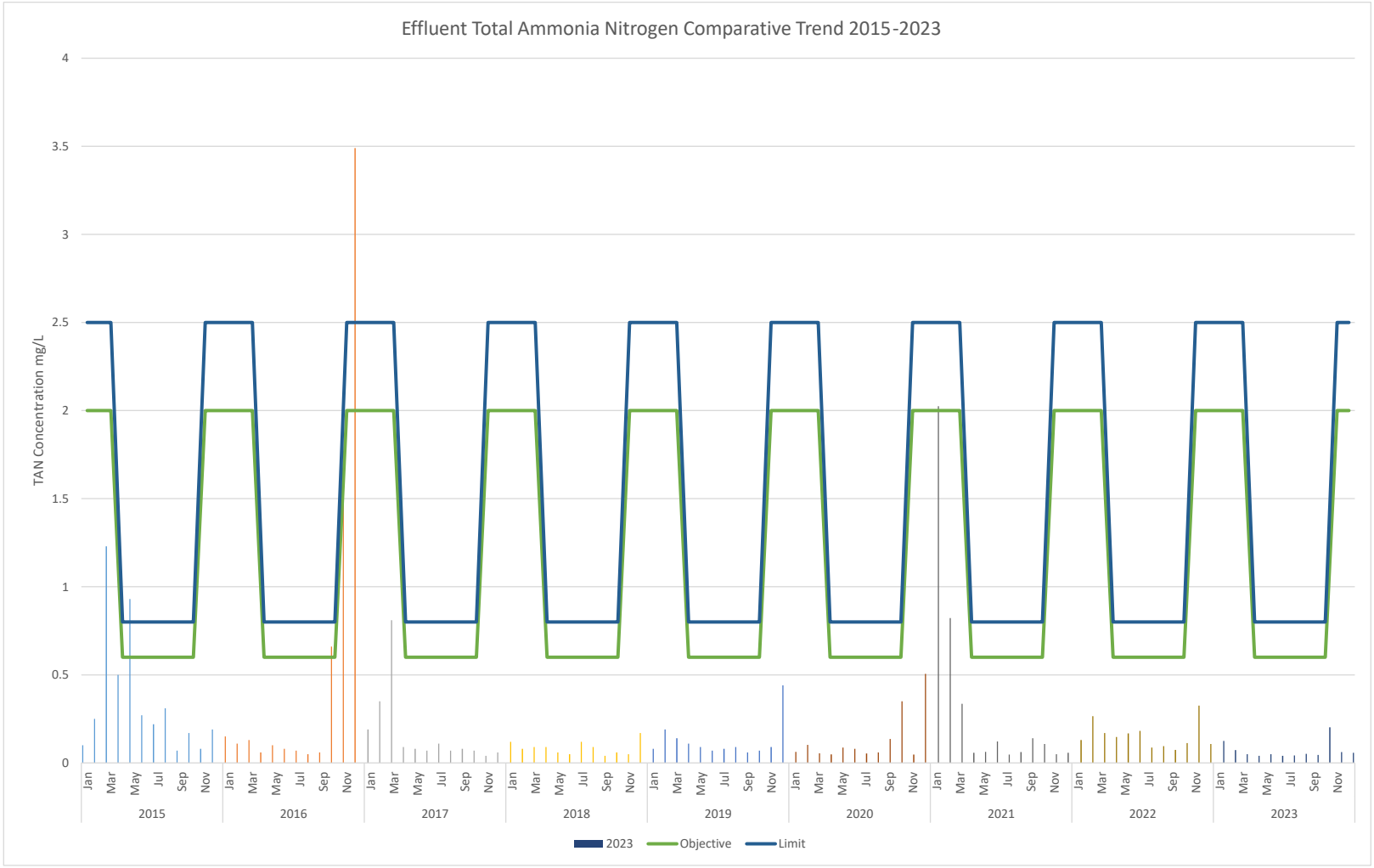
Appendix I

Appendix I


Effluent CBOD5 Comparative Trend 2015-2023
CBOD5 Concentration mg/L
12
10
8
6
4
2
0
Jan Mar May Jul Sep Nov
2015
2016
2017
2018
2019
2020
2021
2022
2023
2023
ECA Objective
Limit

