Port Dalhousie Wastewater Treatment Plant
Annual Performance Summary Report
Treatment and Collection
Reporting Year: 2025

Niagara Region

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PD-T-1 Wastewater Treatment Process Description

The Port Dalhousie Wastewater Treatment Plant (WWTP) is located at 40 Lighthouse Road in the City of St. Catharines and provides wastewater treatment to the City of St. Catharines, and portions of the City of Thorold. The Port Dalhousie WWTP is a class IV conventional activated sludge treatment facility and has been designed to fully treat all flows up to 122,700 m^3/d.

The Port Dalhousie WWTP operates under the following Ministry of Environment, Conservation and Parks (MECP) approvals:

Environmental Compliance Approval (ECA) - Sewage: 8135-B8XS6U, Issued June 19, 2019
Environmental Compliance Approval (ECA) - Air: 8005-D8KK6X, Issued January 13, 2025

The Port Dalhousie WWTP uses the following processes to treat wastewater:

- Imported Sewage Receiving
- Screening
- Grit Removal
- Primary Treatment
- Phosphorus Removal
- Secondary Treatment (Aeration and Settling)
- Disinfection (Chlorination and Dechlorination)
- Solids Handling – sludge digestion and transportation
- Storm Treatment

Imported Sewage Receiving Station: To provide service to Niagara Region residents outside the wastewater servicing area, the Port Dalhousie WWTP accepts imported sewage from commercial haulers. Receiving stations are situated to ensure all imported sewage receives full treatment.

Screening: Mechanically cleaned screens remove rags and large debris that could harm pumps and process equipment. Screenings are sent for disposal in landfill.

Grit Removal: Grit tanks equipped with coarse bubble diffusers are used to remove grit from wastewater. Heavy suspended material such as sand and small stones (grit) is settled to the bottom of the tanks while lighter organic particles are kept in suspension and pass through the tanks for further treatment. The grit removed is dewatered for landfill disposal.

Primary Treatment: Primary clarifiers are large tanks that allow the incoming wastewater to slow down. The slower speed allows heavier solids to fall from the wastewater to the bottom of the tank. Sludge collected at the bottom of the primary clarifiers is removed and sent to the solids handling process.

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

Secondary Treatment:

Aeration Tank: Large tanks are equipped with air diffusers to add fine bubbles into the wastewater. This oxygen-enriched environment encourages microorganisms (or “bugs”) to remove dissolved and suspended organics and nutrients. Activated sludge is returned to the aeration process to ensure enough bugs are present to provide adequate wastewater treatment.

Secondary Clarifiers: Secondary clarifiers receive effluent from the aeration tanks which separates the microorganism population and remaining solids. Solids settle as activated sludge on the bottom of the clarifier while a clean effluent flows from the clarifiers to be disinfected and discharged to the environment. 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. Excess activated sludge is ‘wasted’ or removed from the process and sent to the primary clarifiers for thickening.

Disinfection (chlorination/dechlorination):

Chlorine in the form of liquid sodium hypochlorite is added into the effluent stream for pathogen control from April 1 to October 31 each year. Adequate contact time is provided by the chlorine contact chamber. As chlorine can be toxic to aquatic species, disinfected effluent is dechlorinated with a sodium bisulphite solution before being discharged to the lower Twelve Mile Creek.

Solids Handling

Anaerobic Digestion: Sludge from the primary clarifiers is pumped to one of three (3) primary anaerobic digesters, which overflow into one (1) secondary digester for thickening. Anaerobic digestion allows a further breakdown of pollutants and pathogens in the collected sludge. The digested sludge is transported from site for further treatment such as land application or dewatering at the Garner Road Biosolids Facility.

Storm Treatment: Flows greater than 122,700 m^3/d are diverted from the treatment plant to a storm treatment system. Storm flows are screened, chlorinated and dechlorinated prior to discharge to the environment. This is called a plant overflow.

PD-T-2 Review of Plant Flows, Influent and Imported Sewage Sampling and Monitoring

Review of 2025 Plant Flows

Table PD-T-1 below outlines the volume of sewage treated at the Port Dalhousie WWTP during the reporting year. It also outlines how much Imported Sewage was received at site for treatment.

Table PD-T-1: Table of Port Dalhousie WWTP Design Flows, 2025 Treated Flows and Reported Imported Sewage Volumes

Flow Statistic	Value
Design Average Daily Flow (ML/d)	61.350
Design Peak Flow Rate (ML/d)	122.700
Total Volume Processed (ML)	9,517.482
Annual Average Daily Flow (ML/d)	26.075
% Annual Average Daily Flow Utilization	43%
% Increase/Decrease over prior year	-11%
Volume Imported Sewage Received (ML)	0.000
% Increase/Decrease Imported Sewage over prior year	No Change
Imported Sewage as % of Flow	0.00%

Reviewing the treated flows in 2025, it was observed that, on average, the plant is utilizing 43% of its design Average Daily Flow capacity. This indicates that the facility has the hydraulic capacity to meet the needs of the collection system with room for additional future flows that may be added from development. Where the utilization becomes greater than 80%, plant expansion should be considered.

Daily flows to the plant were reviewed. In 2025, there were 10 instances where the flow to the plant was greater than the design Average Daily Flow, amounting to approximately 3% of the year. These instances occurred during times of wet weather or heavy snow melt. The Port Dalhousie WWTP collection system receives flow from a portion of combined sewers and is impacted by wet weather.

A review of the monthly average daily flow rate for the prior 10-year period was also completed. This can be observed below in Figure PD-T-1 below. There is a slight downward trend in average daily flow, but this may correlate to changes in precipitation amounts. Spikes during typical wet weather seasons further support increased flows are occurring due to remaining combined sewers and Inflow and Infiltration present in the collection system.

