



Queenston Wastewater Treatment Plant Annual Performance Report –Treatment Reporting Year: 2025

Table of Contents:

Queenston Wastewater Treatment Plant Annual Performance Report (QN-T)

Table of Contents:.....	2
List of Tables:.....	3
List of Figures:	3
QN-T-2 Wastewater Treatment Process Description.....	4
QN-T-3 Review of Plant Flows and Influent Sampling and Monitoring	5
Review of 2025 Plant Flows	5
Review of Influent Sampling and Monitoring Activities	7
Review of Final Effluent Sampling and Monitoring Activities.....	8
Effluent Quality Assurance Measurements and Control Measures	9
Deviations from Scheduled Monitoring Program.....	9
QN-T-4 Description of Operating Problems Encountered and Corrective Actions Taken.....	13
QN-T-5 Summary of Major Maintenance Activities and Capital Works.....	14
Summary of Maintenance Carried out on Major Equipment.....	14
Planned Capital Upgrades	14
Summary and Update of Notice of Modifications Completed	14
Proposed Works – Status Update	14
QN-T-6 Summary Calibration Activities	15
Flow Meter Calibration – Influent and Effluent	15
Effluent Monitoring Equipment Calibration/Verification	15
QN-T-7 Solids Handling.....	16
Processed Organics Received.....	16
Volumes of Sludge Generated and Removed From Site	16
Sludge Quality Monitoring.....	16
QN-T-8 Complaints.....	17
QN-T-9 Bypasses, Overflows, Other Situations Outside Normal Operating, Spills and Abnormal Discharge Events	17
Bypasses and Overflows.....	17
Situations Outside of Normal Operating Conditions.....	19
Spills	19
Abnormal Discharges.....	19
QN-T-10 Summary of Efforts to Achieve Conformance with F-5-1 and/or F-5-5	20
Summary of Efforts – Procedure F-5-1 – Secondary Treatment Equivalent	20
Summary of Efforts – Procedure F-5-1 – Sewage Bypass/Overflow from Nominally Separated System	20
Industrial Waste	20

In 2024, an update to the Sewer Use By-law was approved by Council. Sewer Use By-law 2024-51 is still in place ensuring better protection of Niagara Region wastewater

infrastructure	21
Summary of Efforts – Procedure F-5-5	21
Public Reporting of Bypasses and Overflows	21

List of Tables:

Table QN-T-1: Table of Queenston WWTP 2025 Treated Flows	5
Table QN-T-2: Evaluation of Final Effluent sample results to ECA objectives and compliance limits	8
Table QN-T-3: Table of 2025 sampling schedule deviations	10
Table QN-T-4: Annual Summary of Plant Flows, Influent and Effluent Sampling and Monitoring Results.....	11
Table QN-T-5: Summary of Flow Meter Calibration.....	15
Table QN-T-6: Summary of Calibration/Verification of Effluent Monitoring Equipment.....	15
Table QN-T-7: Summary of Sludge Removed from Site 2025.....	16
Table QN-T-8: Annual Summary of Overflow Events by Month.....	18
Table QN-T-9: 2025 Queenston WWTP Overflow Sampling Results	18
Table QN-T-10: Summary of spills occurring at the Queenston WWTP during the reporting year.....	19

List of Figures:

Figure QN-T-1: Graph displaying the Monthly Average Daily Flow Rate in MLD.....	6
Figure QN-T-2: Figure of monthly plant loadings to the Queenston WWTP for TBOD, TSS, TKN and TP (in kg/d) for the period 2023 to 2025.....	7

QN-T-2 Wastewater Treatment Process Description

The Queenston (Niagara-on-the-Lake) Wastewater Treatment Plant (WWTP) is located at 30 Front Street in the Town of Niagara-on-the-Lake and provides wastewater treatment to the village of Queenston. The Queenston WWTP is a class II modified Ludzack-Ettinger treatment facility and has been designed to treat an average daily flow (ADF) of 500 cubic meters per day (m³/d). This facility has peak design flow rate of 1,700 m³/d.

The Queenston WWTP operates under the following MECP approvals:

Environmental Compliance Approval (Sewage): 0371-93YM2L, Issued February 22, 2013

Environmental Compliance Approval (Air): 5305-7G6L32, Issued July 3, 2008

The Queenston WWTP uses the following processes to treat wastewater:

- Raw Influent Pumping
- Screening
- Grit Removal
- Phosphorus Removal
- Secondary Treatment
- Disinfection (Chlorination/Dechlorination)
- Solids Handling (Storage and Transportation)

Raw Influent Pumping: Wastewater from the collection system enters the facility at the raw sewage wet well chamber. This chamber is equipped with raw sewage pumps. The wet well provides a low point for the collection system to discharge to while the raw sewage pumps lift the wastewater to allow the remainder of the treatment process to occur by gravity.

Screening: Wastewater flows through a bar screen to remove rags and large debris that could harm pumps and process equipment downstream. Screenings are sent for disposal in landfill.

