Niagara Region 2024 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 (NH_3) 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 2024.

While most facilities are regularly achieving compliance, Anger Avenue WWTP, Baker Road WWTP, Niagara Falls WWTP, Port Weller WWTP, Queenston WWTP, Stevensville-Douglastown Lagoon and Welland WWTP had instances of non-compliance in 2024.

Table 1 - Summary of Plant Compliance Performance for 2024. “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)	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Baker Road (serving Grimsby, Lincoln, West Lincoln)	Yes	No	No	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
Crystal Beach	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Niagara Falls	No	No	No	No	No	No	No	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	Yes	Yes	Yes	Yes	Yes
Port Weller (serving Niagara-on-the-Lake, St. Catharines and Thorold)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
Queenston	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	No
Seaway (Port Colborne)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Stevensville-Douglastown Lagoon[1]	No	Yes	Yes	Yes	No	No	No	No	Yes	Yes	Yes	Yes
Welland (serving Pelham, Thorold and Welland)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No

[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 2024, a total of 71,731 million litres (ML) of wastewater received full treatment at Niagara Region wastewater treatment facilities. In the same period, a total volume of 1,852 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 2024, Niagara Region contributed $2.0M to support overflow reduction activities through a cost sharing program with local area municipalities. A total of 12 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 2024.

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)	43.777	-	4.575
Baker Road (serving Grimsby, Lincoln, West Lincoln)	26.356	-	30.951[2]
Crystal Beach	-	-	1.538
Niagara Falls	182.201	105.863	198.455
Niagara-on-the-Lake	-	-	0.484[2]
Port Dalhousie (serving St. Catharines and Thorold)	139.234	-	-
Port Weller (serving Niagara-on-the-Lake, St. Catharines and Thorold)	399.620	-	8.872[2]
Queenston	-	-	-
Seaway (Port Colborne)	13.340	-	5.072[2]
Stevensville-Douglastown Lagoon	-	-	-
Welland (serving Pelham, Thorold and Welland)	691.935	-	-
Total:	**1,496.463**	**105.863**	**249.947**

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. All spills are

[2] Total contains estimated overflow volumes

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 2024 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	1
Baker Road (serving Grimsby, Lincoln and West Lincoln)	0	2
Crystal Beach	2	0
Niagara Falls	0	1
Niagara-on-the-Lake	0	0
Port Dalhousie (serving St. Catharines and Thorold)	0	2
Port Weller (serving Niagara-on-the-Lake, St. Catharines and Thorold)	2	1
Queenston	0	-
Seaway (Port Colborne)	0	0
Stevensville-Douglastown Lagoon	0	0
Welland (serving Pelham, Thorold and Welland)	2	1
Total:	**6**	**8**

Summary of Complaints

In 2024, a total of 44 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 2024 by wastewater system.

Wastewater System	Treatment Facility Complaint	Collection System Complaint
Anger Avenue (Fort Erie)	0	2
Baker Road (serving Grimsby, Lincoln and West Lincoln)	2	2
Crystal Beach	0	2
Niagara Falls	4	9
Niagara-on-the-Lake (NOTL)	1	1
Port Dalhousie (serving St. Catharines and Thorold)	2	1
Port Weller (serving Niagara-on-the-Lake, St. Catharines and Thorold)	12	1
Queenston	0	0
Seaway (Port Colborne)	0	1
Stevensville-Douglastown Lagoon	1	0
Welland (serving Pelham, Thorold and Welland)	0	3
Total:	**22**	**22**

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)	• Rebuild and install of secondary clarified #1 gearbox completed • Repairs to secondary clarifier #1 gearbox, scum arm, and framing • Aeration blower piping repairs • Aeration butterfly valve replacements • Repairs to flow diversion chamber valve • Mechanical bar screen repairs • Rebuild raw sewage pump #4 • Replaced variable frequency drive (VFD) on raw sewage pump #5 • Repairs to gravity belt thickener • Dominion Road SPS – rebuild pump #1, replace pump #2 VFD • Lakeshore Road SPS – rebuild of pump #2 • Rose Avenue SPS – rebuild of pump #2	• Rehabilitation of storm tanks • Cleanout of biosolids storage tank and valve replacement • Lakeshore Road SPS sustainability and capacity upgrade • Catherine Street SPS sustainability and capacity upgrade