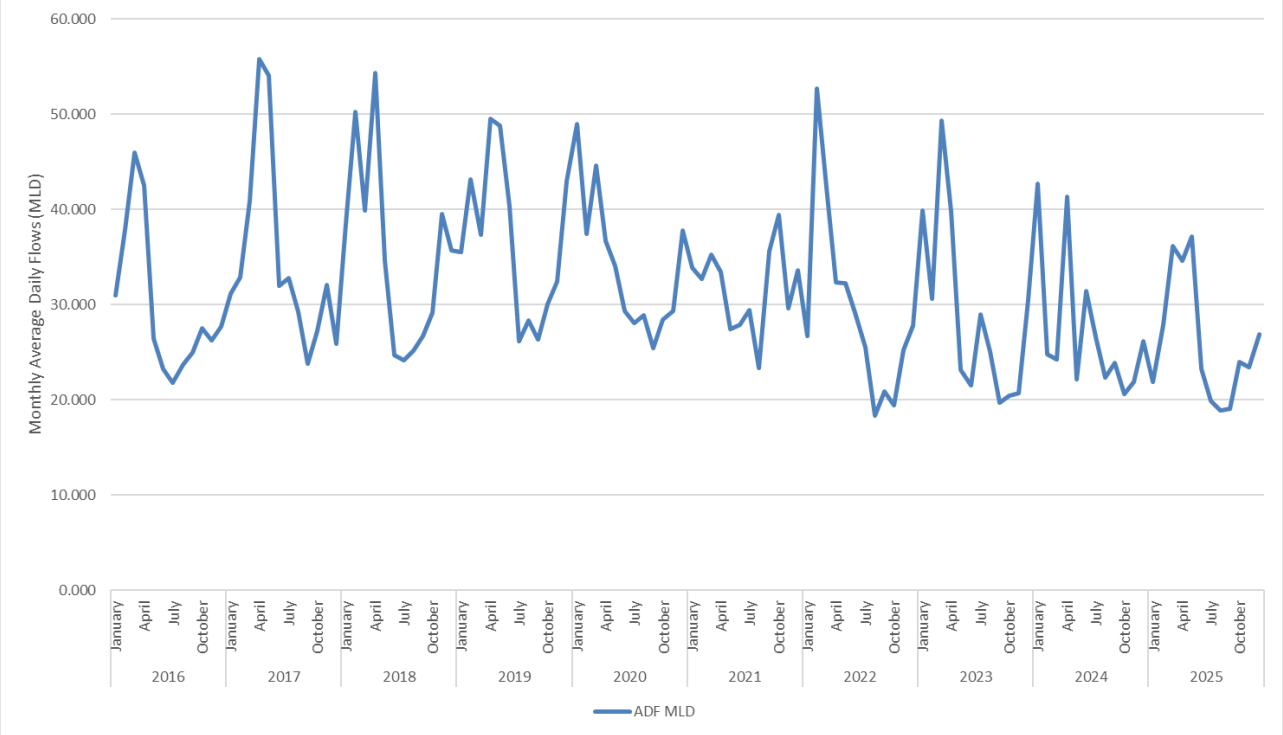

Figure PD-T-1: Graph displaying the Monthly Average Daily Flow Rate in Megalitres per Day (MLD)

Imported Sewage was not received at the Port Dalhousie WWTP in 2025.

Review of Influent Sampling and Monitoring Activities

In 2025, there were 107 samples of influent collected and tested. An annual summary of influent sampling can be observed in Table PD-T-3 below.

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 displayed as kilograms of pollutant per day or kg/d. Below in Figure PD-T-2, is a graph depicting four commonly monitored pollutant loadings to the plant for the period of 2023-2025.