Grit Removal: Grit channels slow the speed of the wastewater allowing heavy suspended material such as sand and small stones (grit) to settle towards the bottom while lighter organic particles are kept in suspension and pass through the tank with the wastewater for further treatment. The grit is collected and sent to landfill for disposal.

Phosphorus Removal: A coagulant, ferric sulphate, is added to the treatment process to aid in phosphorus and suspended solids removal.

Secondary Treatment:

Aeration Tank: Aeration tanks equipped with air bubble diffusers oxygenate the wastewater to encourage microorganisms (or “bugs”) to remove dissolved and suspended organics and nutrients from the wastewater. Return Activated Sludge (RAS); a mixture of bugs and

wastewater, is recycled back through the aeration process to ensure enough bugs are present to provide adequate wastewater treatment.

Secondary Clarifier: The secondary clarifier receives effluent from the aeration tanks. The flow of wastewater slows down and the solids settle quickly as Activated Sludge. The clear effluent on top discharges over a weir for further treatment. A portion of the activated sludge collected on the bottom of the clarifier is pumped back to the front of the aeration tanks to ensure a healthy microbial population (RAS). Any excess or Waste Activated Sludge (WAS) is removed from the process by pumping to the solids handling treatment process.

Disinfection (chlorination/dechlorination):

Chlorine in the form of liquid sodium hypochlorite is added into the effluent stream for pathogen control during the chlorination season from April 1st to October 31st. Adequate contact time is provided as the effluent flows through the chlorine contact chambers. As chlorine can be toxic to aquatic species, disinfected effluent is dechlorinated with a dechlorinating agent before being discharged to the Niagara River.

Solids Handling:

Waste Activated Sludge Storage: Waste activated sludge from the secondary treatment process is transferred to a storage tank for holding until it can be hauled to another WWTP facility for further treatment and processing.

QN-T-3 Review of Plant Flows and Influent Sampling and Monitoring

Review of 2025 Plant Flows

Table QN-T-1 below outlines the volume of sewage treated at the Queenston WWTP during the reporting year.

Table QN-T-1: Table of Queenston WWTP 2025 Treated Flows

Flow Statistic	Value
Design Average Daily Flow (ML/d)	0.500
Design Peak Flow Rate - Dry Weather (ML/d)	1.700
Total Volume Processed (ML)	49.111
Annual Average Daily Flow (MLD)	0.135
% Annual Average Daily Flow Utilization	27%
% Increase/Decrease over prior year	-40%

Niagara Region – Queenston Wastewater System
2025 Annual Performance and Summary Report - Treatment

Reviewing the treated flows in 2025, it was observed that, on average, the plant utilizes 27% of its design Average Daily Flow. This indicates that the facility has the hydraulic capacity to meet the needs of the collection system with room for additional flows that may be added from development. Where the average becomes greater than 80%, plant expansion should be considered.

Daily flows to the plant were reviewed. In 2025, there was one (1) instance where the flow to the plant was greater than the design Average Daily Flow, amounting to approximately 0% of the year.

A review of the monthly average daily flow rate for the prior 10-year period was completed. This can be observed below in Figure QN-T-1 below. This can be observed below in Figure QN-T-1 below. The closure of businesses and tourist attractions because of the COVID-19 Pandemic resulted in lower flows in 2020 and 2021. The trend appeared to be returning to typical flow observed prior to the pandemic however, it was observed that average daily flow rates have again been in decline over the past 3 years. The Town of Niagara-on-the-Lake has indicated that trenchless lining has been implemented in sections of the Queenston sewer shed to address potential sources of inflow and infiltration likely resulting in the observed decreased in flow rates. Spikes align with wet weather seasons.