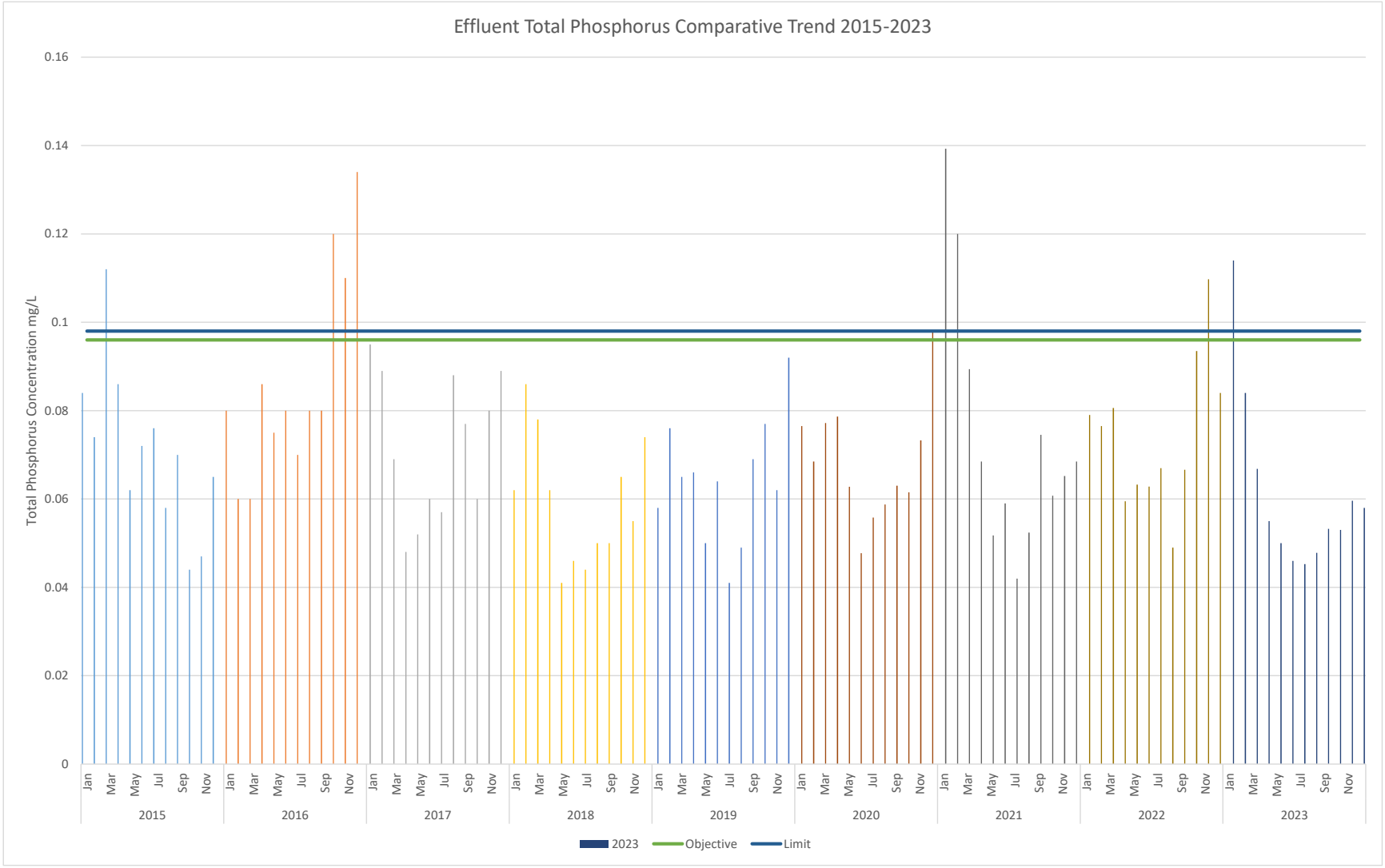
Appendix J

Appendix J

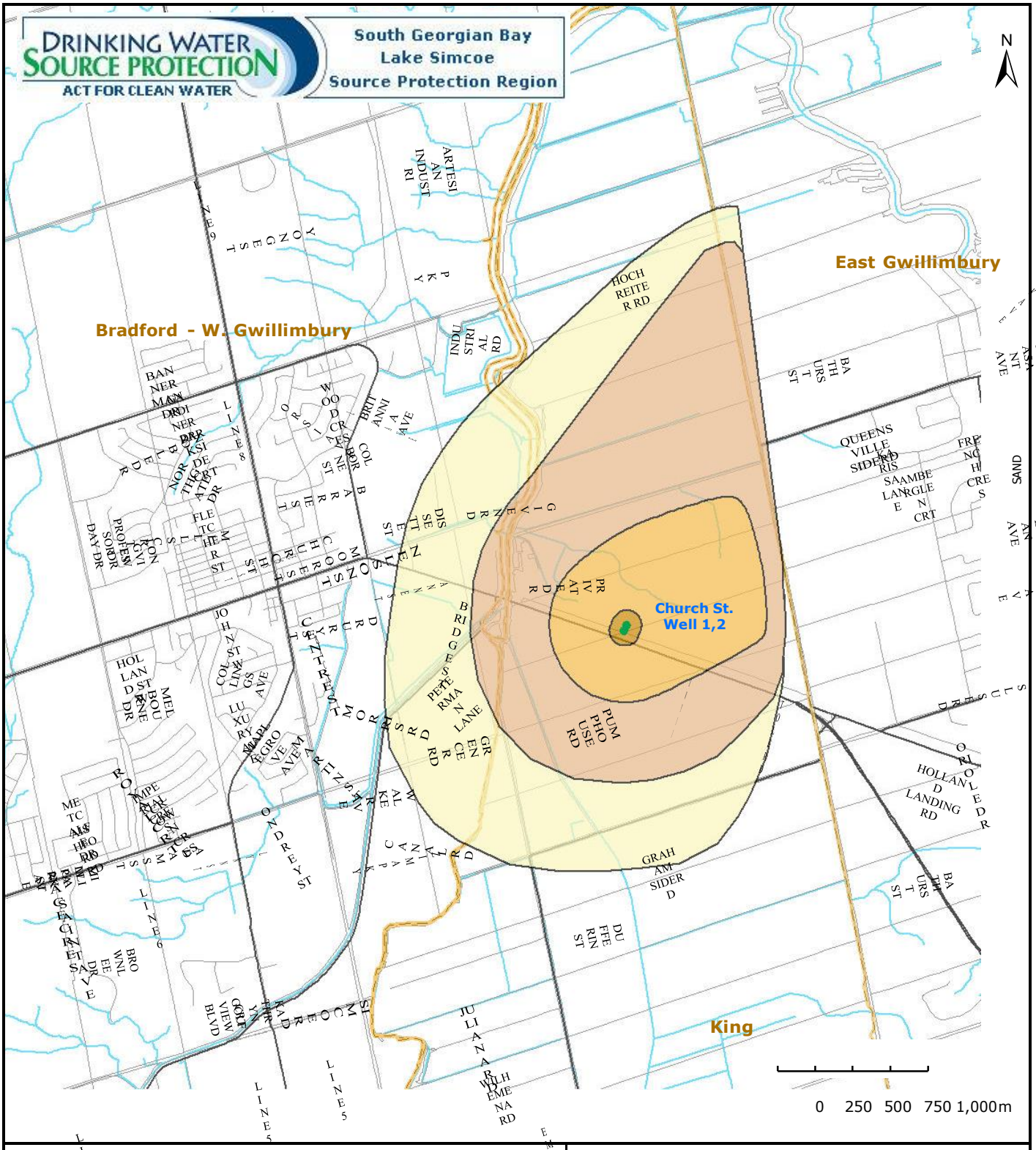

Effluent Total Ammonia Nitrogen Comparative Trend 2015-2023
TAN Concentration mg/L
4
3.5
3
2.5
2
1.5
1
0.5
0
Jan Mar May Jul Sep Nov
2015
2016
2017
2018
2019
2020
2021
2022
2023
2023
Objective
Limit

Appendix K

Appendix K


Effluent Total Phosphorus Comparative Trend 2015-2023
Total Phosphorus Concentration mg/L
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
Jan Mar May Jul Sep Nov
2015
2016
2017
2018
2019
2020
2021
2022
2023
2023
Objective
Limit

Appendix L



- Municipal Supply Well in Bradford-West Gwillimbury
- WHPA-A (100m)
- WHPA-B (2-years time of travel)
- WHPA-C1 (10-years time of travel)
- WHPA-D (25-years time of travel)
- Municipality Boundary
- Water Course

Wellhead Protection Areas
Bradford-West Gwillimbury

Created by: LSRCA Scale: 1:35,000
Date: 2014-04-08 UTM Zone 17N, NAD83

GENIVAR

This map was produced by the Lake Simcoe Region Conservation Authority, lead agency of the South Georgian Bay Lake Simcoe Region Source Protection Region. Base data have been compiled from various sources, under data sharing agreements.
While every effort has been made to accurately depict the base data, errors may exist.

Ontario

Figure 9a-1