Region of Peel
working with you

2022

G. E. Booth Wastewater Treatment Plant
Annual Report

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The Regional Municipality of Peel (the Region) is committed to providing a high level of service in the collection, treatment, and management of wastewater. The Region diligently monitors its sewer network and operates its treatment processes effectively to meet or surpass discharge quality criteria, to protect the environment now and into the future.

Our Commitment:

- **Protecting and preserving the environment, including the prevention of pollution, through effective operation and management of the Wastewater Systems that incorporates quality assurance and control practices**
- **Acting promptly and responsibly in addressing incidents or conditions that pose a risk to the public or environment**
- **Complying with applicable legislation and regulatory requirements**
- **Collaborating with internal and external stakeholders to ensure our services consider their environmental and quality concerns**

If you have any questions about this report, please contact the Wastewater Compliance team at 905-791-7800 ext. 4685 or email.

Executive Summary

The G.E. Booth Wastewater Treatment Plant (WWTP) is located at 1300 Lakeshore Road East in Mississauga, on the shore of Lake Ontario. The plant is designed to treat an average flow of 518 MLD (million liters per day). The G.E. Booth WWTP is classified as a Class IV wastewater treatment facility under Ontario Regulation 129/04. This WWTP was operated under Environmental Compliance Approval (Approval) # 9375-C4RKKZ.

This report summarizes the monitoring results for the G.E. Booth WWTP required by the Approval and describes the operational performance to ensure production of quality effluent.

In 2022, the Region met all the capacity and effluent limits prescribed in the Approval. The annual average daily flow to the plant was **432 million liters**, which is **83%** of the rated capacity specified in the Approval. Information on actions to address capacity is provided in Section 4.8 of this report.

Throughout 2022, the G.E. Booth WWTP met the effluent concentration limits for Total Ammonia Nitrogen (TAN), and *E. coli*, and maintained pH within the range of 6.0 – 9.5, as prescribed in the Approval. The plant experienced operational challenges related to solids removal and meeting the limits for Total Suspended Solids (TSS) and associated parameters - Total Phosphorus (TP) and Carbonaceous Biochemical Oxygen Demand ($CBOD_5$) in January and February. The requirements and results are detailed in Section 4.2 of this report.

There was one bypass in 2022 at the G.E. Booth WWTP and one spill event, as described in Section 4.11.

In 2022, the G.E. Booth WWTP generated **39,265** dry tonnes of sludge cake, which was incinerated on site.

REGION OF PEEL

Provide water and wastewater services to 1.5 million residents and over 175,000 businesses in Brampton, Caledon and Mississauga

2022 SUMMARY

G.E. Booth Wastewater Treatment Plant

3,751 km
of sewage pipes throughout the Region delivering wastewater to the treatment facilities

4,912
samples analyzed

89.2%
of approval effluent limits met

2.0 GJ*
energy used per ML** wastewater treated

$42
of chemicals used per ML** wastewater treated

68%
of the Region's total wastewater treated at GE Booth;

158 billion litres
treated in 2022; equivalent to volume of

173

99.9%
of wastewater underwent complete treatment

*GJ: Gigajoules
**ML: Million Litres

Glossary of Terms and Abbreviations

Activated Sludge: Sludge containing aerobic microorganism that help to break down organic compounds

Final Effluent: The treated wastewater that has undergone all treatment steps, including disinfection, when prescribed

Influent: The untreated wastewater or raw sewage coming into the sewage treatment plant from the collection system

Limit: Value prescribed in Approval for key parameters that the plant must meet in order to stay in compliance. Limits are generally higher than objectives

MLD: megalitres (ML) per day. 1 ML = 1 million litres. 1 MLD is 1000 m^3

Objective: Value prescribed in Approval for key parameters that the plant is designed to meet. Consistently not meeting objectives means that the plant is not being effective and long-term remedial actions are needed. Sampling results that are over objective but under limit are considered in compliance

Parameter: Chemical substances (such as phosphorus or oxygen), microbiological indicators (such as *E. coli*) or physical characteristics (such as pH or temperature) that are measured or sampled and analyzed in order to assess the performance of a plant. Some parameters have limits in the Approval

Rated Capacity: Average annual daily influent flow that the plant is designed to handle

Residual: Remaining amount of a substance after treatment processes are completed

Twinning: Constructing a parallel pipe to provide additional capacity and to allow for condition assessment and rehabilitation of the existing pipe to extend its useful life

Wastewater: Water that has been used and discharged by homes, businesses and industries. Everything we flush down a toilet or pour down a drain, collectively

WWTP: Wastewater Treatment Plant

1. Water Management in the Region of Peel

The Region owns and operates the water and wastewater systems that serve its population. This includes water treatment, storage and distribution, and wastewater collection, pumping and treatment. Figure 1, on the next page shows how these systems interact.

The Region has two drinking water sources: Lake Ontario and groundwater wells in Caledon. The Region retains services of the Ontario Clean Water Agency (OCWA) under a contract to operate, maintain and manage the lake-based drinking water treatment facilities and its water storage and pumping system. The Region operates the groundwater-based water treatment systems and distribution watermain networks. Similarly, on the wastewater side, OCWA is contracted to operate the large wastewater treatment plants on the shore of Lake Ontario, while the Region operates the wastewater collection system, pumping stations, and the treatment facility in the community of Inglewood, in the Town of Caledon.

This water cycle starts when source water is pumped into our water treatment plants and undergoes treatment to meet the Ontario Drinking Water Standards. Treated drinking water is distributed through a network of pipes, storage facilities and pumping stations to homes and businesses. Used water goes down the drains into the wastewater collection system, where a series of pipes collect and convey wastewater to the treatment plants. Although a predominantly gravity-based network, pumping stations are needed to move wastewater from low lying areas. Wastewater undergoes multi-stage treatment to comply with the strict provincial and federal standards before release to the environment. The Region is committed to high standards of treated wastewater quality since it gets discharged into Lake Ontario, which is the source of drinking water for the Region and many neighbouring municipalities.

More information about the water treatment process can be found within the Annual Water Quality Reports, which are available online.

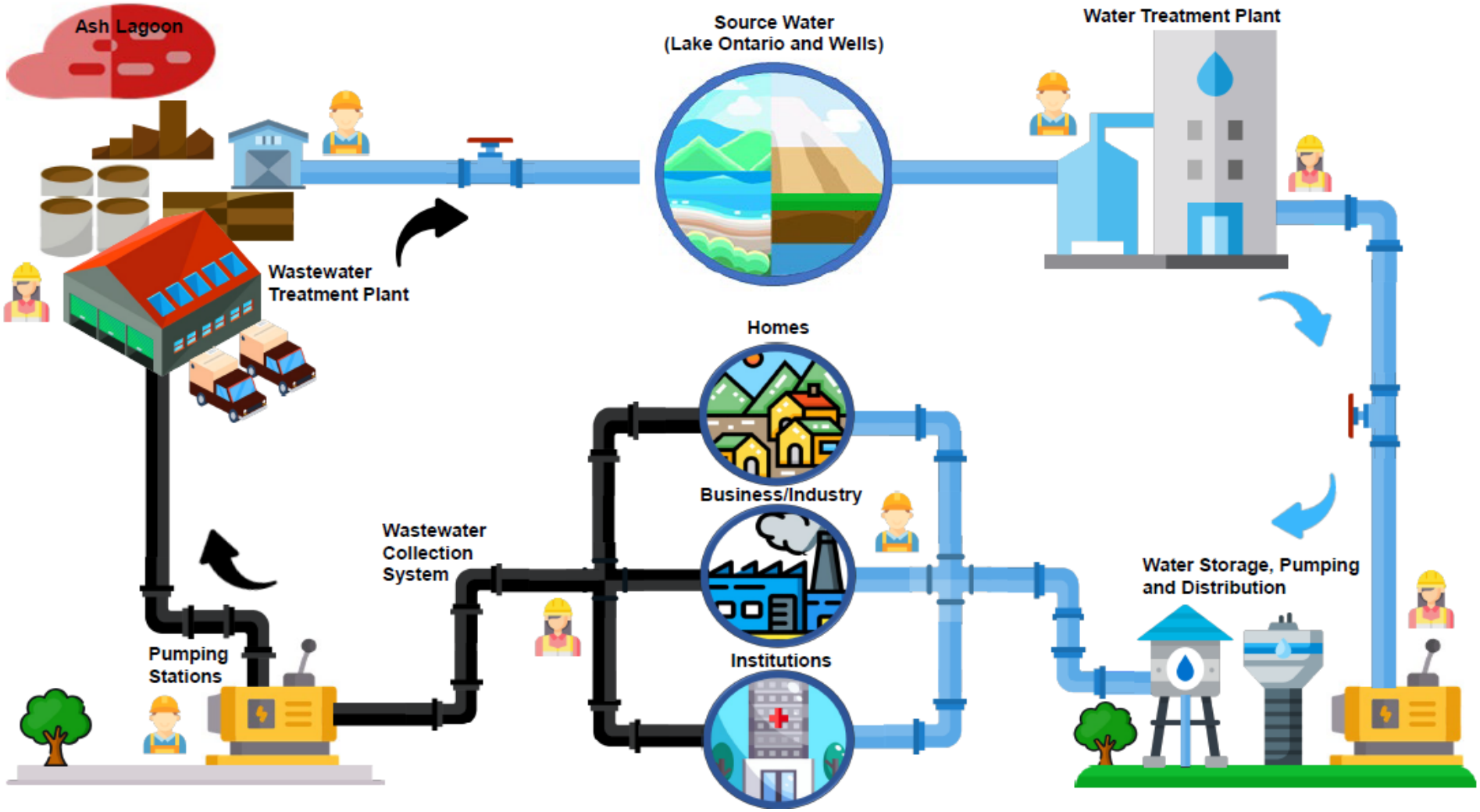

Figure 1 – Water and Wastewater Cycle

2. Introduction

Wastewater systems in Ontario are governed by the Ministry of the Environment, Conservation and Parks (the Ministry) and are also subject to federal legislation.