Wastewater System	Major Maintenance Completed	Capital Upgrades Complete or Ongoing
Baker Road (serving Grimsby, Lincoln and West Lincoln)	• Replace mixer in aeration • Replace motor in primary clarifier #4 • Flush digester gas mixing lines • Odour control system upgrades completed in 2024. • Biggar Lagoon SPS - replaced air relief valve (ARV) on forcemain • Jordan Valley SPS – rebuild of pump #2 • Old Orchard SPS – install of new overflow meter • Grimsby Works Yard Sewage Detention Facility – replacement of overflow meter	• Plant capacity upgrade – environmental assessment and pre-design • Imported sewage receiving station improvements – pre-design • Bridgeport SPS – replacement of station pump • Jordan Valley SPS station and forcemain upgrade - design • Lakewood Gardens SPS station upgrade - design • Bal Harbour SPS station upgrades - design • Lake Street SPS station upgrades - design • Laurie Avenue SPS station upgrades – in construction • Victoria Avenue SPS forcemain upgrade - design • Biggar Lagoon SPS station upgrades- design • Streamside SPS station upgrades – design • Smithville servicing study
Crystal Beach	• Replacement of chain, flights, sprockets and cross collectors on the north clarifier • Clarifier gearbox repair/replacement • Repairs to gravity belt thickener • Replacement of final clarifier scum pump • Digester recirculation pump replacement • Grit snail gearbox replacement • Digester heat exchanger repair/replacement (ongoing)	• Shirley Road SPS station upgrades • Nigh Road SPS station upgrades • Erie Road SPS station upgrades

Niagara Falls	• Ongoing maintenance/repairs to Rotating Biological Contactors
	• Replacement of sludge draw off #5
	• Rebuild of channel blower #3
	• Replacement of rag press and #2 screw
	• Bar screen spring assembly repairs
	• Repairs to boiler #1 and #2
	• Repair of #5 screw conveyor
	• Rebuild of chain and flights in primary clarifiers #3 and #4
	• Replacement of coagulant mixer
	• Replaced motor in primary clarifier #1
	• Replacement of primary clarifier chain pins and retainers
	• Repairs to RBC bypass gate and valves
	• Digester effluent line replacement
	• Grit blower replacement
	• Replacement of coagulant pump
	• Rebuild of effluent pump #3
	• Cleaning of the chlorine contact tank
	• South Side Low Lift SPS – purchasing of new pumps
	• South Side High Lift SPS – rebuild of pump #4
	• Lundy's Lane – repairs to wet well concrete
	• Central SPS
	  ○ Replacement of discharge piping on all five pumps
	  ○ Replacement of check valve on pump #2
	  ○ Repair of electrical failure on pump #1
	  ○ Replacement of station programmable logic controller (PLC)
	• St. Davids #2 SPS
	  ○ Replacement of pump discharge piping
	  ○ Replacement of pump #1
	• Muddy Run SPS – installation of new overflow meter
		• Plant secondary treatment upgrades (currently in construction)
		• Bender Hill SPS station upgrade – design
		• Mewburn SPS station upgrade – design
		• Rolling Acres SPS – design
		• Thundering water trunk sewer rehabilitation – construction anticipated for 2025

Wastewater System	Major Maintenance Completed	Capital Upgrades Complete or Ongoing
Niagara-on-the-Lake (NOTL)	• Rebuild of digester recirculation pump • Ongoing repair efforts on final clarifiers • Replacement of motor on bar screen #1 • Gravity belt thickener drying belt and seals maintenance • Replacement of motor in final clarifier #2 • Replacement of plant sanitary pump #2 with spare, rebuild of removed pump • Replacement of hauled sewage station pump #1 with spare, rebuild removed pump • Rebuild of effluent water pump #2 • William Street SPS – rebuild of pump #1 • Lakeshore Road SPS – installation of new overflow meter	• Decommissioning of the Niagara-on-the-Lake Lagoon - ongoing
Port Dalhousie (serving St. Catharines and Thorold)	• Repair and rehabilitation of primary clarifier chain and flights • Repair and rebuild of west clarifier raw sludge pump • Lakeside SPS – repair of forcemain break and site remediation • Replacement of outfall pipe from Riverview Boulevard/Oakridge Avenue Combined Sewer Overflow	• Plant secondary treatment upgrades - completed in 2024 • Digester cleanout/instrumentation upgrade • Waste gas burner replacement – construction anticipated for 2025 • Improvements to chlorination/dechlorination pumping systems • Beaverdams SPS station and forcemain upgrades – construction anticipated for 2025 • Cole Farm SPS station upgrades – commissioning 2025 • Tupper Drive sewer relining project – completed in 2024