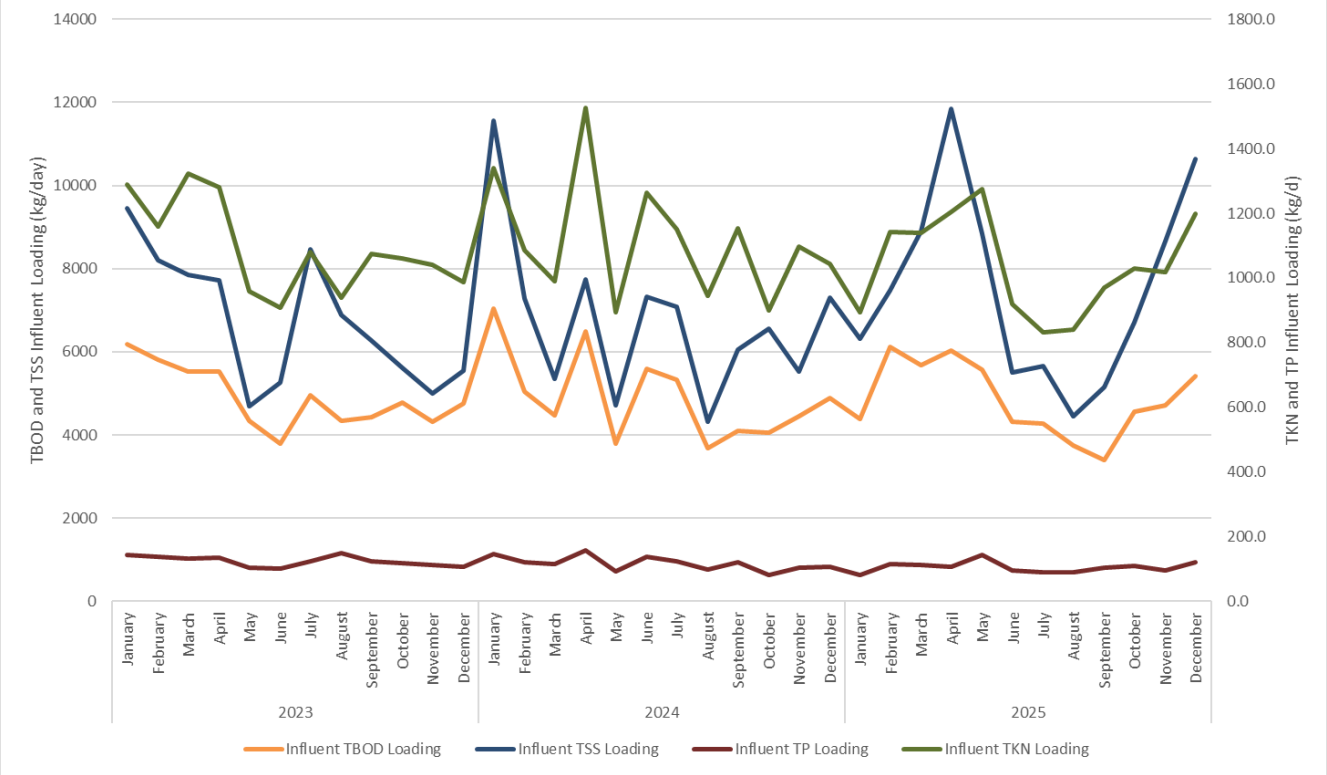

Figure PD-T-2: Figure of monthly plant loadings to the Port Dalhousie WWTP for Total Biochemical Oxygen Demand (TBOD), Total Suspended Solids (TSS), Total Kjeldahl Nitrogen (TKN) and Total Phosphorus (TP), in kg/d, for the period 2023 to 2025.

Reviewing the calculated loadings for TBOD, TSS, TKN and TP shows no significant changes in loadings.

Review of Imported Sewage Sampling and Monitoring

No imported sewage was received at the Port Dalhousie WWTP in 2025. No sampling or monitoring activities were undertaken.

Review of Final Effluent Sampling and Monitoring Activities

In 2025, 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 PD-T-2 below summarizes the number of monthly objective and compliance limit exceedances at the Port Dalhousie WWTP in the reporting year.

Table PD-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 Objective Concentration Exceedances	Number of Monthly Limit Concentration Exceedances	Monthly Loading Objective	Monthly Loading Limit	Number of Monthly Loading Objectives Exceeded	Number of Monthly Loading Limits Exceeded
pH [1]	6.0-9.5	6.0-9.5	0	0	-	-	-	-
Carbonaceous Biochemical Demand (CBOD)	15 mg/L	25 mg/L	0	0	920 kg/d	1,534 kg/d	0	0
Total Suspended Solids (TSS)	15 mg/L	25 mg/L	1	0	920 kg/d	1,534 kg/d	0	0
Total Phosphorus (TP)	0.5 mg/L	1.0 mg/L	2	0	30.7 kg/d	61.5 kg/d	0	0
Total Residual Chlorine (TRC) [2]	Non-detect	0.02 mg/L	1	1	-	-	-	-
E.Coli (*geomean*) [3]	200 MPN/100 mL	200 MPN/100 mL	0	0	-	-	-	-

[1] pH 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

The Port Dalhousie WWTP did not meet the ECA limit of 0.02 mg/L for TRC on May 22, 2025. This is discussed in detail below in section PD-T-3 Description of Operating Issues Encountered. No other compliance limits were exceeded in 2025.

Port Dalhousie WWTP did not achieve the monthly average objective for TP on two (2) occasions, June and August. The monthly average objective for TSS was not met in June 2025. Objective exceedances are attributed to the increased amount of centrate received at the facility.

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

- CBOD – 0%
- TSS – 7%
- TP – 17%
- E.Coli – 10%

Final Effluent sample results did not exceed the ECA objective greater than 50% of the time. The plant continues to provide effective treatment.

An annual summary of monthly average final effluent sample results can be observed in Table PD-T-3 below.

Table PD-T-3: Annual Summary of Port Dalhousie Plant and Imported Sewage Flows, Influent and Effluent Sampling and Monitoring Results

Measured Parameter	January	February	March	April	May	June	July	August	September	October	November	December	Total / Average	Samples Collected
Influent - Monthly Average TSS (mg/L)	289	268	246	342	238	237	285	236	271	280	369	396	288	
Number of Influent TSS Samples	9	9	9	9	8	9	10	8	10	8	9	9		107
Influent - Monthly Average TBOD5 (mg/L)	201	219	157	174	150	186	215	198	178	190	201	202	189	
Number of Influent TBOD5 Samples	9	9	9	9	8	9	10	8	10	8	9	9		107
Influent - Monthly Average TP (mg/L)	3.7	4.1	3.1	3.1	3.9	4.1	4.5	4.7	5.4	4.6	4.1	4.5	4.2	
Number of Influent TP Samples	9	9	9	9	8	9	10	8	10	8	9	9		107
Influent - Monthly Average TKN (mg/L)	40.84	40.88	31.54	34.80	34.31	39.54	41.87	44.51	50.94	42.91	43.40	44.62	40.85	
Number of Influent TKN Samples	9	9	9	9	8	9	10	8	10	8	9	9		107
Total Plant Flows (ML)	677.519	781.351	1,120.885	1,038.189	1,150.894	696.411	616.011	585.356	571.189	743.286	703.657	832.734	9,517.482	
Daily Average (MLD)	21.855	27.905	36.158	34.606	37.126	23.214	19.871	18.882	19.040	23.977	23.455	26.862	26.075	
Maximum Flow (ML)	32.739	70.566	83.727	121.962	112.658	42.060	35.139	42.564	33.590	65.596	41.547	87.495	MAX	121.962
Minimum Flow (ML)	18.966	18.012	22.503	21.584	20.735	18.501	16.355	16.277	16.170	16.105	18.121	16.889	MIN	16.105
Volume Imported Sewage Received (ML)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
Final Effluent - Monthly Average TSS (mg/L)	8.8	6.9	4.6	5.3	8.9	19.3	9.9	8.3	9.1	11.1	10.2	9.7	9.3	
Final Effluent - Average Daily TSS Loading (kg/d)	192	193	166	183	330	448	197	157	173	266	239	261	244	
Number of Final Effluent TSS Samples	9	8	9	9	8	9	10	8	10	8	9	9		106
Final Effluent - Monthly Average CBOD5 (mg/L)	4.0	4.1	4.0	4.0	4.0	4.8	4.0	4.0	4.2	4.3	4.1	4.6	4.2	
Final Effluent - Average Daily CBOD5 Loading (kg/d)	87	114	145	138	149	111	79	76	80	103	96	124	109	
Number of Final Effluent CBOD5 Samples	9	8	9	9	8	9	10	8	10	8	9	9		106
Final Effluent - Monthly Average TP (mg/L)	0.21	0.32	0.19	0.16	0.28	0.58	0.29	0.54	0.48	0.45	0.49	0.43	0.37	
Final Effluent - Average Daily TP Loading (kg/d)	4.59	8.93	6.87	5.54	10.40	13.46	5.76	10.20	9.14	10.79	11.49	11.55	9.60	
Number of Final Effluent TP Samples	9	8	9	9	8	9	10	8	10	8	9	9		106
Final Effluent - Monthly Average TKN (mg/L)	5.09	6.95	3.51	2.62	3.28	2.53	2.74	4.69	9.37	3.43	2.80	4.66	4.31	
Number of Final Effluent TKN Samples	9	8	9	9	8	9	10	8	10	8	9	9		106
Final Effluent - Monthly Average NH3 (mg/L)	3.49	4.78	2.38	1.30	1.05	0.41	1.14	2.64	7.50	1.41	0.87	2.73	2.48	
Number of Final Effluent NH3 Samples	9	8	9	9	8	9	10	8	10	8	9	9		106
Final Effluent - Monthly Average NO3 (mg/L)	14.63	13.61	9.36	7.98	10.05	12.76	14.08	15.03	12.40	12.76	14.53	11.73	12.41	
Number of Final Effluent NO3 Samples	9	8	9	9	8	9	10	8	10	8	9	9		106
Final Effluent - Monthly Average NO2 (mg/L)	0.49	0.40	0.49	0.81	0.49	0.44	0.42	0.43	0.56	0.43	0.41	0.46	0.49	
Number of Final Effluent NO2 Samples	9	8	9	9	8	9	10	8	10	8	9	9		106
Final Effluent - Monthly Geomean E.Coli (MPN/100mL)				49	46	11	9	14	17	15			19	
Number of Final Effluent E.Coli Samples				9	8	9	10	8	9	9				62