The purpose of a wastewater treatment system is to remove solids and nutrients to minimize impact from the effluent on the receiving waterbody. The Environmental Compliance Approval (Approval), issued under the *Environmental Protection Act*, is a facility-specific document through which the Ministry sets discharge quality limits for that facility based on the sensitivity of the receiving waters. To comply with the Approval, the Region of Peel (the Region) prepares an annual report covering the operation and overall performance of the wastewater system.

This report provides a performance summary for the period from January 1 to December 31, 2022, for the G.E. Booth Wastewater Treatment Plant (WWTP), to fulfill the annual performance reporting requirements set out in the Approval # 9375-C4RKKZ.

The G.E. Booth WWTP, a Class IV wastewater treatment facility under Ontario Regulation 129/04, is located on the north shore of Lake Ontario in south-eastern Mississauga and operated on behalf of the Region by the Ontario Clean Water Agency (OCWA). Constructed in 1961, the original plant (formerly named Lakeview WWTP) was designed to serve a community of fewer than 100,000 residents. Over the years, the plant has gone through significant capital expansion and process changes. Today, along with the Clarkson WWTP, G.E. Booth WWTP provides wastewater treatment for a population base of over 1.5 million customers in the Region, as well as wastewater flows received from York Region and the City of Toronto. The G.E. Booth WWTP consists of conventional and biosolids treatment processes and is designed to treat (referred to as rated capacity) an average flow of 518 MLD (million liters per day).

2.1 Compliance

The Approval is a facility-specific document and is the legal instrument that sets requirements for municipal system owners and operating agencies with regards to operation and management, level of treatment, monitoring and recording, routine and event reporting, and effluent quality notification. In accordance with the Approval, major changes to treatment process or equipment are communicated to the Ministry.

The Region ensures that the final effluent produced, and activities associated with wastewater treatment comply with the Approval and related legislation. The Region follows best practices in resource planning, process documentation and emergency preparedness.

The Ministry performs periodic inspections on all wastewater systems, comprised of facility visits and review of information and data for the inspection period. Inspection scope generally covers procedural documentation review, staff competency, process operation and monitoring, and corrective actions to operational events. The Region is committed to ensuring environmental protection and compliance with legislative requirements. We maintain transparency by reporting all findings of potential non-compliance incidents and outcomes of internal assessment to the Ministry district (local) office.

2.2 Monitoring

The Region monitors the effluent quality to ensure it meets limits prescribed in the Approval. The Region has an extensive sampling and monitoring program to assess the influent wastewater, ensure effective treatment processes, and assess the quality of treated wastewater being discharged to protect Lake Ontario. Sampling for various microbiological, chemical, and physical parameters is performed by Ministry-licensed wastewater operators at various sampling points throughout the process and submitted to an accredited laboratory for analysis.

G.E. Booth WWTP is controlled through a computerized Supervisory Control and Data Acquisition (SCADA) system that is monitored 24 hours per day, 7 days a week. Online analyzers continuously monitor the wastewater quality prior to release. Any significant process upset generates an alarm so staff can investigate and take appropriate actions to restore normal operational conditions. The plant is equipped with stand-by power generators to ensure critical equipment can continue to operate in the event of a power failure.

2.3 Water and Wastewater Operations during COVID-19

In 2022, the Region remained flexible in planning for return to normal operation for wastewater programs that had been altered in response to the COVID-19 pandemic. Operations continued to experience indirect effects of the pandemic in the form of delays to delivery of equipment and parts due to global supply chain issues and increased costs. 2022 saw an increased pace of work as the Region attempted to get back on track with previously planned long term capital projects.

To understand COVID-19 virus prevalence in our communities, the Region's Water and Wastewater Division has been working with Peel Public Health and participating in a provincial program since April 2020 that tests the levels of COVID-19 in wastewater. Sampling has detected genetic material of COVID-

19 in wastewater at both the G.E. Booth and Clarkson Wastewater Treatment Plants. When Public Health was testing at a clinical level, the virus detected in wastewater matched the trend of reported COVID-19 cases in Peel. At this time, wastewater testing is an important tool to monitor the prevalence of COVID-19 in our community in the absence of clinical testing.

3. Plant Process Overview

Wastewater is collected from homes and industry through a system of underground sewer pipes known as the **collection system**. The vast majority of wastewater collected in the Region flows by gravity to one of the two WWTPs on the shore of Lake Ontario, G.E. Booth and Clarkson WWTPs.

When untreated wastewater (influent) enters the treatment process, it goes through **preliminary treatment**, which includes **screens** to remove large objects (like personal hygiene products) and a vortex to remove small grit particles. Figure 2 illustrates the wastewater treatment process.

The wastewater then enters **primary treatment** tanks (clarifiers), where it flows slowly, allowing heavier suspended solid particles to settle at the bottom and lighter material (such as grease and scum) to float to the top. Treatment aids may be added at this stage, such as phosphorus removal chemical and polymer (helps particles in the wastewater stick together so they become heavier and settle). The floating material and settled sludge are skimmed by large moving collectors and then pumped to the solids handling process. The remaining water flows to aeration tanks for secondary treatment.

Secondary treatment occurs in two stages to convert organic solids that remain floating to settleable material. The first stage happens in large **aeration tanks** where air is bubbled up via diffusers to provide oxygen so that the microorganisms in the wastewater will break down the nutrients and organic matter. The second stage happens in **secondary clarifiers**, where the microorganisms settle to the bottom. The sludge from the bottom is collected and pumped to the **solids handling process** for treatment and a portion of the sludge is returned to the aeration tanks to supplement the microorganism population.

Treated wastewater (effluent) is **disinfected** using liquid chlorine (sodium hypochlorite) to reduce pathogen content to acceptable levels. Chlorine needs time to exert its disinfection action. This contact time occurs while the effluent travels through the 1.4 km long outfall pipe. Any trace chlorine remaining in the effluent is removed using a dechlorination agent (sodium bisulphite) added near the end of the outfall pipe, prior to release of the final effluent (disinfected effluent) to Lake Ontario. Final effluent quality is tested to confirm compliance with the limits set out in the Approval.

Sludge collected from the primary and secondary treatment processes is sent to the **solids handling process** where it is thickened and dewatered in a series of centrifuges. To aid in thickening and dewatering, a chemical compound called polymer is added. The thickened sludge output material is called sludge cake.

Sludge generated at the nearby Clarkson WWTP is stabilized and trucked to G.E. Booth WWTP for incineration.

The G.E Booth WWTP has four **incineration** units, each of which incinerates an average of 50 dry tonnes of sludge cake per day, when in operation. The incineration process reduces the sludge cake to ash. Ash slurry is pumped to ash lagoons for onsite storage. Each incinerator is equipped with an air

pollution control system that includes a quencher, a wet scrubber and a mercury scrubber to remove pollutants before releasing exhaust gas to the atmosphere. The air being released is monitored through a Continuous Emission Monitoring System and source testing program as required by the air emissions Approvals # 0832-C42SHT (issued June 25, 2021) and # 4675-CAJSSL (issued September 19, 2022). The monitoring program results and an annual summary are provided to the Ministry.