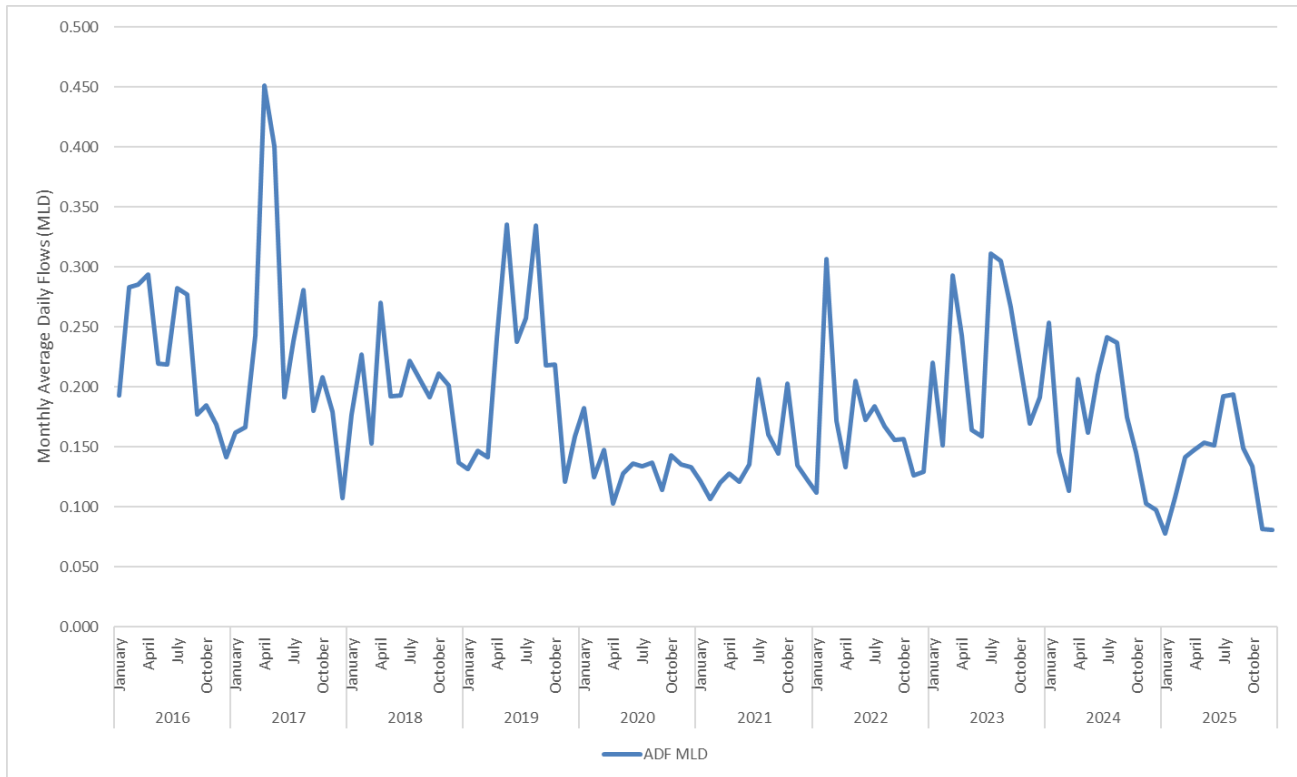


Figure QN-T-1: Graph displaying the Monthly Average Daily Flow Rate in MLD

Review of Influent Sampling and Monitoring Activities

In 2025, there were 105 samples of influent collected and tested. An annual summary of influent sampling can be observed in Table QN-T-4.

Although the volume of sewage is an important consideration for the effective operation of a wastewater treatment plant, another important factor to monitor is plant loading. Plant loading displays if the strength of the sewage received at the plant is getting stronger or weaker. Stronger sewage may impact the amount of sewage the plant can treat effectively.

Plant loading is calculated by measuring the average strength of a pollutant per liter of influent sewage and multiplying it by the average volume of sewage received. This is generally displayed as kilograms of pollutant per day or kg/d. Below in Figure QN-T-2, is a graph depicting four (4) commonly monitored pollutant loadings to the plant for the period of 2023-2025.