Measured Parameter	January	February	March	April	May	June	July	August	September	October	November	December	Total / Average	Samples Collected
Final Effluent - Monthly Average TRC (mg/L)				0.00	0.00	0.00	0.00	0.00	0.00	0.00			0.00	
Number of Final Effluent TRC Samples				30	31	30	31	31	30	31				214
Final Effluent - Monthly Average Temperature (°C)	11.28	10.71	12.02	13.09	15.79	18.57	22.85	23.08	22.01	19.95	16.54	12.93	16.57	
Number of Final Effluent Temperature Samples	9	8	9	9	8	9	10	8	10	8	9	9		106
Final Effluent - Monthly Average pH	6.90	6.79	6.84	6.89	6.94	6.79	6.72	6.74	6.87	6.75	6.83	6.90	6.83	
Number of Final Effluent pH Samples	9	8	9	9	8	9	10	8	10	8	9	9		106

Effluent Quality Assurance Measurements and Control Measures

To ensure Port Dalhousie 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 Sampling Days

Compliance sampling activities at the Port Dalhousie WWTP are scheduled 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.

In 2025, five (5) deviations from the scheduled sampling days occurred. Table PD-T-4 below provides the instances where a deviation occurred and a reason for the deviation.

The 2026 sampling schedule is available upon request.

Table PD-T-4: Table of 2025 sampling schedule deviations

Sampling Date Deviation	Sample Type(s)	Reason
2024-02-18	Final Effluent	Sample submitted the following day
2025-05-20, 2025-12-10	Influent, Primary Effluent, Final Effluent	Samples submitted the following day
2025-08-11, 2025-12-21	Influent, Final Effluent	Samples submitted the following day

PD-T-3 Description of Operating Problems Encountered and Corrective Actions Taken

Total Residual Chlorine Exceedance – May 22, 2025

A single sample Total Residual Chlorine (TRC) exceedance occurred on May 22, 2025, because of wet weather and sustained high flows at the Port Dalhousie WWTP. During this incident, a plant overflow was occurring, with flows greater than 122.700 MLD being diverted through the storm treatment process, which includes screening, chlorination and dechlorination.

Disinfection using chlorination (sodium hypochlorite) and de-chlorination (sodium bisulphite) was ongoing in both the regular plant process (flows up to 122.700MLD) and the storm treatment process. Both the regular and storm processes discharge into a common effluent channel to be de-chlorinated.

Upon the confirmed high TRC result, the operator investigated and found that the dosage of sodium bisulphite (SBS) was insufficient. Operations staff immediately increased the de-chlorination dosage and decreased the chlorine dosage. being limited by a maximum pump speed set point, resulting in insufficient dechlorination. T

Chemical dosage pumps are programmed to limit the maximum speed of the pump based on the flow rate of the plant (flow-pacing). This limitation is in place to avoid overdosing of chemical during high flow events. Further investigation of this incident revealed that the SBS pumps were flow-paced using only the plant effluent flow as an input, whereas the chlorination pumps are flow-paced based on both the plant effluent flow and the overflow volume. Since only the effluent flow is considered for SBS dosing, this lead to insufficient de-chlorination during the overflow event. As a corrective action, the SBS pump program was updated to include both the plant effluent and the overflow volume.

PD-T-4 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 Port Dalhousie WWTP:

- Replacement of primary sludge pump
- Replacement of west grit screw and wear bar
- Transferred sludge and cleared plugged piping in sludge loading tank
- Purchased three-way valve for digester
- Replacement of sprockets and main drive chain on east primary clarifier
- Replacement of #2 check valve, piping and hardware

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

Planned Capital Upgrades

The following is a list of capital upgrades forecasted for the Port Dalhousie WWTP:

- Primary digester clean out and instrumentation upgrade
- Waste gas burner replacement

Summary and Update of Notice of Modifications Completed

Through the facility ECA, 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 Notice 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 for the 2025 reporting period.

