

Niagara Region 2023 Wastewater Annual Performance Report: Executive Summary

Purpose of the Executive Summary

Niagara Region owns and operates 11 active wastewater treatment facilities and 10 wastewater collection systems. Each wastewater treatment plant (WWTP) and collection system is required to complete a performance report annually for submission to the Ministry of the Environment, Conservation and Parks (MECP).

The purpose of this summary is to highlight the overall performance of all wastewater treatment and collections systems owned and operated by the Niagara Region. This summary includes the following information:

- Compliance performance
- Wet Weather Performance
- Summary of Spills
- Summary of Complaints
- Maintenance and Capital Upgrade Summary

A more fulsome coverage of plant performance by system is available in the system specific annual performance report.

Summary of Compliance Performance

Each wastewater system is regulated by a site-specific Environmental Compliance Approval (ECA) with defined conditions and requirements. Compliance performance for most facilities is determined by comparing monthly average final effluent quality to monthly average discharge limits outlined in the ECA. Effluent quality is determined by measuring carbonaceous biochemical oxygen demand (CBOD), total suspended solids (TSS), total phosphorus (TP), pH, E.Coli, total chlorine residual (TRC) and ammonia (NH₃) where applicable. When the monthly average of a measured parameter is greater than the ECA discharge limit, the plant is non-compliant and reported to the MECP. Samples of the influent and effluent are collected by licensed operators and sent to the Region's accredited laboratory for testing.

Table 1 below outlines wastewater system compliance performance for the reporting year 2023.

While most facilities are regularly achieving compliance, Niagara Falls WWTP, Baker Road WWTP, Port Dalhousie WWTP, Welland WWTP and Stevensville-Douglastown Lagoon had instances of non-compliance in 2023.

Table 1 - Summary of Plant Compliance Performance for 2023. “Yes” indicates all compliance limits were achieved for that month. Where “No” is displayed, this means one or more compliance limit was not met for that month.

System Name	January	February	March	April	May	June	July	August	September	October	November	December
Anger Avenue (Fort Erie)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Baker Road (serving Grimsby, Lincoln, West Lincoln)	Yes	Yes	Yes	Yes	No	Yes	Yes	No	Yes	No	Yes	Yes
Crystal Beach	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Niagara Falls	Yes	Yes	Yes	No	No	Yes	Yes	No	No	No	No	No
Niagara-on-the-Lake	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Port Dalhousie (serving St. Catharines and Thorold)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes
Port Weller (serving Niagara-on-the-Lake, St. Catharines and Thorold)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Queenston	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Seaway (Port Colborne)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Stevensville-Douglastown Lagoon ¹	Yes	Yes	Yes	Yes	No	No	No	No	No	No	No	No
Welland (serving Pelham, Thorold and Welland)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes

¹ While most facilities have a monthly average compliance limit, Stevensville-Douglastown has annual compliance limits for most parameters and seasonal compliance limits for ammonia. The table above indicates if a monthly average was above the ECA annual or seasonal average limit. The annual ammonia average limit for January through April and November and December as well as the annual ammonia average limit for May through October was not met.

Summary of Wet Weather Performance

All of Niagara Region's wastewater treatment and collection systems are influenced by wet weather events. The amount of wet weather entering the wastewater systems depends on a number of factors including:

- Volume, duration and intensity of precipitation events;
- Accumulation of snow/snow melt;
- The number of weather events and how close together the events occur;
- If the system was designed to collect sanitary and stormwater; and
- The age and condition of the sewers

Most of the wastewater collection systems across Niagara Region are considered separated or nominally separated and, in an ideal situation, would not be influenced by wet weather. System deficiencies such as connections of roof leader or foundation drains as well as leaky pipes, joints and maintenance holes can result in inflow and infiltration during wet weather. This increases flow to the sanitary sewer collection system. To protect downstream wastewater treatment plant processes and to prevent basement flooding, the wastewater treatment facilities and the collection systems have been designed to overflow to the environment in times of excess flow.