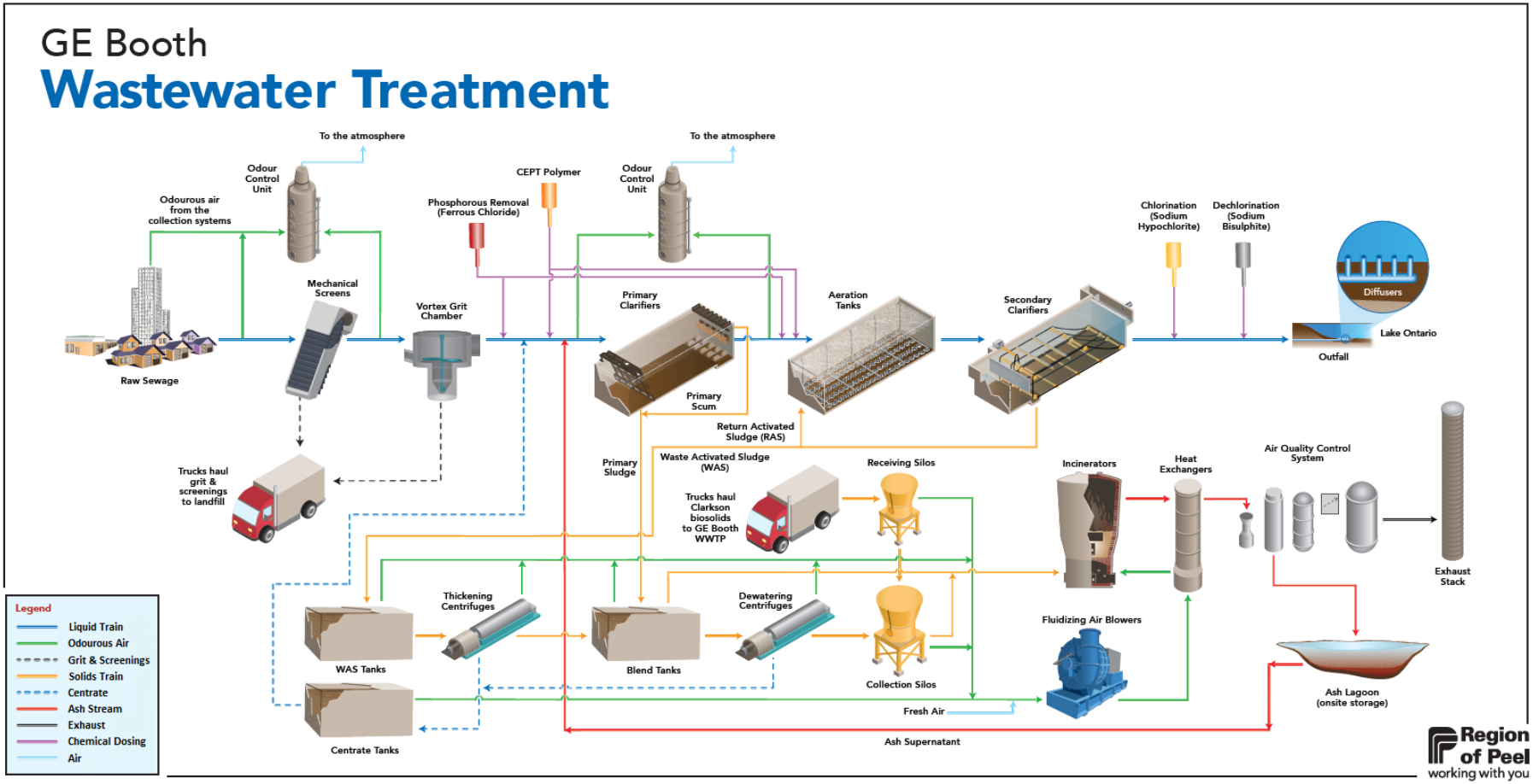

Figure 2 – G.E. Booth Wastewater Treatment Process

4. Operational Performance

4.1 Summary of Influent Monitoring Data

This section summarizes the influent characteristics for G.E. Booth WWTP. Table 1 summarizes monthly influent volumes and monthly average concentrations of analytical parameters for 2022. Figure 3 illustrates historical flow trends for 2017 to 2022. For a description of what each test parameter means, see Appendix A.

Table 1 – Influent Flow and Monthly Average Sampling Results

Month	Maximum Daily Flow (MLD) *	Average Flow (MLD)	BOD_5 (mg/L)	$CBOD_5$ (mg/L)	TKN (mg/L)	TP (mg/L)	TSS (mg/L)
January	997.0	432.3	365	340	33	5.4	318
February	1324.6	490.6	334	331	29	5.0	300
March	975.0	485.8	284	283	27	4.4	261
April	643.0	439.7	338	317	31	5.2	289
May	905.0	443.9	335	314	29	5.4	299
June	785.0	445.8	335	280	29	5.9	272
July	743.0	413.1	403	348	32	4.5	373
August	1026.0	430.1	333	303	28	4.3	317
September	681.0	407.6	352	360	31	4.8	404
October	592.0	398.7	375	352	32	4.9	405
November	617.0	389.1	416	355	33	5.0	395
December	839.0	411.7	356	314	30	4.5	364
Annual	1324.6	432.0	351	325	30	4.9	333

* Highest daily average of the month

Table 2 – Historical Annual Average Influent Flow and Sampling Results

Year	Flow (MLD)	BOD_5 (mg/L)	$CBOD_5$ (mg/L)	TKN (mg/L)	TP (mg/L)	TSS (mg/L)
2017	445.2	294	234	28	5.5	480
2018	473.5	289	258	28	4.5	470
2019	469.1	273	261	28	4.8	364
2020	446.5	294	277	30	5.1	352
2021	439.9	325	309	30	5.3	360
2022	432.0	351	325	30	4.9	333

In 2022, the annual average flow was 432 MLD, representing 83% of the annual rated capacity. Flows to the plant peaked in 2018, at 474 ML or 92% of capacity, and slowly decreased every year since, with a total decrease of 9%. Many factors affect changes in volume of wastewater flow to treatment plants. These include precipitation (through inflow and infiltration of storm water into the wastewater

collection system), existing ground moisture saturation, residential water usage practices, and industry activity. Peel Region has had less precipitation in 2022 than in the previous few years and there has been a small decrease in water demand (as seen by drinking water production in the two major water treatment plants in Mississauga) in the last two years. Along with the decrease in flow, there was an increase in contaminant loading in the raw sewage, with greatest increases seen in Biological Oxygen Demand (BOD5) and Carbonaceous Biochemical Oxygen Demand (CBOD5), with an increase of over 20% over the past 3 years. Total Suspended Solids (TSS) and Total Phosphorus (TP) loading has fluctuated in the last few years. Table 2 provides a summary of flows and contaminant loading for the past six years.

For discussion of efforts to address design capacity, see Section 4.8.

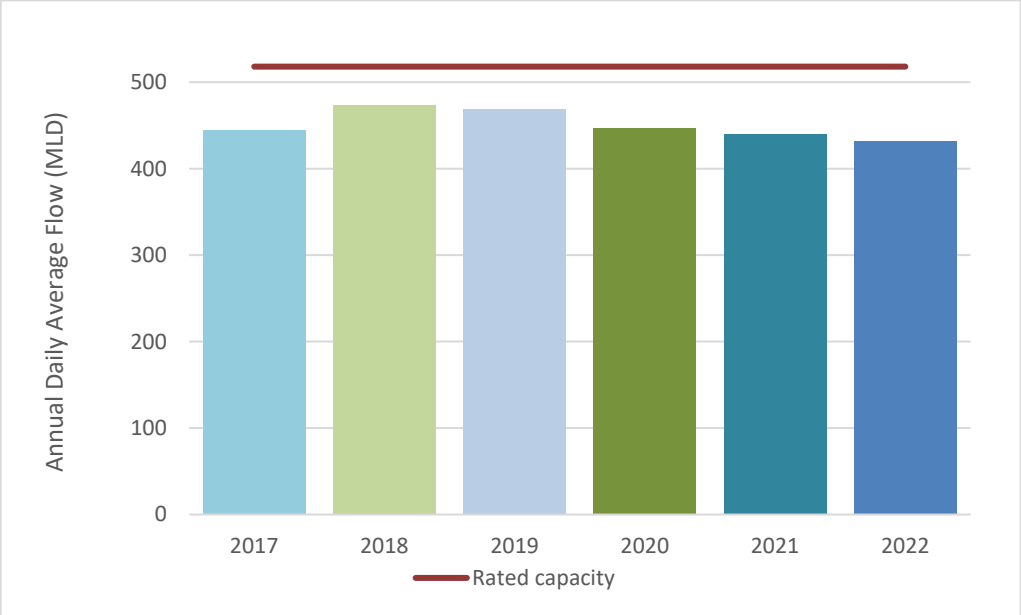

Figure 3 – Annual Average Flow 2017 to 2022

4.2 Summary of Final Effluent Monitoring Data

The plant experienced operational challenges related to solids removal and encountered difficulty in meeting limits for Total Suspended Solids (TSS) and associated parameters: Total Phosphorus (TP) and Carbonaceous Biochemical Oxygen Demand ($CBOD_5$). A summary of final effluent test results and the Approval objectives (targets) and limits (requirements) are shown in Table 3 and Figures 4 and 5. For a description of test parameters, see Appendix A. The effluent exceeded TP monthly average limit of 0.8 mg/L, with an average of 1.0 mg/L in January, and 2.4 mg/L in February; and just met the limit in May. Monthly average TP loading (kilograms of TP deposited per day in the receiving body) limit of 394 kg/day was also exceeded in January and February, with loading of 412 kg/day and 1168 kg/day respectively.

$CBOD_5$ and TSS have a prescribed annual averaging period in the Approval, which means that whether the limit is met or not, it is assessed at the end of the calendar year when the results for the year are averaged. However, operations still try to meet the objectives throughout the year. The limit for both $CBOD_5$ and TSS is 25 mg/L (annual average). The effluent TSS was above 25 mg/L in January and February, and the effluent $CBOD_5$ was above that value in February. These were not exceedances of the Approval limits but were reported as exceedances of the monthly limit for TSS and $CBOD_5$ of the *Wastewater Systems Effluent Regulations* (WSER, SOR/2012-139), a Regulation under the *Fisheries Act* that applies to wastewater treatment plants in Canada. Operations and compliance teams closely monitored the situation and provided updates to the Ministry on recovery steps and developments. Refer to Section 4.4 for more information on the causes and corrective actions.