PD-T-5 Summary Calibration Activities

Flow Meter Calibration – Influent, Effluent and Imported Sewage

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

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

Meter Name	Date Calibrated	Comments
Port Dalhousie Storm Flow Meter	2025-09-09	Passed
Port Dalhousie Final Effluent Meter	2025-06-27	Passed
Port Dalhousie Final Effluent Meter	2025-11-03	Passed

Calibration certificates are available upon request.

The volume of Imported Sewage received at site is reported by the sewage hauler on submitted paper manifests. No calibration required.

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, calibration or verification on all effluent monitoring equipment is completed. A summary of annual calibration/verification activities are available in Table PD-T-6 below.

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

Equipment Description	Date Calibrated	Comments
Balance – 204TS	2025-08-13	Passed
COD Reactor (Hach DRB 200)	2025-09-15	Passed
Spectrophotometer (Hach DR2700)	2025-09-15	Passed
HQ40D Portable Meter with pH Probe	2025-09-15	Passed
HQ40D Portable Meter with DO Probe	2025-09-15	Passed
Pocket Chlorine Colorimeter	2025-09-15	Passed
Benchtop pH meter - Thermo	2025-09-15	Passed

Calibration certificates are available upon request.

PD-T-6 Solids Handling

Processed Organics Received

No processed organics were received at the site during the reporting year. Processed organics are not typically received at this site.

49.4 ML of centrate was received from the Niagara Falls WWTP for further treatment.

Volumes Sludge Generated and Removed From Site

Solids removed from the treatment process are digested and transported from site for further processing and beneficial re-use. All sludge removed from the Port Dalhousie WWTP is taken to Niagara Region's Garner Road Biosolids Facility where it is stored, further thickened and either sent for land application or for dewatering and conversion to a pelletized fertilizer. Table PD-T-7 provides a summary of 2024 and 2025 sludge volumes removed from site.

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

Month	2025 Volume Sludge Hauled (ML)	Prior Year Volume Sludge Hauled (ML)
January	7.284	6.938
February	6.808	6.027
March	7.588	6.721
April	7.761	6.200
May	6.634	5.507
June	6.721	6.721
July	6.331	5.854
August	6.504	6.070
September	4.856	4.900
October	5.810	6.591
November	6.114	9.322
December	7.588	7.284
TOTAL	**79.999**	**78.135**

A 2% increase in sludge removed from site in 2025 versus reporting year 2024 was observed.

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

Sludge Quality Monitoring

Digested sludge is sampled and analyzed bi-weekly to meet regulatory requirements of the Garner Road Biosolids Facility and Port Dalhousie WWTP 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. Average monthly results for 2025 biosolids analysis from the Port Dalhousie WWTP is included in Table PD-T-8.

Table PD-T-8: Summary of Monthly Average Sludge Results

Analyte	Units	NMA Limits	January	February	March	April	May	June	July	August	September	October	November	December
Total Solids	%	-	1.85	2.00	2.35	2.25	2.65	1.95	2.10	1.80	2.00	2.45	2.35	2.03
Ammonia as N	mg/kg	-	835.00	825.00	830.00	995.00	1020.00	900.00	940.00	855.00	870.00	950.00	960.00	906.67
Nitrate+Nitrite	mg/kg	-	1.00	1.00	0.99	1.00	1.00	1.00	0.99	0.99	0.99	1.00	0.99	1.00
Phosphorus	mg/kg	-	30,450	17,460	29,550	28,550	29,150	26,300	26,333	31,000	29,100	28,150	29,150	30,900
Arsenic	mg/kg	170	2.90	2.25	3.35	4.05	2.15	3.70	3.13	3.05	2.35	2.50	2.85	2.40
Cadmium	mg/kg	34	0.50	0.50	0.75	0.70	0.65	0.55	0.67	0.55	0.80	0.95	1.00	0.90
Chromium	mg/kg	2,800	70.70	61.00	71.75	69.40	64.25	71.20	70.73	62.95	64.90	64.00	57.60	60.80
Cobalt	mg/kg	340	2.85	2.40	2.70	2.85	3.05	3.25	2.90	2.85	3.25	3.00	2.95	3.07
Copper	mg/kg	1,700	543	510	498	500	512	479	478	482	533	552	522	536
Lead	mg/kg	1,100	24.50	23.00	39.50	30.50	35.00	26.50	24.67	23.50	25.00	26.50	23.50	21.67
Mercury	mg/kg	11	0.71	0.26	0.29	0.22	0.23	0.23	0.22	0.23	0.43	0.21	0.33	0.16
Molybdenum	mg/kg	94	7.50	7.00	7.00	7.00	6.00	6.00	8.33	10.50	11.50	10.50	10.00	10.33
Nickel	mg/kg	420	16.90	18.35	17.85	20.80	23.60	21.40	16.53	16.95	17.40	17.00	16.50	16.23
Potassium	mg/kg	-	6015	6860	7065	6860	6045	7250	5390	5420	5900	5205	4435	5723
Selenium	mg/kg	34	3.55	3.25	3.40	3.40	3.75	4.30	4.77	4.35	4.05	4.15	3.85	3.70
Zinc	mg/kg	4,200	621	537	620	647	650	598	614	638	702	690	627	613

PD-T-7 Complaints

Five (5) complaints were received in 2025 regarding the operation of the Port Dalhousie WWTP. When a complaint is received, operations staff attend the site to verify the complaint. Corrective actions are taken if required based on the site verification. All complaints and corrective actions are logged in a complaint tracking system

PD-T-8 Bypasses, Overflows, other situations outside Normal Operating, Spills and Abnormal Discharge Events

Bypasses and Overflows

There were seven (7) plant overflow events at the Port Dalhousie WWTP in 2025. Plant overflows from this facility receive preliminary treatment prior to discharge to the environment including screening, chlorination and dechlorination (between April 1 and October 31). Table PD-T-9 provides a monthly breakdown of overflow events occurring at the Port Dalhousie WWTP during the reporting period.