In 2023, a total of 77,356 million litres (ML) of wastewater received full treatment at Niagara Region wastewater treatment facilities. In the same period, a total volume of 2,021 ML of combined sewage was discharged to the environment with partial or no treatment during wet weather events. This equates to 97% of all wastewater collected receiving full treatment prior to discharge to the environment. Table 2 below summarizes overflow volumes for each wastewater system.

In 2023, Niagara Region contributed \$4.0M to support overflow reduction activities through a cost sharing program with local area municipalities. A total of 23 projects were approved for cost sharing in this reporting year. Details of activities related to the reduction of bypasses and overflows are included in each individual wastewater system performance report.

Table 2: Table summarizing wet weather overflow volumes and level of treatment by wastewater system for reporting year 2023.

Wastewater System Name	Total Volume of Plant Overflows with partial treatment (ML)	Total Volume of Plant Overflows with no treatment (ML)	Total Volume Collection System Overflows (ML)
Anger Avenue (Fort Erie)	7.536	-	0.070
Baker Road (serving Grimsby, Lincoln, West Lincoln)	21.441	-	34.193 ²
Crystal Beach	-	-	-
Niagara Falls	154.044	59.846	153.308 ²
Niagara-on-the-Lake	-	-	1.090 ²
Port Dalhousie (serving St. Catharines and Thorold)	208.395	-	-
Port Weller (serving Niagara-on-the-Lake, St. Catharines and Thorold)	336.870	-	0.624
Queenston	-	-	-
Seaway (Port Colborne)	6.395	-	2.101 ²
Stevensville-Douglastown Lagoon	-	-	-
Welland (serving Pelham, Thorold and Welland)	1,034.970	-	-
Total:	1,769.651	59.846	191.386

Wet weather discharges are included in each annual performance report and provide further details such as event date and sampling and analysis results.

Summary of 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.

Incidents of spills are reported to the MECP Spills Action Centre and Niagara Region Public Health upon discovery. Spills are investigated and written reports are submitted to the MECP and Environment and Climate Change Canada as required by legislation. Starting in April

² Total contains estimated overflow volumes where flow measurement is not available.

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2023, all spills are communicated to Regional Council through a memo included in the Councillors weekly correspondence distribution.

Table 3 below summarizes spills that occurred at a Niagara Region wastewater treatment facility or from a wastewater collection system. Further details regarding incidents of spill are included in each annual performance report where applicable.

Table 3: Table summarizing spills that occurred in 2023 at a Niagara Region wastewater treatment facility or from a wastewater collection system.

Wastewater System	Spill at Treatment Facility	Spill in Collection System
Anger Avenue (Fort Erie)	0	0
Baker Road (serving Grimsby, Lincoln and West Lincoln)	0	0
Crystal Beach	1	0
Niagara Falls	0	2
Niagara-on-the-Lake	0	0
Port Dalhousie (serving St. Catharines and Thorold)	4	0
Port Weller (serving Niagara-on-the-Lake, St. Catharines and Thorold)	1	1
Queenston	0	-
Seaway (Port Colborne)	0	1
Stevensville-Douglastown Lagoon	0	0
Welland (serving Pelham, Thorold and Welland)	0	3
Total:	6	7

Summary of Complaints

In 2023, a total of 19 complaints were received regarding the operation of wastewater treatment and collection systems across Niagara Region. When a complaint is received, Operations staff attend the site to verify the complaint. Corrective actions are taken as needed upon verification of any issue. Below in table 4 is a summary of the number of complaints received by wastewater system.

Table 4: Summary of complaints received in 2023 by wastewater system.