G.E. Booth WWTP met the effluent concentration limits for Total Ammonia Nitrogen (TAN), and *E. coli*, and maintained pH within the range of 6.0 – 9.5, as prescribed in the Approval.

Monitoring the Disinfection Process

The Approval requires disinfection of the effluent (done with chlorine) and subsequent removal of the chlorine residual prior to releasing the effluent 1.4 km offshore in Lake Ontario. The presence of bisulphite residual in the final effluent demonstrates the absence of chlorine residual. It is not practical to sample at the end of the long outfall; therefore, a small portion of the effluent is directed through a 1.4 km coiled pipe in the facility to simulate conditions in the outfall, with sampling points at the end for monitoring. The simulator takes a sample of the chlorinated effluent water and adds sodium bisulphite (dechlorination agent) in proportion to simulate conditions within the outfall, then another sample at a point representative of the final effluent. Bisulphite residual could not be measured for several periods throughout 2022 due to challenges with various system components, such as the dosing equipment, analyzers, and pumps. Refer to Section 4.4 for more information. Dosing of both chlorine and sodium bisulphite continued within the full-scale effluent stream throughout. This was noted in the monthly courtesy reports sent to the Ministry.

Table 3 – Final Effluent Monthly Average Flow and Sampling Results

Month	Daily Flow (MLD)	$CBOD_5$ (mg/L)	Total Suspended Solids (mg/L)	Total Phosphorus (mg/L)	Total Phosphorus Loading (kg/day)	Total Ammonia Nitrogen (mg/L)	pH (pH units)	*E. coli* (CFU/100 mL) [1]	Bisulphite Residual [2] (mg/L)
Objective	N/A	15	15	0.7	N/A	6.0 (Jun - Sep) 17.0 (Nov - Apr) 8.0 (May & Oct)	6.5 – 8.5	150	Detectable
Limit	518	25	25	0.8	394	8.0 (Jun - Sep) 34.0 (Nov - Apr) 16.0 (May & Oct)	6.0 – 9.5	200	Detectable
Compliance Assessment Basis[3]	Annual Average	Annual Average	Annual Average	Monthly Average	Monthly Average	Monthly Average	Single Sample	Monthly Geometric Mean Density	Monthly Average [4]
January	432.3	11.1	30.6	**1.0**	**412**	5.4	6.9	33	0.41
February	490.6	40.4	101.2	**2.4**	**1168**	5.1	6.9	53	0.43
March	485.8	4.4	11.0	0.4	170	1.5	7.0	21	0.46
April	439.7	3.5	7.9	0.4	173	2.5	7.0	10	0.46
May	443.9	8.3	22.4	0.8	358	3.1	6.9	14	0.44
June	445.8	4.3	8.5	0.6	280	0.2	6.8	6	0.37 [5]
July	413.1	3.5	6.5	0.4	161	0.1	6.9	21	0.21 [5]
August	430.1	3.2	6.8	0.5	195	0.1	6.9	57	0.23 [5]
September	407.6	3.7	9.9	0.5	192	0.2	6.8	62	0.23 [5]
October	398.7	3.0	8.5	0.6	232	0.2	6.7	9	0.16
November	389.1	4.5	10.4	0.7	288	0.6	6.9	5	0.38 [5]
December	411.7	4.2	10.8	0.5	186	0.3	7.0	5	0.32 [5]
Annual Average	**432.0**	**7.6**	**19.0**	**0.7**	**304**	**1.6**	**6.9**	**N/A**	**0.36**

[1] CFU = Colony forming units.

[2] Approval includes Residual Chlorine objective of non-detectable and limit of 0.02 mg/L. If bisulphite residual is used as a surrogate to Total Residual Chlorine, then detected levels of bisulphite residual in the sample shall be deemed to confirm absence or equivalent to 0.0 mg/L concentration level of Total Residual Chlorine.

[3] For different parameters, compliance is assessed based on different time periods. TP and TAN are deemed in compliance if monthly average meets the limit; $CBOD_5$, TSS and flow are in compliance if annual average meets limit; bisulphite residual and pH are assessed on daily results. *E. coli* is assessed using a monthly geometric average.

[4] If continuous analyzer is used, the Approval prescribes that reading shall be recorded at a minimum frequency of every 5 minutes and any record is not to exceed 0.1 mg/L and any two-hour moving average is not to exceed 0.02 mg/L. With the Ministry's knowledge, the plant is currently using mass balance to demonstrate compliance in place of continuous analyzer readings.

[5] Malfunction of simulator sodium bisulphite dosing system. Chlorine and sodium bisulphite were dosed within full-scale effluent stream according to chart provided by consulting engineer. See Section 4.4 for more information.

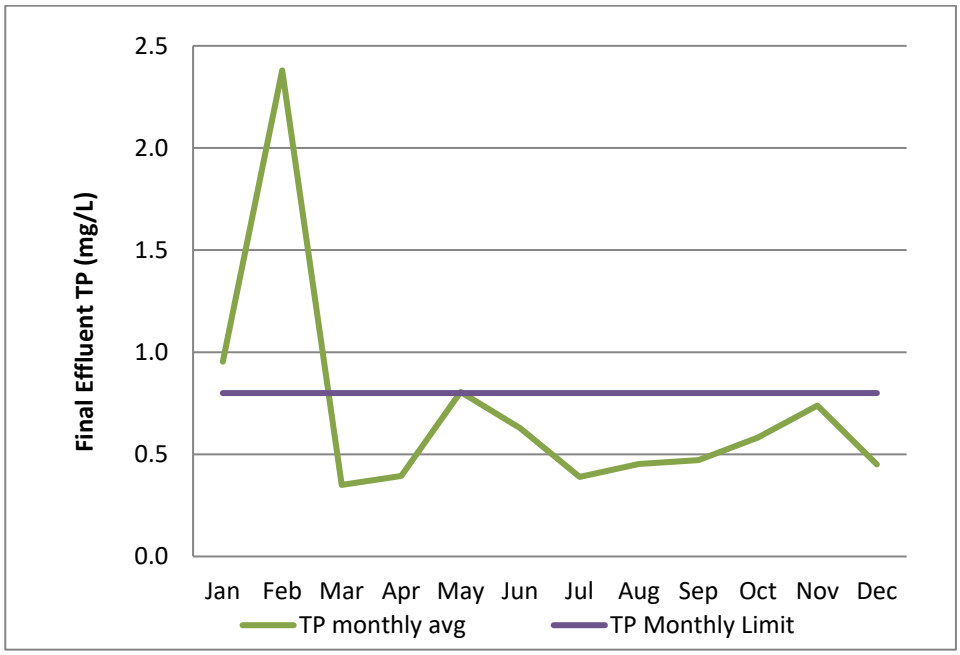

Figure 4 –Effluent TP Monthly Average Sampling Results Compared to Approval Limit

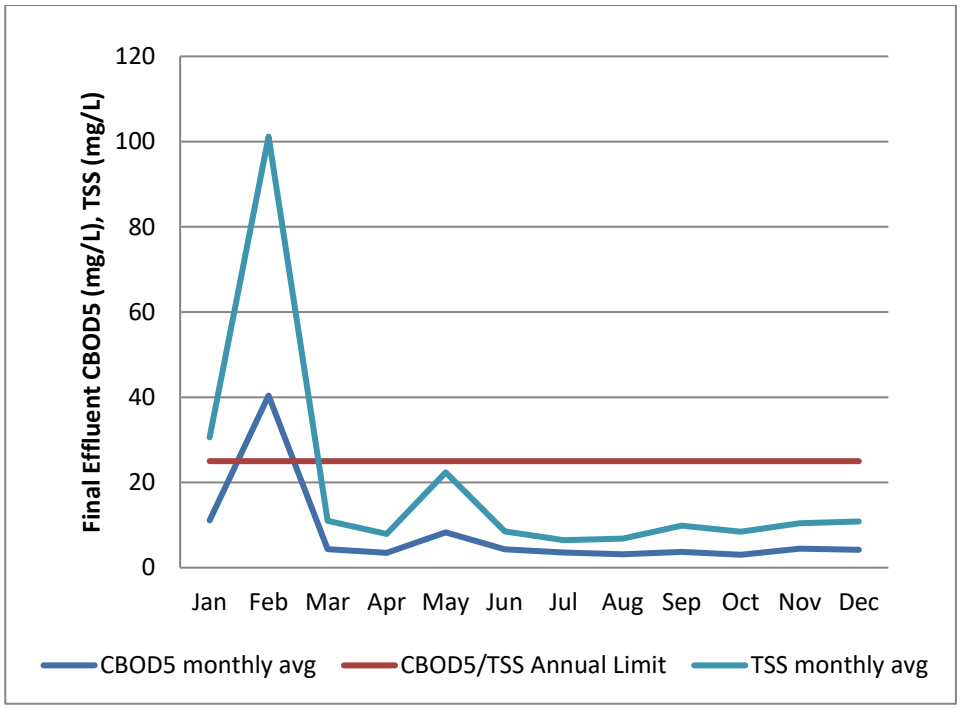

Figure 5 –Effluent CBOD5 and TSS Monthly Average Sampling Results Compared to Approval Limits

4.3 Deviations from Monitoring Schedule and Next Reporting Year Schedule

The wastewater influent and effluent must be sampled and tested in accordance with the requirements of the Approval. Each year, a sampling schedule is prepared to ensure all requirements are met. Table 4 shows the sampling schedules for 2022 and 2023. There was one deviation from the 2022 schedule, related to bisulphite system malfunction, as mentioned in Section 4.2.