Table PD-T-9: Annual Summary of Plant Overflow Events by Month

Month	Number of Plant Overflow Events	Total Volume (ML)
January	0	0.000
February	0	0.000
March	0	0.000
April	1	58.804
May	3	28.246
June	1	8.838
July	0	0.000
August	0	0.000
September	0	0.000
October	1	21.422
November	0	0.000
December	1	24.473
Total	**7**	**141.783**

Overflow events are sampled and submitted for analysis. Overflow samples are collected at the start of each event and every eight hours for the duration of the event. Results for overflow samples are shown in Table PD-T-10 below.

Table PD-T-10: 2025 Port Dalhousie WWTP Plant Overflow Sampling Results

Date	T BOD (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)	E. Coli[4] (MPN/ 100 mL)
2025-04-02/ Event Start	74	181	1.20	13.3	5.19	0.90	0.10	800,000
2025-04-03/ Event 8 Hour	40	29	0.40	4.90	1.87	4.40	0.10	10,000
2025-04-03/ Event 16 Hour	40	22	0.30	3.90	1.47	3.60	0.10	10,000
2025-05-01/ Event Start	66	74	1.00	16.90	4.10	0.20	0.10	1,170,000
2025-05-16/ Event Start	126	111	1.40	12.80	5.50	0.90	0.40	1,790,000
2025-05-22/ Event Start	40	47	1.20	11.00	2.80	0.70	0.20	450,000
2025-05-22/ Event 8 Hour	40	39	1.50	5.80	0.70	2.20	0.10	10,000
2025-06-18/ Event Start	76	96	2.00	16.00	9.20	0.20	0.40	5,480,000
2025-10-07/ Event Start	51	108	2.10	18.30	9.00	0.40	0.10	5,480,000
2025-12-29/ Event Start	134	362	3.00	20.40	4.60	0.40	0.10	-
2025-12-29/ Event 8 Hour	40	31	0.90	6.70	2.80	2.40	0.10	-

[4] Sampling and analysis of E.Coli is required April 01 to October 31 annually

Situations Outside of Normal Operating Conditions

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

There were no situations 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 arise where a spill occurs due to equipment malfunction, failure or other reasons. Occasionally, a spill is required to safely complete required maintenance to critical equipment. If this is necessary, approval from the MECP is obtained in advance.

All spills are reported to the MECP Spills Action Centre upon discovery and follow up written reports are completed and submitted to the MECP and Environment and Climate Change Canada as required by regulation. Below in Table PD-T-11 summarizes spills that occurred at the Port Dalhousie WWTP in 2025.

Table PD-T-11: Summary of spills occurring at the Port Dalhousie 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.

There were no instances of abnormal discharges at Port Dalhousie WWTP in the reporting year.

PD-T-9 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 1.0 mg/L for TP.

As demonstrated above in section PD-T-2, in general, Port Dalhousie 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 4 mg/L, the observed annual average for TSS was less than 9 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 and F-5-5 – Bypassing from Combined Sewer Systems

The Port Dalhousie WWTP receives sewage from portions of the City of Port Dalhousie where combined sewer systems still exist. Procedure F-5-1 and F-5-5 require that a staged program be developed for the ultimate goal of total containment and treatment of all sewage flows.

Being a two-tier system, Niagara Region works closely with the City of St. Catharines, and the City of Thorold to reduce bypasses at the wastewater treatment plant. Pollution Prevention and Control Plans (PPCP) are undertaken by area municipalities with support and participation from Niagara Region. As well, Niagara Region undergoes a Master Servicing Plan every five years to identify areas that require I&I reduction or capacity increases based on expected development growth in the area. Both studies take into consideration impacts from wet weather and provide recommended actions to reduce wet weather overflows/bypasses.

Niagara Region participates in a cost sharing strategy with lower tier municipalities to fund overflow reduction projects and pollution prevention and control plan updates. In 2025, Niagara Region had an approved budget totaling $4.0M for the overflow reduction cost sharing program. One project was approved for cost sharing in the City of St. Catharines with Niagara Region contributing $743,700 to support sewer separation activities.

Excess Primary Treatment Capacity

F-5-1 allows for excess primary treatment where it is impractical or uneconomical to provide secondary treatment to wet weather flow. Port Dalhousie WWTP is not equipped with excess primary treatment capacity.

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 as well as 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.

PD-C-1 Overview of the Port Dalhousie WWTP Collection System

The Port Dalhousie WWTP collection system is a class IV system that collects wastewater from domestic, commercial and industrial sources from portions of the City of St. Catharines, and portions of the City of Thorold. The collection system consists of the following:

- Local sanitary sewers
- 21.7 kilometres of regional gravity mains
- 8.0 kilometres of regional force mains
- 14 pumping stations:
    - Cole Farm Sewage Pumping Station
    - Lighthouse Road Sewage Pumping Station
    - Lakeside Sewage Pumping Station
    - Eastchester Sewage Pumping Station
    - Argyle Sewage Pumping Station
    - Renown Sewage Pumping Station
    - Glendale Sewage Pumping Station
    - Wellandvale Sewage Pumping Station
    - Riverview Sewage Pumping Station
    - Beaverdams Sewage Pumping Station
    - St. Georges Point Sewage Pumping Station
    - Snug Harbour Sewage Pumping Station
    - October Village Sewage Pumping Station
    - Confederation Heights Sewage Pumping Station
- Three Combined Sewer Overflows (CSOs) on Niagara Region infrastructure and four CSOs upstream of Niagara Region infrastructure.