Wastewater System	Major Maintenance Completed	Capital Upgrades Complete or Ongoing

Port Weller (serving St. Catharines, Thorold and NOTL)	• Rebuild of aerator #2 motor
	• Rebuild of waste activated sludge pump #2
	• Replaced wheels and mounting brackets on east and west primary clarifier travelling bridges
	• Replacement of digester 3-way gas valve
	• Rebuild of raw sewage pump #3
	• Inspection on all mechanical aerators
	• Major repairs and concrete work on east primary clarifier
	• Locate and repair of potable water leak at plant
	• Repair and rebuild of east influent screw gearbox
	• Repair potable water system leak at plant
	• Peel Street SPS
	  ○ Rebuild of pump #2 and #3
	  ○ Repair of break in forcemain
		• Chlorine/dechlorination system upgrades – phase one 2025
		• Digester instrumentation upgrade – design – construction anticipated for 2025
		• Port Weller Optimization Study
		• Spring Gardens SPS station sustainability upgrades – construction anticipated for 2025
		• Glendale flume sustainability upgrade - design

Queenston	• Purchase of spare raw sewage pump	• Plant sustainability upgrades

Wastewater System	Major Maintenance Completed	Capital Upgrades Complete or Ongoing
Seaway (serving Port Colborne)	• Replacement of storm bypass actuator • Imported sewage receiving tank cleaning and pump replacement • Repairs to north and south primary clarifiers • Rosemount North SPS – pump replacement • Nickel Street SPS – pump replacement • Elm Street SPS – Rebuild of biobed odour control system • Omer SPS – installation of new overflow meter	• Standby generator upgrade - construction • Ferric system upgrades (tank and piping replacement) - construction • Influent channel repairs - construction • City Hall SPS and forcemain upgrades - design • East Side SPS and forcemain upgrades - design • Oxford SPS capacity and sustainability upgrades - design • Arena SPS station upgrades - design • Sugarloaf SPS forcemain replacement - design • Union Street SPS station upgrades - design
Stevensville-Douglastown Lagoon	• Replacement of blower #2 • Douglastown SPS – rebuild of pump #1	• Maintenance project to remove sludge from cell #2 and rehabilitate lagoon banks followed by sludge removal and rehabilitation of cell #1 – cell #1 rehabilitation completed in 2024

Wastewater System	Major Maintenance Completed	Capital Upgrades Complete or Ongoing
Welland (serving Welland, Pelham and Thorold)	• Grit classifier gear box and coupling replacement • Secondary clarifier #5 corner sweep and scum collection mechanism rebuild • Primary clarifier #4 cleaning, scum trough repairs and ongoing rebuild project • Return activated sludge pump #6 replacement including isolation and check valves • Screen and digester building electrical classification study and repair • Glycol heating system repairs • Repair of raw sewage pump #4 • Installation of digester mixing valve • Dain City SPS – replacement of forcemain air relief valve (ARV) • Conditions assessments completed on Ontario Road and Ridge Road siphons	• Primary digester #2 cleanout and instrumentation upgrade – completed in 2024 • Primary digester #1 cleanout and instrumentation upgrade – to be completed in 2025 • Ontario and Ridge Road Siphon Sustainability Upgrades – design • Quaker Road new trunk sewer installation – construction • Dain City SPS station upgrades – design • Mill Street area sanitary sewer improvements (in partnership with City of Welland)– completed 2024 • Broadway trunk sewer replacement (in partnership with City of Welland) - • 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) • Dain City SPS station upgrades • Mill Street area sanitary sewer improvements • Broadway trunk sewer replacement - construction