Table 4 – Sampling Schedules for 2022 and 2023

Monitoring Program				Scheduled Sampling Program 2022	Scheduled Sampling Program 2023
	Parameters	Sample Type	Minimum Frequency	Frequency	Frequency
Influent	BOD_5	24 hours composite	Weekly	Three Times Per Week	Three Times Per Week
	TSS	24 hours composite	Weekly	Daily	Daily
	Total Phosphorus	24 hours composite	Weekly	Daily	Daily
	TKN	24 hours composite	Weekly	Daily	Daily
Final Effluent	$CBOD_5$	24 hours composite	Weekly	Daily	Daily
	TSS	24 hours composite	Weekly	Daily	Daily
	Total Phosphorus	24 hours composite	Weekly	Daily	Daily
	TAN	24 hours composite	Weekly	Daily	Daily
	TKN	24 hours composite	Weekly	Daily	Daily
	Nitrate as Nitrogen	24 hours composite	Weekly	Daily	Daily
	Nitrite as Nitrogen	24 hours composite	Weekly	Daily	Daily
	E. coli	Grab	Weekly	Three Times Per Week	Three Times Per Week
	Total Residual Chlorine/ Bisulphite Residual	Grab/Analyzer	Daily	Daily	Daily
	pH[1]	Grab/Probe/Analyzer	Weekly	Daily	Daily
	Temperature[1]	Grab/Probe/Analyzer	Weekly	Daily	Daily
	Unionized Ammonia[2]	As Calculated	Weekly	Three Times Per Week	Three Times Per Week
	Dissolved Oxygen	Grab/Analyzer	Weekly	Two Times Per Week	Two Times Per Week
Cake	Total Solids	Grab	Annually	Annually	Quarterly
	TAN	Grab	Annually	Annually	Quarterly
	Nitrate	Grab	Annually	Annually	Quarterly
	TP	Grab	Annually	Annually	Quarterly
	Metals (As, Cd, Co, Cr, Cu, Pb, Hg, Mo, Ni, Se, Zn)	Grab	Annually	Annually	Quarterly
	Potassium[3]	Grab	Annually	Annually	Quarterly

[1] pH and temperature of the final effluent shall be determined in the field at the time of sampling for Total Ammonia Nitrogen.
[2] The concentration of un-ionized ammonia is calculated using the total ammonia concentration, pH and temperature.

4.4 Operating Issues and Corrective Actions

The G.E. Booth WWTP operates year-round, 24 hours a day. Occasional operating issues are encountered. Table 5 summarizes operating issues in the reporting period that temporarily affected the process or effluent quality and lists the corrective actions taken. This information is reported to the Ministry Inspector monthly.

Table 5 – Summary of Operating Issues and Actions Taken

Issue	Date	Causes	Corrective Actions
Effluent TP, TSS and CBOD5 objectives or limits exceeded	January February	Note: Effluent TP, TSS and CBOD5 are highly correlated; same causes apply to all, and most corrective actions will address all as well. 1) High sludge depths in primary tanks due to decreased incineration capacity; 2) The loss of a flow meter signal (January 27) resulted in high flows to the older part of the plant, which caused additional solids carryover into final tanks; and 3) The older part of the plant began experiencing poor solids settling (associated with excessive growth of filamentous microorganisms that hinder settling), which amplified the process upset	1) The flow meter was repaired Feb 1; 2) The aeration tanks were reseeded with a healthy population of microorganisms to help restore the process; 3) Increased wasting of the settled sludge to remove the undesired microorganisms from the biological process; 4) Sampling and analysis were increased to closely monitor plant performance; 5) Microbiological growth within the treatment processes was monitored using microscopy; 6) Maximized the burn rate of the incinerators of the in-service incinerators to remove solids in the conventional plant; 7) Reduced Clarkson WWTP sludge cake haulage to G.E. Booth WWTP to reduce incineration demand;8) Expedited repairs on a final tank that was out of service; 9) Diverted collection system sewage flow toward Clarkson WWTP to reduce influent flows to G.E. Booth WWTP
Effluent TP monthly average concentration above the objective	May	1) High sludge depths in primary tanks; 2) Phosphorus removal chemical dosing line in one part of the plant was air plugged; 3) Two incinerators were offline for repairs, which contributed to the high solids accumulation in the process tanks	1) Investigated and resolved the air plugged chemical dosing line; 2) Expedited the maintenance and returned the third incinerator to service to improve the removal of solids from process tanks; 3) Adjusted phosphorus removal chemical dose;
	November	1) A broken sludge collector prevented effective removal of sludge from one final clarifier (for return to aeration and wasting); 2) Sludge built up in two final clarifiers;	1) Adjusted phosphorus removal chemical dose; 2) Fixed broken sludge collector; 3) Adjusted return and wasting rates to reduce sludge build-up in the affected final clarifiers

Effluent pH value lower than the objective range	November 11, 13, 15	pH value lower than the objective range (6.5) due to pH meter reading inaccurately	Replaced the pH meter and calibrated it
Effluent *E. coli* higher than average	September 5, 7, 8, 15	*E. coli* test results were higher than usual but in compliance with the monthly geometric mean	1) Increased chlorine dose; 2) Adjusted plant wasting and return rates to improve the plant effluent quality
Disinfection simulator system malfunction	June 30 July 1-22 July 29-August 14 September 22, 24-26 November 11-20 December 6-31	Malfunctions of simulator components (on-line analyzer, bisulphite dosing quill, simulator pump, and sample pump), resulting in inability to measure bisulphite residual	1) Repaired analyzer components 2) During these periods, Operations used dosing chart provided by engineering consultant to ensure dosing adequate sodium bisulphite for complete dechlorination within the outfall 3) Replacement sample pumps have been ordered
Daily plant flow exceeded rated capacity	February 17-20, 22-24 March 7, 17-20, 24, 25 May 4 June 7 August 22 December 16, 31	Seasonal snow thaw and heavy precipitation	1) Monitored plant processes 2) Bypassed secondary treatment in one part of the plant on February 17. See Section 4.11.1 3) Filled empty tanks to buffer the high flows

4.5 Maintenance Activities

4.5.1 Repair and Maintenance

To keep the G.E. Booth WWTP in good operating order, major plant components must be inspected and maintained on a regular basis. Table 6 provides a summary of planned and emergency repairs and maintenance activities carried out during the reporting period.

Table 6 – Summary of Repairs and Maintenance Activities

Plant Process	Maintenance Activity
Preliminary Treatment	Replaced travelling screen, grit conveyer and assembly
	Replaced the absorbent media in the odour control units
	Repaired washer and compactor for a screen at Headworks
	Overhauled fine screens and grit vortexes
Primary Treatment	Replaced two raw sludge pumps and scum pumps
	Overhauled several primary tanks
	Repaired primary bridge and associated equipment, refurbished electrical panels
	Repaired scum collector line for Plant 1 (oldest part of the plant)
Secondary Treatment	Overhauled aeration blowers
	Replaced several pumps for waste activated sludge, return activated sludge, and scum
	Replaced diffusers in two aeration tanks

	Repaired chain and flights on sludge collector for final tank
	Overhauled one final tank
Solids Handling	Repaired two incinerators and fully refurbished an additional one
	Replaced components of the continuous emissions monitoring system, such as the analyzer, the heated sample line and data storage system
	Repaired two cake pumps and associated equipment
	Replaced incinerator emergency spray pumps
	Overhauled a supernatant pump and rebuilt ash pumps
	Refurbished/repaired several dewatering and thickening centrifuges
	Replaced rake in solids receiving silo
Other Works	Replaced the absorbent media in the odour control units in the plant as required
	Replaced piping for incinerator utility water supply
	Inspected outfall discharge system
	Upgraded sensors for safety gas detection and monitoring system

4.5.2 Operating Resources

The Approval requires the Region to ensure that the plant and all equipment used to achieve compliance are properly operated and maintained. This includes providing adequate funding. The Region funds operational activities and process chemicals to maintain daily operation, as well as capital activities to ensure future system performance.

In 2022, $6.6 million was spent on process chemicals at G.E. Booth WWTP, such as sodium hypochlorite, polymer, sodium bisulphite, and phosphorus removal chemical (see introduction and Appendix A for description of use of each of these), with an overall cost of $42 per million litres of wastewater treated. This is a 38% increase over the previous year. The increase is due in small part to an increase in volume of certain chemicals used and in larger part due to cost increases.

Water and wastewater treatment are among the highest energy users in the Region. In 2022, 2.0 gigajoules of energy were used per million litres treated. Energy rates vary slightly from year to year; in 2022, the rate was comparable to the average over the past 5 years.

Energy usage and performance of energy intensive equipment is monitored, and the Region continues to research ways to optimize and reduce energy use through energy-saving opportunities during design of capital improvement and construction projects.