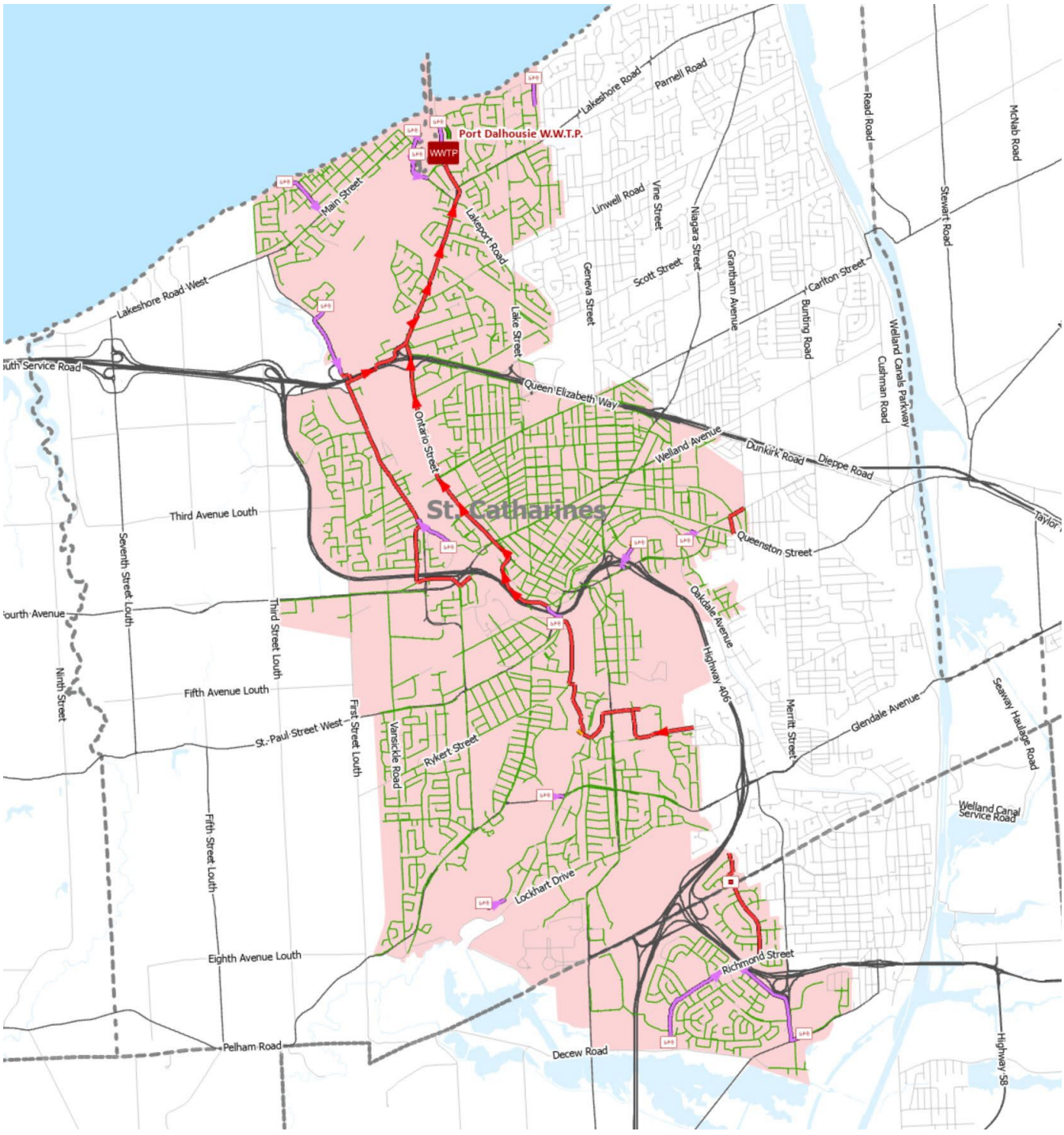

Figure PD-C-1: Map of Port Dalhousie WWTP Collection System

The collection system is operated under a two-tier system, where the area municipalities owns and operates local gravity sanitary sewers and Niagara Region owns and operates sewage pumping stations, forcemains, larger gravity sanitary sewers or trunk sewers and some sewage detention facilities. It is classified as a combined sewer system. This means there are

a small portion of pipes still remaining in the system that were designed to collect sanitary sewage and storm water in a single pipe. Combined sewers are no longer allowed to be constructed in Ontario and are being replaced with separate sewer systems as funding allows. Combined systems are heavily impacted during wet weather and snow melt events. While the majority of the collection system is separated, the separated system may still be impacted by inflow and infiltration from sources such as roof leaders, foundation drains, leaky pipes and joints and maintenance holes.

The collection system operates under the following Consolidated Linear Infrastructure ECA:

- Port Dalhousie Wastewater Catchment System, 007-W605, issue number 1

Annual reporting has been prepared to meet the requirements of this approval.

PD-C-2 Summary and Interpretation of Collection System Monitoring Data

Monitoring of Pump Station Operations

Pump stations operate through automatic control and are monitored continuously using Supervisory Control and Data Acquisition (SCADA). Stations alarms are programmed to alert the operations staff at the Port Dalhousie WWTP 24 hours a day of potential issues including but not limited to high wet well levels, pump faults, communication failures and standby generator status. Operators will respond to station alarms as required to ensure proper station operation.

Station operation is trended in SCADA. SCADA trends are reviewed daily by operations staff to evaluate station performance. Operators will look at pump cycle times, station discharge flow and pump duty rotation to identify potential issues. Where potential issues are identified, work orders are generated for follow up by maintenance staff.

In addition to SCADA monitoring, monthly station inspections are completed by operations staff. This includes inspection of the station and testing of standby generator equipment. In addition, starting in 2025, operations staff conducted fourteen (14) visual inspections of sanitary sewer overflow locations.

Sanitary Sewer Closed-Circuit Television Inspection Program

Niagara Region owns and maintains 151 kilometers of trunk sanitary gravity sewers, 175 kilometers of sanitary forcemains, and 2,093 sanitary access chambers across 11 municipalities. Approximately 85% of its conventional trunk sanitary gravity system is inspected using closed-circuit television (CCTV) once every three years. The remaining 15% is large

diameter trunk sewers which are inspected once every 10 to 15 years due to the necessity for specialized equipment to access and inspect sewers that have continuous high flow levels.