Wastewater System	Treatment Facility Complaint	Collection System Complaint
Anger Avenue (Fort Erie)	0	0
Baker Road (serving Grimsby, Lincoln and West Lincoln)	2	1
Crystal Beach	0	1
Niagara Falls	3	6
Niagara-on-the-Lake (NOTL)	0	0
Port Dalhousie (serving St. Catharines and Thorold)	0	0
Port Weller (serving Niagara-on-the-Lake, St. Catharines and Thorold)	3	0
Queenston	0	-
Seaway (Port Colborne)	0	1
Stevensville-Douglastown Lagoon	0	0
Welland (serving Pelham, Thorold and Welland)	0	2
Total:	8	11

Major Maintenance and Capital Upgrades

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 in table 5 is a summary of normal and emergency maintenance activities carried out on major equipment and capital upgrades for all Niagara Region wastewater systems.

This list does not include normal minor maintenance or preventative maintenance activities.

Table 5: Summary of major maintenance and capital upgrade by wastewater system. This does not include minor maintenance or regular preventative maintenance activities.

Wastewater System	Major Maintenance Completed	Capital Upgrades Complete or Ongoing
Anger Avenue (Fort Erie)	<ul style="list-style-type: none"> • Repairs to secondary clarifier gearbox and scum arm • Check valve replacement return activated sludge pump #2 • Cleaning of chlorine contact tank • Gravity belt thickener chicane replacement 	<ul style="list-style-type: none"> • Grit system upgrades • Rehabilitation of storm tanks • Upgrades to solids handling processes • Lakeshore Road SPS sustainability and capacity upgrade • Catherine Street SPS sustainability and capacity upgrade
Baker Road (serving Grimsby, Lincoln and West Lincoln)	<ul style="list-style-type: none"> • Rebuild of sludge loading pump • Major structural rebuild of secondary clarifier #2 • Woodview SPS – repair of pump #1 • Jordan Valley SPS – rebuild of pump #2 • Ontario Street SPS – rebuild of pump #2 	<ul style="list-style-type: none"> • Upgrades to biobed (odour control) • Plant capacity upgrade – environmental assessment and pre-design • Bridgeport SPS sustainability and capacity upgrade (completed 2023) • Jordan Valley SPS station and forcemain upgrade • Lakewood Gardens SPS station upgrade • Bal Harbour SPS station upgrades • Lake Street SPS station upgrades • Laurie Avenue SPS station upgrades • Victoria Avenue SPS forcemain upgrade • Woodview SPS station upgrade – environmental assessment and pre-design

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Wastewater System	Major Maintenance Completed	Capital Upgrades Complete or Ongoing
Crystal Beach	<ul style="list-style-type: none"> • Replacement of chain, flights, sprockets and cross collectors on the south clarifier • Improvements to generator and motor control centre room • Replacement and rebuild of return activated sludge pumps • Pump replacement at Shirley Road SPS 	<ul style="list-style-type: none"> • Shirley Road SPS station upgrades
Niagara Falls	<ul style="list-style-type: none"> • Ongoing maintenance and repairs to the Rotating Biological Contactor units • Rebuild of raw sewage pumps #1 and #2 • Cleaning of chlorine contact tank • Clean out of primary digester #1 • New pumps purchased for South Side Low Lift SPS • South Side High Lift SPS – rebuild of pump #4 • Repairs to wet well concrete at Lundy’s Lane SPS • Central SPS: <ul style="list-style-type: none"> ○ Replacement of discharge piping on all 5 pumps ○ Replacement of pump #2 check valve ○ Repair of electrical failure of pump #1 • St. Davids #2 SPS: <ul style="list-style-type: none"> ○ Replacement of pump #1 ○ Pump discharge piping replacement 	<ul style="list-style-type: none"> • Plant secondary treatment upgrades (currently in construction) • Plant solids handling upgrade
Niagara-on-the-Lake (NOTL)	<ul style="list-style-type: none"> • Refurbishment of digester mixing pump • Refurbishment of digester recirculation pump • Re-piping of Imported Sewage station discharge piping 	<ul style="list-style-type: none"> • Decommissioning of the Niagara-on-the-Lake Lagoon - ongoing • Hunter Farm (Line 2) SPS – sustainability upgrade (completed 2023)