4.5.3 Capital Expenditure Information

Region staff determine priorities to eliminate unnecessary capital spending while maintaining infrastructure. Table 7 shows a summary of the major capital expenditures at G.E. Booth WWTP in the previous year.

Table 7 – Summary of Capital Costs

Activity	2022 Expenditures
Condition Assessment and Studies	$1,373,144
Equipment Repair & Replacement, Conventional Plant	$49,685,724
Equipment Repair & Replacement, Biosolids Processes	$5,969,591
Odour Mitigation	$11,323,438
Total	**$68,351,896**

4.6 Effluent Quality Assurance and Control Measures

Quality Assurance & Control Measures

Sampling Data

Licensed operators perform **in-house testing** of multiple parameters for process control

Primary treatment efficiency **sampling program**

Samples are analyzed by an **accredited laboratory**

All **process data** is captured electronically

SCADA real-time data capture & monitoring, data historian, and reporting tools for the collection and analysis of data

Operational Control

Operational facility sheets capture data that can be used to determine trend and diagnose problems

Calibration of critical equipment is performed with required frequency

Equipment redundancy to increase equipment availability and effective response to failures and unplanned emergencies

Ability to **co-thicken waste** activated sludge in primaries or centrifuge increases operational flexibility

Multiple **SCADA** stations throughout the facility ensures operators have ready access to real-time conditions and control of plant equipment

Internal **Standard Operating Procedures** complement Operations and Maintenance Manuals

Document control system for proper and effective record-keeping

Wastewater Contingency Plan to address emergency situations in the interest of meeting final effluent limits and prevent impacts to the environment

Preventive Maintenance

Reliability Centered Maintenance program reduces emergency repairs, shifting toward proactive control

Inventory of equipment is captured in a **Computerized Maintenance Management System**, improving the ability to manage assets

A major **maintenance program** focuses on replacing or refurbishing aging assets

Competent Staff

Operator licences (issued under O. Reg. 129/04) are verified monthly

Comprehensive operator training includes classroom, online and hands on training

Overall Responsible Operator readily available to provide direction during operational challenges and emergency situations

Compliance and Process staff for system oversight

Process and Energy Optimization staff for managing cost efficiency, energy savings and environmental stewardship

Management Oversight

Regular process and compliance meetings between the owner and the operating authority

Monthly operations staff meetings provide training and discussion on topics including health and safety, compliance, and operational and maintenance activities

4.7 Monitoring Equipment Calibration and Maintenance

Equipment used to monitor wastewater influent and effluent flows must be checked and maintained to ensure it is reading accurately. This is achieved through annual calibration and maintenance of flow meters, completed by a third-party vendor. For 2022, final effluent flow meters were found to be within acceptable limits.

4.8 Efforts Made to Achieve Design Capacity and Objectives

In 2022, the annual average flow was 432 MLD, representing 83% of the annual rated capacity of 518 MLD. Flows to the plant peaked in 2018 and slowly decreased every year since, with a total decrease of 9%.

The Region recognizes that the plant capacity is approaching 90% of design, which increases the possibility of bypass occurrences and potential impacts to effluent quality during high flows. Several projects are underway to restore, maintain and expand plant design capacity. These projects are described below.

Collection System

To address high flows to G.E. Booth WWTP, there is a project underway to divert flows from east to west (away from G.E. Booth WWTP and towards Clarkson WWTP). The project is expected to be completed and flow diversion operational in 2027. The preliminary flow diversion strategy under this project is to re-direct approximately 70 MLD. More information on this project is available on the Region's website. Information on Environmental Assessments being performed by the Region are on the Environmental Assessment webpage.

The Region continues working to reduce inflow and infiltration in the collection system that contributes to peak flows during high flow events (see Section 4.13 for more information).

Capital Works Projects at the G.E. Booth WWTP

The Region has undertaken proactive long-term actions to address changes to influent characteristics since the last plant expansion. A review of influent monitoring data from the last six years shows that there has been a significant increase in influent $CBOD_5$ and TSS concentrations compared to the plant's original design basis (key process specifications for the 2008 plant expansion). Refer to Figures 6 and 7.

A project is currently underway to completely replace Plant 1 (the oldest and smallest liquids treatment train in the facility). Preparatory activities such as construction of a new inlet conduit and storage complex are completed. The Plant 1 design is finished, and its construction underway. The new treatment train will account for the increased influent loading (concentration of nutrients in influent that has to be treated). In addition, two new primary clarifiers in Plant 3 (the newest and largest treatment train) have been constructed and ancillary mechanisms are being completed. The primary clarifiers, which do not add overall treatment capacity, are being commissioned.

In 2022, the Region continued to move forward on an Environmental Assessment (EA) for the wastewater treatment facilities to provide additional treatment capacity and meet Master Plan flow

projections to 2041. The EA is near completion, and an Environmental Study Report will be submitted for final public review in spring 2023.

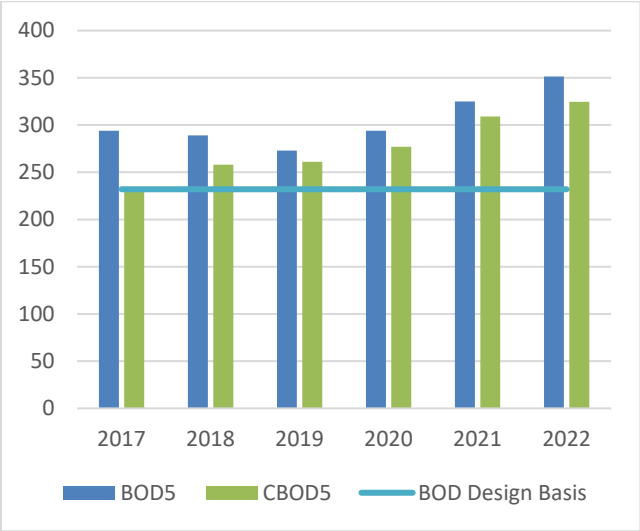

Figure 6 – Influent BOD_5 & $CBOD_5$ (mg/L)

Figure 7 – Influent TSS (mg/L)

4.9 Sludge Generation and Disposal

The treatment process removes solids from the wastewater stream in the form of sludge, which is processed on site, as described in Section 3. Table 8 shows the total monthly and annual sludge volumes generated at the G.E. Booth WWTP.

In 2022, an annual total 42,309 dry tonnes of sludge cake were incinerated, which included 39,265 dry tonnes generated at G.E. Booth WWTP and 3,043 dry tonnes generated and delivered from Clarkson WWTP. This represents an 11% decrease in total cake incinerated compared to the previous year. This is due to a decrease in system-wide flows and also to less cake being sent from the Clarkson WWTP for incineration at G.E. Booth WWTP due to a new biosolids diversion strategy. For more information refer to the Clarkson WWTP Annual Report at www.peelregion.ca/wastewater/#reports.

It is difficult to predict the change in sludge production for the following year as there has not been a clear trend in the last several years. There was a 3% decrease in sludge generation since the previous year that corresponded to lower flows. Based on a predicted population increase of 1%, and no significant expected changes to flows or processing, no significant changes in sludge generation are expected for the next year.

Table 8 – Summary of Sludge Volume Generated in Different Processes and its Disposal

Month	Primary Sludge (m3)	Sludge Cake Incinerated (G.E. Booth) (dry tonnes)	Sludge Cake Incinerated (Clarkson) (dry tonnes) [1]	Total Sludge Cake Incinerated (G.E. Booth and Clarkson) (dry tonnes)
January	99,345	3,175	385	3,559
February	89,031	2,710	88	2,798
March	129,135	3,980	595	4,576
April	93,283	3,466	545	4,011
May	96,092	3,058	61	3,118
June	140,889	3,784	65	3,849
July	97,968	3,228	280	3,507
August	112,175	3,273	489	3,762
September	89,438	2,979	0	2,979
October	118,546	3,415	102	3,517
November	83,876	2,732	172	2,905
December	85,744	3,466	260	3,726
Annual Daily Average	**3,385**	**108**	**8**	**116**
Annual Total	**1,235,522**	**39,265**	**3,043**	**42,309**

[1] Mass as determined based on volume of cake pumped

4.10 Summary of Complaints

The Approval requires that the Region log, investigate and resolve all resident complaints. The Region attempts to contact all customers and satisfactorily address their concerns and enquiries. A database is used to record details including information collected from the customer on the nature of the enquiry and action taken by the Region. Eight complaints were received in 2022, and of those, originated from the same address, related to an ongoing inquiry (see Table 9). In 2021 and 2020, the Region received five and four complaints respectively.

The Region takes proactive action to reduce sewage odour at the source. In 2022, an interim odour mitigation measure was taken with covers installed over the weirs on Plant 1 primary tanks. The covers capture odorous air from the weirs, where the effluent is agitated thus releasing odours, and convey the captured air for treatment through odour control units. In addition, operations staff proactively take mitigative measures during activities that are likely to generate additional odours, such as dewatering of tanks for maintenance.