The table below details the total length of sewers inspected over the past four years.

Table PD-C-1- CCTV Program Summary

Measurement in Kilometers (km)	2022	2023	2024	2025
Inspection Length (km)	59.3	33.0	31.3	58.7

Observations from the inspections are recorded for structural and operational deficiencies of the pipes. Operational deficiencies (blockage from grease, roots, debris) are addressed through the cleaning/flushing program. Structural deficiencies (broken, fractured, surface damage, holes) as well as Inflow and Infiltration are forwarded for consideration in the asset management plan and capital upgrade program.

Flow Monitoring

Niagara Region monitors sewer flows at 158 locations. Flow monitoring information is used for municipal Pollution Prevention and Control Plans (PPCPs), Master Servicing Plans (MSPs) including the 2021 Water and Wastewater MSP, Inflow and Infiltration studies, billing, development planning, and capital project design.

PD-C-3 Summary of Operating Issues Encountered and Corrective Actions Taken

Pump Stations and Forcemains

An issue occurred in the forcemain servicing the Renown SPS in April 2025. This is included in Section PD-C-7 Collection System Spills below.

No other operational issues were experienced at the pump stations or associated forcemains in 2025.

Gravity Trunk Sewers

No operational issues were experienced in the gravity trunk sewers in 2025.

PD-C-4 Summary of Major Maintenance, Capital Projects and Pre-Authorized Alterations

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 in the Port Dalhousie Collection System:

- Renown SPS – Forcemain repair

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

Planned Capital Upgrades

The following is a list of capital upgrades forecasted for the Port Dalhousie Collection System:

- Beaverdam SPS upgrades and forcemain replacement – Construction to continue 2026
- Confederation Heights – Generator Replacement

Summary of Pre-Authorized Alterations Undertaken

Through collection system ECAs, MECP has given System Owners the ability to complete low risk changes to a sewage pumping station, forcemain or gravity main without requiring further approval from the MECP. These modifications are documented on an applicable MECP form and 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 pre-authorized modifications were completed.

No pre-authorized works were completed and therefore, there were no alterations that would pose a significant threat to drinking water.

PD-C-5 Summary of Calibration Activities

Collection system overflow meters are calibrated at minimum once per year. Other instrumentation used in process control is calibrated on an as needed basis. Table PD-C-2 below provides a summary of calibrations completed in the collection system in 2025.

Table PD-C-2 - Summary of Calibration Activities Undertaken in the Port Dalhousie Collection System

Equipment Description	Date Calibrated	Comments
No system calibrations required.		

Calibration certificates are available upon request.

PD-C-6 Summary of Complaints

Six (6) complaints were received in 2025 regarding the operation of the Port Dalhousie collection system. When a complaint is received, operations staff attend the site to verify the complaint. Corrective actions are taken if required based on the site verification. All complaints and corrective actions are logged in a complaint tracking system.

PD-C-7 Summary of Collection System Overflows and Spills

Collection System Overflows

The Port Dalhousie wastewater collection system is classified as a combined sewer system. This means the collection systems consists of a small portion of sewers that are designed to collect both sanitary and storm water while most sewers are separated. Collection system overflows occur during wet weather events due to combined sewers but also because of inflow and infiltration of storm water into sections of the sewage collection system that are separate. Overflows are necessary to prevent basement flooding and to protect downstream infrastructure and wastewater treatment processes.

Table PD-C-3 provides a summary of collection system overflows that occurred during the reporting year. The table includes volume discharge, overflow durations as well as pollutant loading to the environment. In some cases, no sample could be acquired due to the short duration of the overflow. These cases are indicated in the table as “NS”.

More information on sewage overflows and inflow and infiltration, is available on the Region’s website (www.niagararegion.ca/living/sewage/cso).

Table PD-C-3: Collection System Overflow Event Details

Overflow Location	Overflow Date	Overflow Volume (ML)	Overflow Duration (hhh:mm)	BOD Loading (kg)	TSS Loading (kg)	TP Loading (kg)	TKN Loading (kg)	E.Coli (MPN/100 mL)	Was the Overflow Disinfected (Yes/No)	Were Any Adverse Impacts Observed (Yes/No)	Corrective Actions Taken
Eastchester SPS	2025-04-02	1.044	3:20	NS	NS	NS	NS	NS	No	No	
Eastchester SPS	2025-10-07	0.106	0:20	NS	NS	NS	NS	NS	No	No	

Collection System Spills

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

All spills are reported to the MECP Spills Action Centre upon discovery and follow up written reports are completed and submitted to the MECP and Environment and Climate Change Canada as required by regulation. Below in Table PD-C-4 summarizes spills that occurred in the Port Dalhousie collection system in 2025.

Table PD-C-4: Summary of Spills Occurring in the Port Dalhousie Collection System

Spill Date	MECP Incident Number	Description of Spill	Link to Public Spill Report
2025-04-14	1-NQ7WFE	Renown SPS failed valve on forcemain	CWCD 2025-69 (https://www.niagararegion.ca/council/Council%20Documents/2025/council-correspondence-may-02-2025.pdf)

PD-C-8 Summary of Efforts to Reduce WWTP Bypasses/Overflows and Collection System Overflows

Projects Undertaken to Reduce Bypasses or Overflows

Being a two-tier system, Niagara Region works closely with the City of St. Catharines, and the City of Thorold to reduce overflows at the wastewater treatment plant. 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. One project was approved for cost sharing in the City of St. Catharines with Niagara Region contributing $743,700 to support sewer separation activities.

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)

Niagara Region has posted signs at publicly accessible sites close to overflow locations that warn about potential hazards and precautions on water use following wet weather. These precautions are not in place at all times but are recommended after wet weather when overflows may affect water quality and safety.

Figure PD-C- 2 - Image of Sanitary Sewer Overflow Public Signage