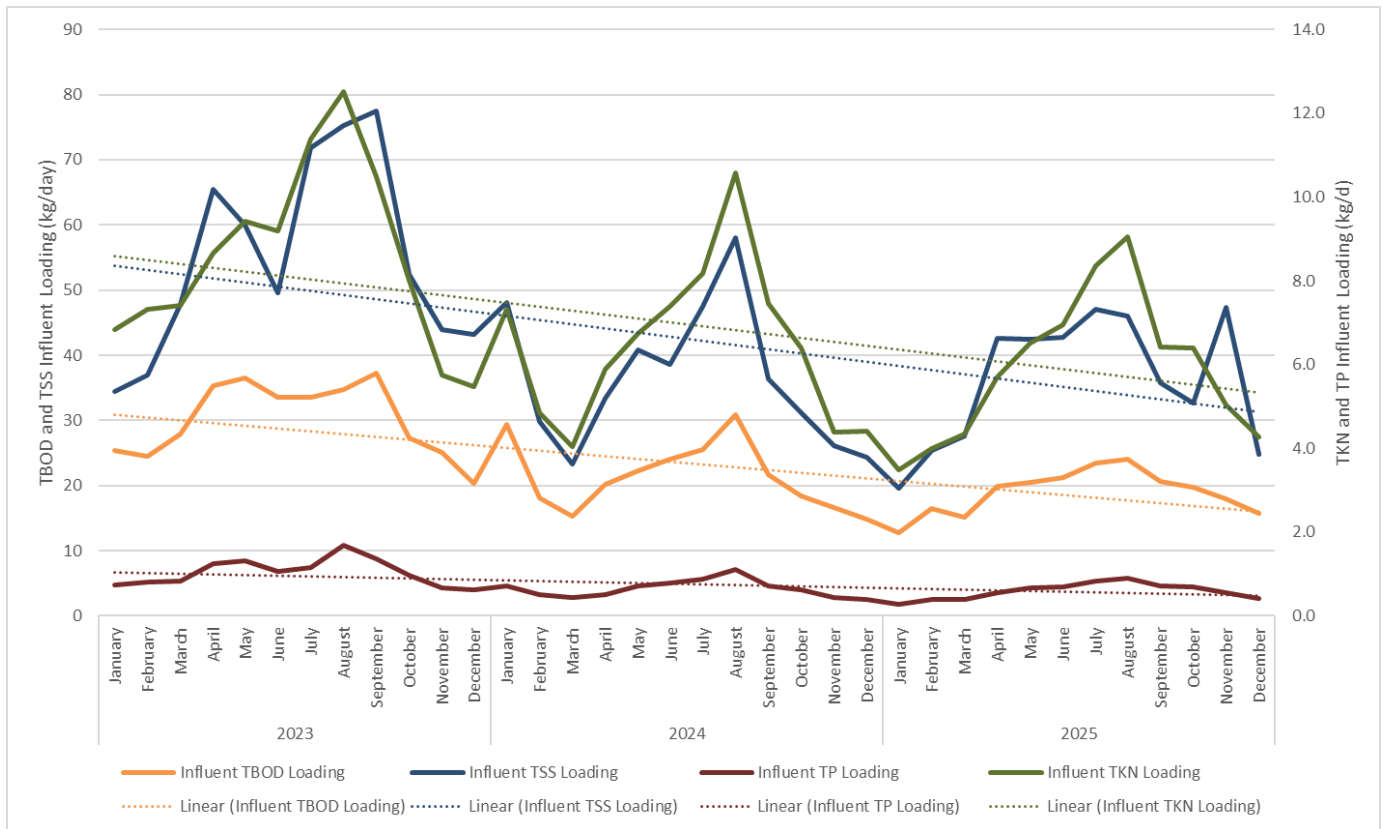


Figure QN-T-2: Figure of monthly plant loadings to the Queenston WWTP for TBOD, TSS, TKN and TP (in kg/d) for the period 2023 to 2025.

Reviewing the calculated loadings for TBOD, TSS, TKN and TP for the past three (3) years there is a decreasing trend for all four parameters. The decreased loadings are likely related to the decrease in average daily flows over the same period. These parameters will continue to

be monitored to see if the trend persists, however a decreasing trend does not negatively impact operations.

Review of Final Effluent Sampling and Monitoring Activities

In 2025, there were 105 samples of final effluent were collected and tested. Individual as well as monthly average results are reviewed and compared to the objective and compliance limits stated in the facility ECA. Table QN-T-2 below summarizes the number of monthly objective and compliance limit exceedances at the Queenston WWTP in the reporting year.

Table QN-T-2: Evaluation of Final Effluent sample results to ECA objectives and compliance limits

Pollutant	ECA Monthly Concentration Objective	ECA Monthly Concentration Limit	Number of Monthly Objective Concentration Exceedances	Number of Monthly Limit Concentration Exceedances	ECA Annual Average Loading Limit	Number of Annual Loading Limit Exceeded
pH ¹	6.0-9.5	6.0-9.5	0	1	-	-
Carbonaceous Biological Oxygen Demand (CBOD)	15 mg/L	25 mg/L	0	0	12.5 kg/d	0
Total Suspended Solids (TSS)	15 mg/L	25 mg/L	2	1	12.5 kg/d	0
Total Phosphorus (TP)	1.0 mg/L	-	0	0	-	-
Total Residual Chlorine (TRC) ²	0.50 mg/L	-	0	-	-	-
E-Coli (<i>geomean</i>) ³	200 CFU/100 mL	200 CFU/100 mL	0	0	-	-

The Queenston WWTP did not meet all ECA compliance limits for the 2025 reporting year. A single sample pH exceedance occurred on January 31, 2025. The monthly average limit for Total Suspended Solids (TSS) was not met in April. Full details regarding the non-compliances are described in full in section QN-T-4 below.

¹pH must meet objectives/limits at all times (inclusive)

² Total Residual Chlorine monitoring only required April 01 to October 31 inclusive

³ E.Coli monitoring only required April 01 to October 31 inclusive

Queenston WWTP had one (1) monthly objective exceedance for Total Suspended Solids (TSS) in February. This objective exceedance was caused by nitrification and poor settling of the activated sludge in the final clarifier leading to solids carryover in the final effluent.

A review of individual results against ECA objectives was also complete. Below summarizes the percentage of individual samples that were over the ECA objective:

- CBOD – 2%
- TSS – 11%
- TP – 1%
- E.Coli – 3%

Final Effluent sample results did not exceed the ECA objective greater than 50% of the time.

The plant continues to effectively treat all wastewater received for treatment. An annual summary of monthly average final effluent sample results can be observed in Table QN-T-4 below.

Effluent Quality Assurance Measurements and Control Measures

To ensure Queenston WWTP continues to produce a high-quality effluent the following measures have been implemented:

- Development and implementation of a Wastewater Quality Management System (WWQMS) program
 - This program promotes an environment of continuous improvement for all staff impacting the quality of wastewater
- Development of an ISO 14001:2015 Environmental Management System
- Compliance samples are analyzed by an ISO 17025:2017 accredited laboratory unless sample results are required to be collected in the field at the time of sampling
- Standard Operating Procedures (SOPs) are in place to support proper sampling and field measurements
- A compliance sampling schedule is created each year to ensure regulatory requirements are being met, as a minimum
- Equipment used in the monitoring and measurement of Final Effluent quality are calibrated annually

Deviations from Scheduled Monitoring Program

Compliance sampling activities at the Queenston WWTP follow a scheduled monitoring program to ensure all provincial and federal requirements are met. A schedule is prepared for the upcoming year and is submitted to the MECP as part of the annual reporting requirement.