Table 9 – Summary of Complaints

Date of Complaint	Description of Complaint	Action Taken in Response
20-May	Sewage odour for about a week	Odourous primary tanks were treated with an oxidizer to minimize odours
21-Jun	Sewage odour	One primary tank was out of service for maintenance, which can cause odours. The maintenance was completed on June 22. Odour control units were operating throughout this duration.
28-Jun	Intermittent odour for a few weeks	One primary tank was out of service for maintenance. Hot weather and algae accumulation may have contributed to odours. The plant was otherwise operating normally, and odour control units were operating properly throughout.
16-Jul	Rotten Eggs/Sulphur odour	One primary tank was out of service for maintenance earlier that week. Mitigation efforts were taken, and odour equipment was working properly.
2-Aug, 4-Aug, 29-Sep, 9-Nov	Reporting long term odour issues and enquiring about control measures	Operations staff investigated the plant and collection system, and all were operating normally without increased odour. Investigation of multiple complaints from the same resident, suggested a correlation between reports of odour and wind blowing towards the resident's building. Resident was informed about maintenance program and current and future mitigation efforts.

4.11 Bypasses, Overflows, Spills and Abnormal Discharge Events

Occasional weather events such as heavy rainfall and spring snow melt can result in flow rates that are higher than those for which the plant was designed and burden the treatment process. These challenges, as well as the need for planned maintenance and construction activities, may result in a discharge to the environment of a portion of wastewater that has not undergone all treatment processes, outside of normal operating conditions, in what is referred to as a bypass event.

4.11.1 Bypasses

A **bypass** is an intentional diversion of excess wastewater around one or more wastewater treatment process(es). The bypassed portion of wastewater undergoes part of the treatment process followed by disinfection and gets re-combined with the fully treated flow prior to release into Lake Ontario at the approved discharge location and sampling point. Final effluent is sampled and tested during bypass events to assess its quality.

Occasionally, a planned bypass is necessary to repair an essential part of the treatment process or during construction. In those cases, Peel submits a request to the federal and provincial governments to perform the bypass, including a plan to minimize its impact.

While not desirable, emergency bypasses may be necessary during high flow events to prevent spills and flooding at the WWTP and backups within the sewer system that can cause basement flooding and spills to the environment. Bypasses are also essential to protect the plant core biological treatment process (microorganisms that treat the sewage) from being washed out, which would prevent the plant from functioning properly and potentially causing long-term treatment impacts until the biological community is re-established.

Most bypasses in Peel are *secondary bypasses*, whereby the diverted wastewater receives primary treatment, bypasses secondary treatment, and receives a high degree of disinfection.

There was one secondary bypass in 2022. Of all the wastewater processed at G.E. Booth WWTP in 2022, 99.9% underwent the full treatment process. All events are reported to the Region of Peel Environmental Control, the Ministry's Spills Action Centre (SAC), the Medical Officer of Health, and recorded in a database. A summary is provided in Table 10.

Table 10 – Summary of Bypasses

Date	Location	Type	Duration (hours)	Volume (ML)	Disinfected	Reason
17-Feb	Plant 3	Secondary	7.5	164.5	Yes	High intensity precipitation and snowmelt

4.11.2 Overflows

An **overflow** is a controlled discharge of wastewater to the environment from a designed location at the plant other than the approved final effluent outfall. **There were no overflow events** during the reporting period.

4.11.3 Spills

A **spill** is an unplanned discharge to the environment from any location that is not specifically designed for this purpose. **There was one spill event** during the reporting period. A summary is provided in Table 11.

Table 11 - Summary of Spill Events

Date	SAC Reference Number	Description	Action Taken in Response
12-May	1-1SY0VB	Sewage spill of approx. 240 m^3 into a construction excavation site during dewatering of primary tanks by contractor.	The contractor cleaned up the spill and repaired the pipe leak that caused it

4.12 Notice of Modifications to Sewage Works

The Approval allows for certain pre-authorized modifications to be made to the facility. The Ministry requires each modification to be documented on a *Notice of Modification to Sewage Works* form which is retained and made available to the Ministry during inspections.

There was one *Notice of Modification to Sewage Works* documented during 2022: a new dewatering centrifuge feed pump and cake exportation under contingency conditions.

Repair and maintenance activities are exempt from the documentation requirements and may be performed as needed to maintain the WWTP in good working condition. These were summarized in Section 4.5.

4.13 Status of the Proposed Works

The Region undertakes construction projects to upgrade or enhance the WWTP to meet demands related to industrial and commercial growth in the Region that may alter incoming wastewater volume or loading, and to integrate new technologies. Future construction plans proposed by the Region are submitted to the Ministry for engineering review. Approved installations and modifications are listed in the *Proposed Works* section of the Approval. Table 12 summarizes status of Proposed Works under the current Approval (#9375-C4RKKZ) and the previous Approval (#5461-AWWQUL).

Table 12 – Status of Proposed Works

ECA	Proposed Work	Status Update	Expected Completion
5461-AWWQUL	Plant 3 Primary Treatment System	Minor issues are being resolved in advance of turning on the system in mid-February 2023.	February 2023
	Disinfection System	New Disinfection dosing point was placed into service in January 2023.	January 2023
9375-C4RKKZ	New Plant 1	Work began on the project in summer of 2022. A significant part of the excavation is complete. Structural concrete works have been ongoing on the two new Primary Clarifiers 1 and 2 along their pump gallery.	Fall 2026

4.14 Efforts to Achieve Conformance with Ministry's Treatment and Collection System Requirements (Procedure F-5-1)

As the Region's population continues to grow, volumes of wastewater are expected to continue to increase. In addition, flows rise during wet weather and snow melt events due to infiltration of water into the collection system. Climate change causes an increase in the frequency and severity of these wet weather events. Increased flows influence treatment effectiveness. Another influence is industrial discharges into the collection system. The Region's *Water and Wastewater 10-Year Plan* includes ongoing capital improvements to the treatment plants and collection system to improve flow management to protect neighbourhoods from flooding, maintain treatment capacity, and meet all regulatory limits for treated effluent. The Region has several avenues by which it is working to address these challenges to the wastewater system, as described below.

4.14.1 Effluent Design Objectives and Effluent Guidelines

Despite the plant being near the hydraulic rated capacity for several years, the plant meets the Approval limits the vast majority of the time.

4.14.2 Primary Treatment Capacity Modifications

Throughout 2022, the Region completed construction of two primary tanks, a project aimed at expanding primary capacity in Plant 3 (the newest and largest treatment train of the WWTP). The new primary tanks will provide additional storage, and the existing Plant 3 inlet conduit is being twinned for increased capacity.

4.14.3 Collection System Operation, Maintenance and Upgrades

The Region's strategy for offsetting wastewater flows from the east side of Mississauga and Brampton includes several major collection system initiatives, with an overall budget of approximately $420 million. Twinning of the East Brampton and West sanitary trunk sewer is now complete and operational and will provide additional capacity and allow for condition assessment and rehabilitation of the

existing trunk sewer to extend its useful life. The Region recently completed a condition assessment of the existing East Brampton sanitary trunk sewer and is in the process of retaining an engineering consultant to support detailed design and construction of planned rehabilitation work. Several significant wastewater condition assessment and rehabilitation initiatives were initiated or continued in 2022, including condition assessments of portions of the West Trunk Sewer, portions of the East Brampton Trunk Sewer, the Sawmill Creek and Levi Creek Trunk Sewers, the Upper Cooksville Trunk Sewer, and the Erin Mills Trunk Sewer.

The goal of these projects is to assess and rehabilitate sanitary infrastructure to meet target levels of service, which in turn improves system resiliency and longevity, and reduces site-specific infiltration, such as leaking pipe joints. The East Trunk Sewer and Energy Dissipation Chamber Rehabilitation Class EA and Detailed Design were completed in 2022, and the project is currently in the early stages of construction. This project was also awarded combined federal and provincial funding.

The Region is also proposing additional collection system initiatives to facilitate diversion and storage to alleviate extraneous flows related to inflow and infiltration. More details can be found in the Sanitary Sewage Collection System Annual Performance Report at https://www.peelregion.ca/wastewater/#reports.

4.14.4 Industrial Wastes

The Region's Wastewater Bylaw (53-2010) sets concentration limits for discharges to the sanitary sewer, which subsequently protects the WWTPs from industry impacts, and provides information on agreements and spills to the environment. The bylaw applies to the Industrial, Commercial, and Institutional (ICI) sectors as well as residences and establishes penalties for offences of up to $100,000 for businesses.

All ICI facilities are inspected by regional staff at a minimum once every 2 years, resulting in over 5,000 inspections being completed annually. The inspections are used to assess the discharges from the facility and its compliance with the bylaw as well as the effect on the wastewater collection and treatment systems. Upon discovery of a spill into the sanitary sewer, or notification from an industry of a release, WWTPs are notified so staff can implement protective actions.

5. Performance Management Programs

5.1 Ministry Inspections

Wastewater System inspections are performed periodically by the Ministry to ensure systems are operating as required and complying with the terms and conditions of their Approvals. Performance data is reviewed against the compliance objectives and limits. The inspections also verify that the Region meets sampling, testing and treatment standards and staff competency requirements. Additional inspections can be triggered through a variety of factors such as frequency of events or inconsistent system performance (e.g., increased number of spills or reportable incidents), in response to a complaint or concern, or as part of a follow-up from prior non-compliances.