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Wastewater System	Major Maintenance Completed	Capital Upgrades Complete or Ongoing
	<ul style="list-style-type: none"> • Rebuild of Imported Sewage pump • Rebuild of grit classifier drive • Lakeshore Road SPS – repair and rebuild of pump #1 	
Port Dalhousie (serving St. Catharines and Thorold)	<ul style="list-style-type: none"> • Repair and rehabilitation of primary clarifier chain and flights • Repair and rebuild of west clarifier raw sludge pump • Beaverdams SPS – repair and rebuild of pump #1 	<ul style="list-style-type: none"> • Plant secondary treatment upgrades (currently in construction) • Digester cleanout/instrumentation • Waste gas burner replacement • Beaverdams SPS station and forcemain upgrades • Cole Farm SPS station upgrades • Tupper Drive sewer relining project
Port Weller (serving St. Catharines, Thorold and NOTL)	<ul style="list-style-type: none"> • Repair and rebuild of east influent screw gearbox • Repair potable water system leak at plant • Rebuild of primary digester mixer #3 • Cleanout of primary digester, replace failed access hatch • Install piping and valves for future instrumentation upgrade on primary digester • Repair and rebuild of digested sludge pump • Rebuild of return activated sludge pump • Removal and rebuild of primary digester mixer (ongoing) • Refurbishment of waste activated sludge pump #1 motor 	<ul style="list-style-type: none"> • Chlorine/dechlorination system upgrades • Replacement of the Carleton Street SPS forcemain (completed 2023) • Spring Gardens SPS station sustainability upgrades
Queenston	<ul style="list-style-type: none"> • Aeration line replacement • Fabrication of equipment to support sustainability upgrade project and condition assessments 	<ul style="list-style-type: none"> • Plant sustainability upgrades

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Wastewater System	Major Maintenance Completed	Capital Upgrades Complete or Ongoing
Seaway (serving Port Colborne)	<ul style="list-style-type: none"> • Replacement of blower #1 • South primary clarifier head shaft replacement • Grit valve actuator replacement • Hot water boiler line repairs • Imported Sewage pump and area repairs • Rosemount South SPS – replacement of pump #1 and #2 • Fares street SPS pump rail replacement • East Side SPS biobed leachate pump replacement • Oxford SPS pump repair • Clarke Street SPS pump repair • Arena Street SPS pump repair • Main Street SPS pump repair • Rosemount North SPS pump replacement • Rebuild of Elm Street SPS biobed (odour control) - ongoing 	<ul style="list-style-type: none"> • Standby generator upgrade • Electrical upgrades • Ferric system upgrades (tank and piping replacement) • Biosolids handling and digester refurbishment • Influent channel repairs • City Hall SPS and forcemain upgrades • East Side SPS and forcemain upgrades • Oxford SPS capacity and sustainability upgrades
Stevensville-Douglastown Lagoon	<ul style="list-style-type: none"> • No major maintenance occurred in 2023 	<ul style="list-style-type: none"> • Maintenance project to remove sludge from cell #2 and rehabilitate lagoon banks followed by sludge removal and rehabilitation of cell #1 (currently underway)
Welland (serving Welland, Pelham and Thorold)	<ul style="list-style-type: none"> • Secondary clarifier #4 corner sweep and scum collection mechanism rebuild • Rebuild of secondary clarifier #2 chain, flights, sprockets and cross collectors • Grit classifier drive repairs • Aeration blower check valve replacement 	<ul style="list-style-type: none"> • Plant phase one secondary treatment upgrades (completed 2023) • George Street SPS station upgrades (completed 2023) • Quaker Road trunk sewer replacement • Emergency replacement of Dain City SPS forcemain (under construction)

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Wastewater System	Major Maintenance Completed	Capital Upgrades Complete or Ongoing
	<ul style="list-style-type: none"> • Return activated sludge pump #4 replacement including isolation and check valves • Replacement of boiler water recirculation pump • Repairs on primary digester #2 	<ul style="list-style-type: none"> • Dain City SPS station upgrades • Mill Street area sanitary sewer improvements • Broadway trunk sewer replacement