Niagara Region – Queenston Wastewater System
2025 Annual Performance and Summary Report - Treatment

In 2025, seven (7) deviations from the scheduled sampling days occurred. Table QN-T-3 below provides the instances where a deviation occurred and a reason for the deviation.

The 2026 sampling schedule is available upon request.

Table QN-T-3: Table of 2025 sampling schedule deviations

Sampling Date Deviation	Sample Type(s)	Reason
2025-01-27 2025-02-27 2025-03-04 2025-03-06	Influent, Final Effluent	Autosampler malfunction. No sample available.
2025-05-22	Influent, Final Effluent	Sampler malfunction. Sample submitted the following day.
2025-04-10	Influent, Final Effluent, E.Coli	Effluent flow to the environment was limited for a portion of the day resulting in a sample that was not representative of typical plant discharge.
2025-10-14	E. Coli	Sample submitted the following day.

2025 Annual Performance and Summary Report - Treatment

Table QN-T-4: Annual Summary of Plant Flows, Influent and Effluent Sampling and Monitoring Results

Measured Parameter	January	February	March	April	May	June	July	August	September	October	November	December	Total / Average	Total Samples Collected
Influent - Monthly Average TSS (mg/L)	250	235	195	289	276	282	245	238	240	243	578	306	281	
Number of Influent TSS Samples	9	8	9	9	8	8	10	8	9	9	9	9		105
Influent - Monthly Average TBOD5 (mg/L)	164	152	107	135	133	140	122	124	139	147	219	194	148	
Number of Influent TBOD5 Samples	9	8	9	9	8	8	10	8	9	9	9	9		105
Influent - Monthly Average TP (mg/L)	3.6	3.6	2.8	3.8	4.3	4.5	4.3	4.7	4.8	5.1	6.8	5.2	4.5	
Number of Influent TP Samples	9	8	9	9	8	8	10	8	9	9	9	9		105
Influent - Monthly Average TKN (mg/L)	44.68	36.91	30.61	38.71	42.26	45.83	43.55	46.83	43.08	47.59	61.36	53.00	44.53	
Number of Influent TKN Samples	9	8	9	9	8	8	10	8	9	9	9	9		105
Total Plant Flows (ML)	2.423	3.031	4.388	4.419	4.770	4.550	5.949	5.996	4.463	4.162	2.456	2.504	49.111	
Daily Average (MLD)	0.078	0.108	0.142	0.147	0.154	0.152	0.192	0.193	0.149	0.134	0.082	0.081	0.135	
Maximum Flow (ML)	0.147	0.301	0.352	0.712	0.304	0.255	0.244	0.252	0.227	0.200	0.139	0.328	MAX	0.712
Minimum Flow (ML)	0.064	0.068	0.083	0.078	0.102	0.117	0.150	0.130	0.119	0.103	0.060	0.051	MIN	0.051
Final Effluent - Monthly Average TSS (mg/L)	12.6	15.6	14.6	37.4	6.1	9.5	7.9	7.9	4.8	6.8	11.7	4.1	11.6	
Final Effluent - Average Daily TSS Loading (kg/d)	1	2	2	6	1	1	2	2	1	1	1	0	2	
Number of Final Effluent TSS Samples	9	8	9	9	8	8	10	8	9	9	9	9		105
Final Effluent - Monthly Average CBOD5 (mg/L)	4.0	4.1	5.2	6.6	4.0	8.5	4.2	4.0	4.0	4.0	4.0	4.0	4.7	
Final Effluent - Average Daily CBOD5 Loading (kg/d)	0	0	1	1	1	1	1	1	1	1	0	0	1	
Number of Final Effluent CBOD5 Samples	9	8	9	9	8	8	10	8	9	9	9	9		105
Final Effluent - Monthly Average TP (mg/L)	0.27	0.43	0.39	0.76	0.26	0.26	0.30	0.43	0.36	0.41	0.34	0.29	0.38	
Final Effluent - Average Daily TP Loading (kg/d)	0.02	0.05	0.06	0.11	0.04	0.04	0.06	0.08	0.05	0.06	0.03	0.02	0.05	
Number of Final Effluent TP Samples	9	8	9	9	8	8	10	8	9	9	9	9		105
Final Effluent - Monthly Average TKN (mg/L)	1.22	1.95	2.01	3.83	2.03	1.34	1.92	1.38	1.28	1.31	1.23	1.52	1.75	
Number of Final Effluent TKN Samples	9	8	9	9	8	8	10	8	9	9	9	9		105
Final Effluent - Monthly Average NH3 (mg/L)	0.17	0.22	0.43	0.90	0.66	0.18	0.83	0.21	0.22	0.10	0.09	0.30	0.36	
Number of Final Effluent NH3 Samples	9	8	9	9	8	8	10	8	9	9	9	9		105
Final Effluent - Monthly Average NO3 (mg/L)	18.54	15.13	7.42	9.41	10.51	13.74	8.84	16.15	13.99	16.12	14.12	10.78	12.90	
Number of Final Effluent NO3 Samples	9	8	9	9	8	8	10	8	9	9	9	9		105
Final Effluent - Monthly Average NO2 (mg/L)	0.43	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	
Number of Final Effluent NO2 Samples	9	8	9	9	8	8	10	8	9	9	9	9		105
Final Effluent - Monthly Geomean E.Coli (cfu/100mL)				6	5	2	5	4	3	3			4	
Number of Final Effluent E.Coli Samples				8	9	8	10	8	9	9				61
Final Effluent - Monthly Average TRC (mg/L)				0.00	0.00	0.00	0.00	0.00	0.00	0.00			0.00	