There was no Ministry inspection of the G. E. Booth WWTP in 2022.

Appendix A – Summary of Tested Wastewater Parameter Information

Parameter	Parameter Information
Dissolved Oxygen (DO)	Amount of oxygen dissolved in water. It is essential for the survival of aquatic plants and animals. In the wastewater treatment process, DO is required by the microorganisms to break down the organic material present. A lower DO value suggests a greater amount of organic matter present in the sample.
Total Biochemical Oxygen Demand (BOD_5)	Amount of DO used by microorganisms to break down organic material present in a wastewater sample, measured as DO decrease over a 5-day period. A higher BOD_5 value means greater amount of organic matter present in the sample, which can cause deplete DO in receiving waters.
Carbonaceous Biochemical Oxygen Demand ($CBOD_5$)	Amount of DO needed by microorganisms to break down carbonaceous (carbon rich) organic material present in a wastewater sample over a 5-day period.
Alkalinity	Water's resistance to the effect of acids added to water.
Total Phosphorous (TP)	An essential nutrient used by microorganisms for growth. TP comes from a variety of sources including fertilizers, detergents, domestic wastewater, and wastewater from industrial processes. Excess phosphorus in waterbodies can promote algae blooms.
Total Suspended Solids (TSS)	Suspended particles (organic and inorganic material) present in the water sample. TSS can include sediment, sand, silt, plankton, and algae. High concentration of TSS can interfere with the disinfection process and can also lower the quality of the receiving waterbody.
Total Kjeldahl Nitrogen (TKN)	Sum of ammonia nitrogen and the amount of nitrogen present in organic form. High TKN can be toxic to aquatic life.
Total Ammonia Nitrogen (TAN)	The amount of ammonia in wastewater. Sources of ammonia include domestic, industrial, or agricultural pollution, primarily from fertilizers, animal and plant decomposition, and animal waste.
Nitrite, Nitrate	An intermediate nitrogen species in the cycle of nitrogen removal from wastewater.
pH	A measure of the alkalinity or acidity in wastewater, which can indicate chemical or industrial pollution.
Temperature	Temperature of the wastewater sample measured at the time of collection. Higher wastewater temperatures allow for more efficient treatment at biological treatment plants.
Sodium Hypochlorite	Liquid chlorine used for disinfection of treated wastewater. To minimize chlorine effects on the receiving waters, the effluent is dechlorinated before being released into Lake Ontario.
Sodium Bisulphite	Used to neutralize the chlorine present in final effluent after disinfection. This is done to minimize chlorine effects on the receiving waters.
E. coli	An indicator of fecal contamination in effluent. Most species of this bacteria are harmless to humans; however, some strains can be pathogenic (cause disease).

Appendix B – Frequently Asked Questions

1. Where does water go after it is used?

After you use water to wash dishes and clothes, brush your teeth, shower or flush the toilet, the used water (wastewater) that goes down your drains flows through a series of underground sewer pipes to the wastewater treatment plants.

The wastewater is treated to remove contaminants and kill disease-causing microorganisms before being discharged into the environment. The Region of Peel operates three wastewater treatment plants (WWTP): G.E. Booth WWTP and Clarkson WWTP, both discharging into Lake Ontario, and the Inglewood WWTP, discharging into the Credit River. These three plants serve the cities of Mississauga and Brampton and the Town of Caledon.

Click here for more information on how wastewater is treated.

2. Why am I experiencing a sewage odour outside my house?

The sewage odor outside your house could be from a variety of sources. It could be that the sewer is backed up close to your property. If your property is located close to a lake, algal blooms also cause odours. Other sources of odour might include: scheduled treatment plant maintenance coupled with prevailing winds, nearby farming activities, or odours from waste management facilities or industries.

If you are noticing odours near your property, please call the Region of Peel at 905-791-7800.

3. Why am I experiencing a sewage odour inside my house?

If you notice an odour of sewage coming from a drain in your house, it is recommended to pour a cupful of bleach into the drain, let it sit for 10-15 minutes and then rinse it down with plenty of water. If this does not resolve the odour problem, please call the Region of Peel at 905-791-7800 for further investigation.

4. What is the difference between a storm sewer and sanitary sewer?

Wastewater that goes down drains inside homes and buildings enters the sanitary sewer system, which sends it to a wastewater treatment facility for treatment before it is released to the environment. Sanitary sewer systems in Mississauga, Brampton and Caledon are maintained by the Region of Peel.

Rainwater and melting snow are called storm water. Stormwater enters storm grates on the road and enters the storm sewer pipes that run beneath the roadways. These pipes discharge the storm water to local waterways, like streams, creeks, and lakes. The majority of storm sewer is maintained by the local municipality – the cities of Brampton and Mississauga and the Town of Caledon. The Region of Peel maintains storm sewers on Regional roads.

Click here for more information about wastewater and storm water.

5. What happens to industrial wastewater?

Some companies treat their own wastewater and release it directly into the environment or into the Region of Peel sanitary sewer (wastewater collection system). Wastewater released into the sanitary sewer joins all other wastewater collected (from households and building drains) and flows to one of the wastewater treatment plants. Industrial wastewater can be hazardous or contain substances that may damage sewer infrastructure or upset the treatment process. Therefore, all wastewater released and all businesses that release it into Region of Peel sewers must comply with the Region of Peel's Sewer Use Bylaw (Wastewater Bylaw). To ensure compliance, industrial facilities are examined by inspectors from the Region's Environmental Control department. Approximately 6,000 inspections are completed each year.

6. What must not be disposed down the toilet or poured down the drain?

It is important to understand that what goes down the drain or the toilet may have negative impacts on the wastewater system and the environment. Fats, oils, and grease should never be poured down the drain because these materials are known to cling to pipe walls. Over time, their accumulation can build up to such high levels that the sewer can become blocked. Another reason to avoid disposing fats, oils, and grease into drains or toilets is that it is not effectively broken down during the wastewater treatment process. Instead, the Region of Peel recommends that edible household fats, oils and grease should be collected and properly disposed as per the **FOG disposal at home** instructions on this page. Click here to learn more about Peel's Community Recycling Centres.

It is also important not to dispose items down the toilet that could get stuck in or damage the sewer systems. Sticks, rags, paper towels, personal hygiene products, diapers, disposable wipes, household hazardous waste and pharmaceuticals should not be disposed by simply flushing down the toilet. Any unused or expired pharmaceuticals can be returned to your local pharmacy. For more information on how to properly dispose of items that damage the wastewater refer https://idontflush.ca/

7. What causes a sanitary sewer backup?

Most sewer backups occur when sewer pipes get blocked. Sewer pipes can become clogged with excess fats, oils, greases, food wastes, coffee grounds, hair, toilet paper, soap residue, or inappropriate materials being flushed down the toilet or drain. Even sanitary wipes that are labelled "flushable" will in fact clog pipes, sewers, and screens at the treatment plants. To help reduce sanitary sewer blockages and prevent backups, it is recommended to properly dispose of these items and other materials that can harden or settle within the sewer pipes.

Sanitary sewer backups can also occur when tree roots grow into or through sewer lines. These roots may be from trees that are outside your property boundaries. The only solution to this problem is to cut away the roots and then replace the pipeline.

If you notice a sewer backup in your home, call the Region of Peel at 905-791-7800 ext. 4409, or 1-888-919-7800 for residents in Caledon. If the problem area is determined to be on private property, there is a flat fee for the service call. Click here for more information.

8. How safe is the treated wastewater that is released into Lake Ontario?

To meet environmental compliance criteria in Ontario, all wastewater must be treated before being returned to the environment. The Region of Peel operates and maintains three wastewater treatment facilities, G.E. Booth, Clarkson, and Inglewood, under strict regulations and the effluent discharged into the environment must meet location-specific, provincial, and federal standards.

9. Which pipes are mine and which are the Region's responsibility?

Click here for more information about homeowner and regional responsibilities of wastewater infrastructure.

10. What is optional water/sewer line insurance program?

The pipes on the private side of the property line belong to the property owner. Sometimes these pipes may get damaged or blocked, which can result in costly plumbing bills. The Region of Peel endorses a voluntary pipe insurance program. Read more here:

Click here for more information on the water/sewer line insurance program.

Other sources for more information about wastewater and related issues:

Region of Peel working with you **Wastewater-related questions:** **Region of Peel** 10 Peel Centre Drive Brampton ON L6T 4B9 Phone: 905-791-7800 Ext. 4685 Website: https://peelregion.ca/wastewater/ E-mail: Publicworkscustserv@peelregion.ca	Region of Peel working with you **Water and Sanitary Sewer/Septic Protection Plans:** https://www.peelregion.ca/pw/water/SLWCfaqs.htm **Peel Wastewater Bylaw:** https://www.peelregion.ca/council/bylaws/2010s/2010/by-53-2010.htm
Ontario **Ministry of the Environment, Conservation & Parks** Public Information Centre Phone: 416-325-4000 Toll-Free: 1-800-565-4923 Web site: www.ontario.ca/environment	Canada **Environment and Climate Change Canada** Inquiry Centre Phone: 819-997-2800 Toll-Free:1-800-668-6767 Web Site: http://www.ec.gc.ca