2025 Annual Performance and Summary Report - Treatment

Measured Parameter	January	February	March	April	May	June	July	August	September	October	November	December	Total / Average	Total Samples Collected
Number of Final Effluent TRC Samples				30	31	30	31	31	30	31				214
Final Effluent - Monthly Average Temperature (°C)	8.29	7.46	9.78	12.62	15.46	18.06	21.02	21.44	20.52	17.92	14.13	8.66	14.61	
Number of Final Effluent Temperature Samples	9	8	9	9	8	8	10	8	9	9	9	9		105
Final Effluent - Monthly Average pH	6.70	6.59	6.93	6.69	6.68	6.55	6.43	6.62	6.71	6.44	6.79	6.91	6.67	
Number of Final Effluent pH Samples	9	8	9	9	8	8	10	8	9	9	9	9		105

QN-T-4 Description of Operating Problems Encountered and Corrective Actions Taken

Total Suspended Solids Compliance Limit Exceedance – April 2025

On April 2 and April 3, a significant rainfall event occurred. Flows to the small Queenston plant were higher than the typical flow. A sample of the effluent was collected during this period as scheduled in the compliance sampling schedule. The sample collected during the wet weather/high flow event had a TSS result of 274 mg/L. This is not typical of effluent quality at the Queenston WWTP and is suspected to be caused by solids carryover from the final clarifier into the final effluent based on visual observation of the sample.

All other compliance effluent samples for the month of April were well within the ECA limit for TSS.

During this wet weather event, two sewage lift pumps (SLPs) came on simultaneously due to programming error. Plant flows exceeded the peak design flow rate of 1,700 m³/d, resulting in solids carryover. In response to this event, the ability to run two pumps simultaneously has been rectified by SCADA technicians and the pumps have been interlocked allowing only one SLP to run at a time. One SLP can pump the ECA design peak flow rate of 1,700 m³/d.

Single Sample pH Compliance Limit Exceedance – January 31, 2025

pH is required by the facility ECA to be between the values of 6.0 and 9.5 at all times. On January 31, 2025, operations staff recorded a field pH of 5.94. Investigation was initiated to identify the source of the low pH values.

Dissolved oxygen (DO) levels in aeration cells #1 and #2 were noted to be significantly higher than typically observed. It is believed that the higher DO levels in aeration were encouraging nitrification to occur. Since nitrification utilizes alkalinity in the wastewater, this would lower the pH of the plant effluent.

Aeration blower speed was decreased to reduce the DO in each cell. Wasting from aeration was also increased to reduce and maintain consistent sludge levels. Additionally, operations staff added small quantities of magnesium oxide daily to the aeration zone to increase the pH to levels greater than 6.0. Chemical addition was continued until the effluent pH was stable and in compliance with the ECA limits.

QN-T-5 Summary of Major Maintenance Activities and Capital Works

Summary of Maintenance Carried out on Major Equipment

Niagara Region works to keep wastewater infrastructure in a state of good repair. Maintenance activities completed include regular preventative maintenance (PM) activities and normal and emergency equipment repair or replacement. Where a substantial amount of upgrade is required, this work is carried out under the capital works program.

Below is a summary of normal and emergency repairs carried out on major equipment at the Queenston WWTP:

- Main Gate Replacement
- Return Activated Sludge Pump #1 Rebuild
- Raw Sewage Pump #2 Rebuild
- Purchase of spare Raw Sewage Pump

This list does not include PM activities. PMs are completed and tracked in a computerized maintenance management system. PMs completed during the reporting year are available upon request.

Planned Capital Upgrades

A sustainability upgrade is occurring at the Queenston WWTP. An inspection and survey of the clarifier is to be completed in 2026. An investigation into methods of bypassing the clarifier tank during installation of a new bridge clarifier assembly is currently underway.

Summary and Update of Notice of Modifications Completed

Through the facility ECA, the MECP has given System Owners the ability to complete low risk changes to a treatment plant without requiring approval from the MECP. These modifications are documented on a Notice of Modification form and are signed off by the Owner or delegate of the system. Any pre-authorized modifications must be reported on annually to the MECP.

During the reporting year 2025, no Notices of Modification were completed.

No Notice of Modification forms were completed in previous reporting years. No status update is required.

Proposed Works – Status Update

There were no Proposed Works to be reported on for the 2025 reporting period.

QN-T-6 Summary Calibration Activities

Flow Meter Calibration – Influent and Effluent

Flow meters measuring flows discharging to the environment are calibrated at minimum, once per calendar year. Below in Table QN-T-5 provides a summary of flow meter calibration.

Table QN-T-5: Summary of Flow Meter Calibration

Meter Name	Date Calibrated	Comments
Queenston Final Effluent Meter	2025-07-02	Pass
Queenston Final Effluent Meter	2025-11-05	Pass

Calibration certificates are available upon request.

Effluent Monitoring Equipment Calibration/Verification

It is a requirement to calibrate, or, where unable to calibrate, verify equipment that is used to measure effluent quality.

Some effluent monitoring equipment calibration or verification is completed daily or as used by operations staff such as pH meter calibration or verification of the Total Residual Chlorine colorimeter.

Once annually, a third-party contractor performs calibration or verification on all effluent monitoring equipment. A summary of third-party calibration/verification activities are available in Table QN-T-6 below.

Table QN-T-6: Summary of Calibration/Verification of Effluent Monitoring Equipment

Equipment Description	Date Calibrated	Comments
pH Meter	2025-09-16	Passed
Chlorine Portable Pocket Colorimeter (asset 41154)	2025-09-16	Passed
Chlorine Portable Pocket Colorimeter (asset 37666)	2025-09-16	Passed

Calibration certificates are available upon request.

QN-T-7 Solids Handling

Processed Organics Received

One (1) load, 43 m³, of mixed liquor was shipped from the Anger Avenue WWTP to the Queenston WWTP in June 2025. This was to improve the plant biomass and settling of solids in the final clarifier.

Volumes of Sludge Generated and Removed From Site

Solids removed from the treatment process are stored and transported from site for further processing and beneficial re-use. All sludge removed from the Queenston WWTP is taken to another WWTP for further processing and anaerobic digestion. Table QN-T-7 provides a summary of 2024 and 2025 sludge volumes removed from site.

Table QN-T-7: Summary of Sludge Removed from Site 2025

Month	2025 Volume Sludge Hauled (ML)	Prior Year Volume Sludge Hauled (ML)
January	0.217	0.217
February	0.173	0.130
March	0.130	0.173
April	0.347	0.173
May	0.217	0.173
June	0.390	0.130
July	0.434	0.130
August	0.390	0.304
September	0.304	0.260
October	0.260	0.260
November	0.217	0.173
December	0.217	0.130
TOTAL	3.295	2.255

The volume of sludge hauled increased by 46% in 2025. The increase in 2025 is likely due to operational changes made to wasting rates.

No changes are anticipated for sludge handling in 2026 at the Queenston WWTP.

Sludge Quality Monitoring

Sludges are sampled and analyzed bi-weekly to meet regulatory requirements of the Garner Road Biosolids Facility ECA and maintain our ability to beneficially re-use biosolids. Results

are trended and compared to Nutrient Management Act (NMA) limits. Where a trend is detected, investigations are initiated to identify potential sources of the pollutant and correct any issue identified.

The Queenston WWTP does not directly haul sludge to Garner Road Biosolids Facility. Queenston WWTP does not have an on-site digester for storage and treatment of solids. Instead, sludge generated at this WWTP is directed to neighbouring wastewater treatment plants so that it may receive further treatment and processing.

As a result, no sludge samples are collected from Queenston WWTP.

QN-T-8 Complaints

No complaints were received for the Queenston WWTP in 2025.

QN-T-9 Bypasses, Overflows, Other Situations Outside Normal Operating, Spills and Abnormal Discharge Events

Bypasses and Overflows

There were no overflow events at the Queenston WWTP in 2025. This facility normally does not overflow. Table QN-T-8 provides a monthly breakdown of overflow events occurring at the Queenston WWTP during the reporting period. A complete listing of individual events is available upon request.

Niagara Region – Queenston Wastewater System
2025 Annual Performance and Summary Report - Treatment

Table QN-T-8: Annual Summary of Overflow Events by Month

Month	Number of Overflow Events	Total Volume (ML)
January	0	0.000
February	0	0.000
March	0	0.000
April	0	0.000
May	0	0.000
June	0	0.000
July	0	0.000
August	0	0.000
September	0	0.000
October	0	0.000
November	0	0.000
December	0	0.000
Total	0	0.000

Overflows are sampled and submitted for analysis. Results are shown in Table QN-T-9 below.

Table QN-T-9: 2025 Queenston WWTP Overflow Sampling Results

Date	CBOD (mg/L)	Total Suspended Solids (mg/L)	Phosphorus (total) (mg/L)	Total Kjeldahl Nitrogen (mg/L)	Ammonia as N (mg/L)	Nitrate (mg/L)	Nitrite (mg/L)
No bypass or overflow events occurred.							

Situations Outside of Normal Operating Conditions

The MECP defines “Normal Operating Conditions” as when all unit process(es), excluding Preliminary Treatment System, in a treatment train is operating within its design capacity.

The plant did not operate outside of Normal Operating Conditions during the reporting year.

Spills

Niagara Region strives to maintain and operate wastewater infrastructure so spills to the environment do not occur. However, circumstances may arise and a spill occurs due to equipment malfunction, failure or other reasons. Occasionally, a planned spill may be required in order to safely complete required maintenance to critical equipment. In the event that this is necessary, approval from the MECP is obtained in advance.

All spills are reported to the MECP Spills Action Centre upon discovery. Spills are investigated and written reports are submitted to the MECP and Environment and Climate Change Canada as required by legislation. Below in Table QN-T-10 summarizes spills that occurred at the Queenston WWTP in 2025.

Table QN-T-10: Summary of spills occurring at the Queenston WWTP during the reporting year.

Spill Date	MECP Incident Number	Short Description of Spill	Link to Public Spill Report
No spills occurred in 2025			

Abnormal Discharges

An abnormal discharge is a discharge to the environment that is abnormal in quality or quantity. Final effluent containing higher than required levels of suspended solids was discharged to the environment in April 2025. This incident was covered in detail in section QN-T-4 above. This incident was verbally reported to the local district MECP office followed by the submission of a written report.

QN-T-10 Summary of Efforts to Achieve Conformance with F-5-1 and/or F-5-5

Summary of Efforts – Procedure F-5-1 – Secondary Treatment Equivalent

Procedure F-5-1 states wastewater treatment facilities are to provide treatment of wastewater to a minimum of secondary treatment equivalence. This means the WWTP should be designed to meet objectives of 15 mg/L for CBOD and TSS and 1 mg/L for TP.

As demonstrated above in section QN-T-2 and Table QN-T-4, Queenston achieved effluent quality that met or exceeded design objectives. The Final Effluent annual average quality achieved in 2025 was equivalent with the MECP design objectives for advanced treatment plants. The observed annual average for CBOD was less than 5 mg/L, the observed annual average for TSS was 11.6 mg/L, while the annual average TP concentration of the Final Effluent was less than 0.4 mg/L.

Summary of Efforts – Procedure F-5-1 – Sewage Bypass/Overflow from Nominally Separated System

Procedure F-5-1 states that bypasses and overflows from nominally separated systems are not allowed except in emergency situations. Emergency situations include protection from basement flooding, preventing damage to WWTP equipment or pumping stations or to prevent treatment process washout.

The Queenston WWTP has adequate capacity to fully treat all flows received to the WWTP and is not required to bypass or overflow during wet weather. However, it is noted that high flow conditions occur during wet weather indicating inflow and infiltration in the system. Being a two-tier system, Niagara Region works closely with the Town of Niagara-on-the-Lake to reduce inflow and infiltration. Niagara Region participates in a cost sharing strategy with lower tier municipalities to fund overflow reduction projects. In 2025, Niagara Region had an approved budget totaling \$4.0M for the overflow reduction cost sharing program. No projects were included for cost sharing with the Town of Niagara-on-the-Lake for the Queenston collection system.

Industrial Waste

Industrial waste can contain material that can have negative impacts on collection system infrastructure as well as the wastewater treatment process itself. Upsets to the treatment process can cause a plant to become non-compliant with ECA objectives and limits. To protect our infrastructure, the Niagara Region has a Sewer Use By-law in place. Environmental

Enforcement Officers conduct industry inspections, sampling and monitoring of industrial discharges on a routine basis to ensure that they meet the Sewer Use By-law limits.

In 2024, an update to the Sewer Use By-law was approved by Council. Sewer Use By-law 2024-51 is still in place ensuring better protection of Niagara Region wastewater infrastructure.

Summary of Efforts – Procedure F-5-5

The MECP Procedure F-5-5 applies to combined sewage systems. The Queenston wastewater collection system is considered nominally separated. This procedure does not apply.

Public Reporting of Bypasses and Overflows

Niagara Region reports all [bypass and overflow events](#) publicly on the Niagara Region website (<https://www.niagararegion.ca/living/sewage/CSO/Reporting/CSOLocations.aspx>)

Niagara Region updates the data on recent overflows four times a year and displays any overflows that may have occurred in the past 12 months.

A [listing of overflow data back to 2008](#) is available through the Niagara Open Data website (<https://niagaraopendata.ca/dataset/combined-sewage-overflow>)

A new public tool is now available that shows bypass and overflow status in near real time. It includes [a map of overflow locations](#) and their current status. The status shows if an overflow is happening now or if one occurred in the past 48 hours. This tool can help people make informed decisions about recreational water use.

(https://experience.arcgis.com/experience/76c72e893f93447c87e6ff717f78556d#data_s=id%3ADataSource_1-1922f276303-layer-1-0%3A37)